COMMUTER TRANSPORTATION SERVICES, INC.

THE 1979 SCRTD WORK STOPPAGE: THE EFFECT ON COMMUTING BEHAVIOR AND RESULTING CTS ACTIVITIES.

COMMUTER COMPUTER
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Commuter Transportation Services, Inc. is a non-profit corporation providing both commuter ridesharing services and regional emergency ridesharing services in Southern California, and is principally sponsored by CALTRANS, the Southern California Association of Governments, and the five counties of the South Coast Air Basin.

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INTRODUCTION

This study is the result of an evaluation of emergency ridesharing behavior which occurred in response to the Southern California Rapid Transit District's (SCRTD) 23 day work stoppage in Fall of 1979. The purpose of the study is to analyze commuter behavior and its subsequent effect on Commuter Transportation Services, Inc. (CTS), the ridesharing agency serving the affected region.

The primary goal of the evaluation was to examine the effects of the strike and then determine how CTS should prepare to expand service in the event of future transit emergencies.

COMMUTER TRANSPORTATION SERVICES

CTS is a non-profit corporation, formed in 1974 to address economic, environmental and mobility problems initially arising as a result of the 1973 Mid-East oil embargo.

During the period under review CTS concentrated its efforts on providing carpool matching information to registrants, who ideally began to rideshare once having received the information.

THE SCRTD TRANSIT STRIKE

The SCRTD transit strike began on August 26, 1979, and continued until September 18, 1979 forcing 1.25 million daily boarding passengers to locate alternate transportation modes for the duration.

CTS received 17,000 strike-induced calls for transportation information and 4,000 registrations for assistance during the course of the strike. A special, discrete "bus-strike"

registrant computer data file was created at the onset of the strike and kept separate from the ongoing registrant data base.

Thus, the strike afforded CTS the unique opportunity to compare characteristics of transit-emergency-induced registrants with "typical" CTS registrants.

THE EVALUATION

A major portion of the evaluation focuses on the analysis of needs, expectations, and travel behavior of transit-oriented commuters. The bases of these analyses are findings from surveys administered by CTS to three groups of commuters:

- the "bus-strike" registrant group, (registered with CTS as a direct result of the transit strike),
- the "transit-non-registrant" group, (SCRTD users affected by the strike who did not register with CTS), and
- the "typical" registrant group, (registered prior to and not influenced by the transit strike).

THE EFFECT OF THE SCRTD STRIKE ON CTS SERVICE

The effects of the transit strike manifested themselves both directly (i.e., increased demand for commuter telephone information), and indirectly (i.e., delays in anticipated program development and enhancement).

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* See Glossary in appendix for definition of these and other organizational and operational terms.

Experience gained during the onslaught of gasoline shortage-induced registrations in Spring 1979 enabled CTS to handle the bus-strike registrations with no long-term setbacks in overall productivity.

THE TRANSIT PATRON

Findings from CTS administered surveys indicate:

- The major difference in pre-strike travel behavior between the strike-induced registrant and transit users who did not register with CTS was level of dependence on SCRTD. Registrants used SCRTD primarily for home-to-work commutes.
- The majority of the transit users surveyed were able to solve their commuting dilemna.
    - 60% switched to some form of ride-sharing (47% carpooled).
    - 20% drove alone.
    - 7% were unable to travel.
- Carpool formation dates suggest that the strike registrant had fewer immediate carpooling opportunities than the non-registrant.
- Strike-induced carpools were smaller, travelled shorter distances and included fewer drivers than regular CTS carpools.
- The vast majority of strike-induced carpools disbanded immediately following resumption of SCRTD service.

- o "Bus-strike" registrants differ greatly from CTS's usual target market.* The most outstanding difference was a high percentage of female registrants. In addition, household income has found to be lower and occupation tended to be clerical rather than professional.
- o Education appears to be an important factor in whether a transit patron will call CTS during a strike. The percentage of college educated registrants was double that of non-registrants.

THE STRIKE-INDUCED REGISTRANT

Strike-induced registrants differed from typical registrants in source of awareness of CTS service and motivation for registering for assistance.

Since CTS marketing efforts are not aimed at transit riders, it was not unusual for survey responses to indicate that most registrants were reached through "secondary sources," primarily "word-of-mouth." Few transit registrants learned of CTS's services from their employers suggesting that a greater number of impacted transit patrons might be reached in future crises if more emergency information were disseminated through employers.

"Bus strike" registrants' motivation for calling CTS differed from that of typical and "gasoline-crisis" registrants.

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* The typical registrant for CTS services is male, college educated and approximately 40 year of age. He is generally employed in a professional capacity with an annual household income over $25,000.

Whereas typical registrants usually volunteer a ridesharing related reason for calling, (i.e., form or add to existing carpool) the majority of transit registrants surveyed offered "no way to work" suggesting that they were not actually aware of the services CTS provided. Those "bus-strike" registrants offering carpooling-related reasons for calling (e.g., want to carpool to work during the bus-strike) were most likely to enter into long-term carpools.

Matchlist Utilization

Compared with findings of the 1978 Carpool Evaluation and the Evaluation of the Gasoline Shortage (1980), matchlist quality (number of potential matches) was improved and matchlist turn-around-time was reduced.

The matchlist utilization however, was no higher than that of regular registrants. Common reasons for not using matchlist included:

1) matches were not "close" enough (distance), and
2) organizing driving arrangements would be too difficult.

"Spontaneous" carpool formation was very high, (without the use of matchlists) demonstrating motivation to carpool, yet "bus-strike" registrants appeared more apprehensive about contacting potential matches than "typical" registrants. There are a number of possible explanations for this observation:

- normal carpool driving arrangements (share drive) would be inconvenient to transit oriented commuters,

- o distance to meeting point may be beyond the normal threshold of transit users,
- o "crisis" induced carpoolers may not be carpooling by choice as compared to typical registrants, (supported by the finding that very few carpools survived after the resumption of SCRTD service),
- o a large proportion of the "bus-strike" registrants were women; earlier studies have indicated that women tend to require more information about potential carpool partners than men (Margolin & Misch), and
- o "bus-strike" registrants were less likely to be acquainted with any of the matches on their lists than typical registrants (who often find co-workers on their lists).

Handmatch Utilization

Only one finding from analysis of "handmatch" respondents given a low response rate (15% or 22 cases) was statistically significant. Commuters receiving handmatches were more likely to attempt to act on CTS given information than those only receiving matchlists. This could be attributed to several reasons, including:

- o more personalized service,
- o faster service, and
- o higher quality service.

Factors Affecting Carpool Formation

CTS was directly responsible for 9% of the carpools produced by the "bus-strike" registrant sample. A number of factors unique to the "bus-strike" group contributed to this seemingly low direct carpool formation rate:

- The need was immediate, and could not wait receipt of the matchlist.
- The high incidence of "passive poolers" (unable to provide automobile or share driving) complicated the organization of carpools.
- Perception of distance created a need for a partner who lived closer than 1.25 miles.
- The large percentage of regular registrants who make up most of the data base had longer commutes and were incompatible.

Long-Term Carpoolers

More than one third of the long-term carpoolers in the sample carpooled with a partner provided by CTS.

As a group, long-term carpoolers appeared more motivated to use CTS services as evidenced by the following findings:

- a larger percentage of long-term carpoolers used their matchlists than either short-term or non-poolers, and
- of those who did use their matchlists, long-term carpoolers attempted to reach a greater number of people than did short-term and non-poolers.

Suggested Improvements

Eighty percent of the suggestions for improved service were related to matchlist generation. They included:

- o more names on the matchlist,
- o "closer" matches (in terms of distance), and
- o speedier delivery

CRISIS-COMPELLED CARPOOLERS

Awareness of CTS services may have an indirect effect on whether or not an impacted transit patron will carpool during a transit strike. Those respondents aware of CTS were more likely to form carpools than those not, regardless of whether or not they called for assistance.

Source of awareness is also useful in predicting crisis carpooling. Although freeway signs are an effective introduction to knowledge of CTS under normal circumstances, they are not intended to motivate transit patrons to carpool. Media such as "word-of-mouth" and print/video are more effective in motivating or communicating service characteristics.

Those transit users who continued carpooling after the strike ended (long-term carpoolers) closely resembled the regular CTS carpooler in the following respects:

- o automobile availability,
- o education,
- o occupation, and
- o income.

THE EFFECT OF THE SCRTD STRIKE ON EMPLOYERS IN THE REGION

Prior to the onset of the work stoppage, a "Transit Emergency Information" kit had been developed for dissemination to employers located within the work grids serviced by the 10 most heavily travelled SCRTD bus lines.

Although the direct impact of the kits was lower than anticipated during the transit strike, overall response has been better. Since the materials are not "time specific" to the 1979 strike, their development will still be of value in future emergencies.

Employer responses to CTS administered surveys indicated that employers located within the impacted region were unaware of the level of employee dependence on SCRTD. The majority of those surveyed responded favorably to carpooling assistance in future transit stoppages.

CONCLUSIONS AND RECOMMENDATIONS

- Ridesharing may be the most viable alternative open to SCRTD transit patrons in the event of a transit work stoppage in the Los Angeles Metropolitan Area.
- Ridesharing is also the most popular alternative. However, the crisis-compelled ridesharer may not be ridesharing by choice (as evidenced by the limited number of carpools surviving beyond the transit strike).
- Despite the decreased demand for service, CTS was able to reach 90% of the crisis registrants within 7 days with a matchlist of potential ridesharing matches.

- Several elements of CTS operations became ongoing program elements. The Information Center is an example. These improvements have increased CTS's ability to assist commuters in future emergencies.

- Due to staff growth and the development of more efficient operations since the 1979 strike, CTS expects to be capable of handling increased demands of similar proportions in the future.

- For CTS to be effectively utilized as a source of assistance during transit work stoppages dissemination of information directed at transit patrons must begin prior to the transit interruption.

- Positive aspects or incentives which appeal specifically to transit users should be included in all marketing media. Among others, these include:

    .. transit patrons are already ridesharers,
    .. ridesharing is more relaxing than driving alone,
    .. carpooling often reduces travel time, and
    .. ridesharing is an inexpensive alternative.

- During transportation emergencies, CTS should continue to focus on ridesharing assistance to commuters. Attempting to assist callers with special needs, (e.g., medical appointments or shopping) would be beyond the scope of CTS's current expertise and diminish the effectiveness of the service for commuters.

CHAPTER 1

BACKGROUND AND INTRODUCTION

INTRODUCTION

This report is an evaluation of the impact of the 1979 SCRTD bus strike on commuter travel behavior and its subsequent effect on CTS services. The primary goal of the evaluation is to examine the implications for expanded service in the event of future transportation emergencies.

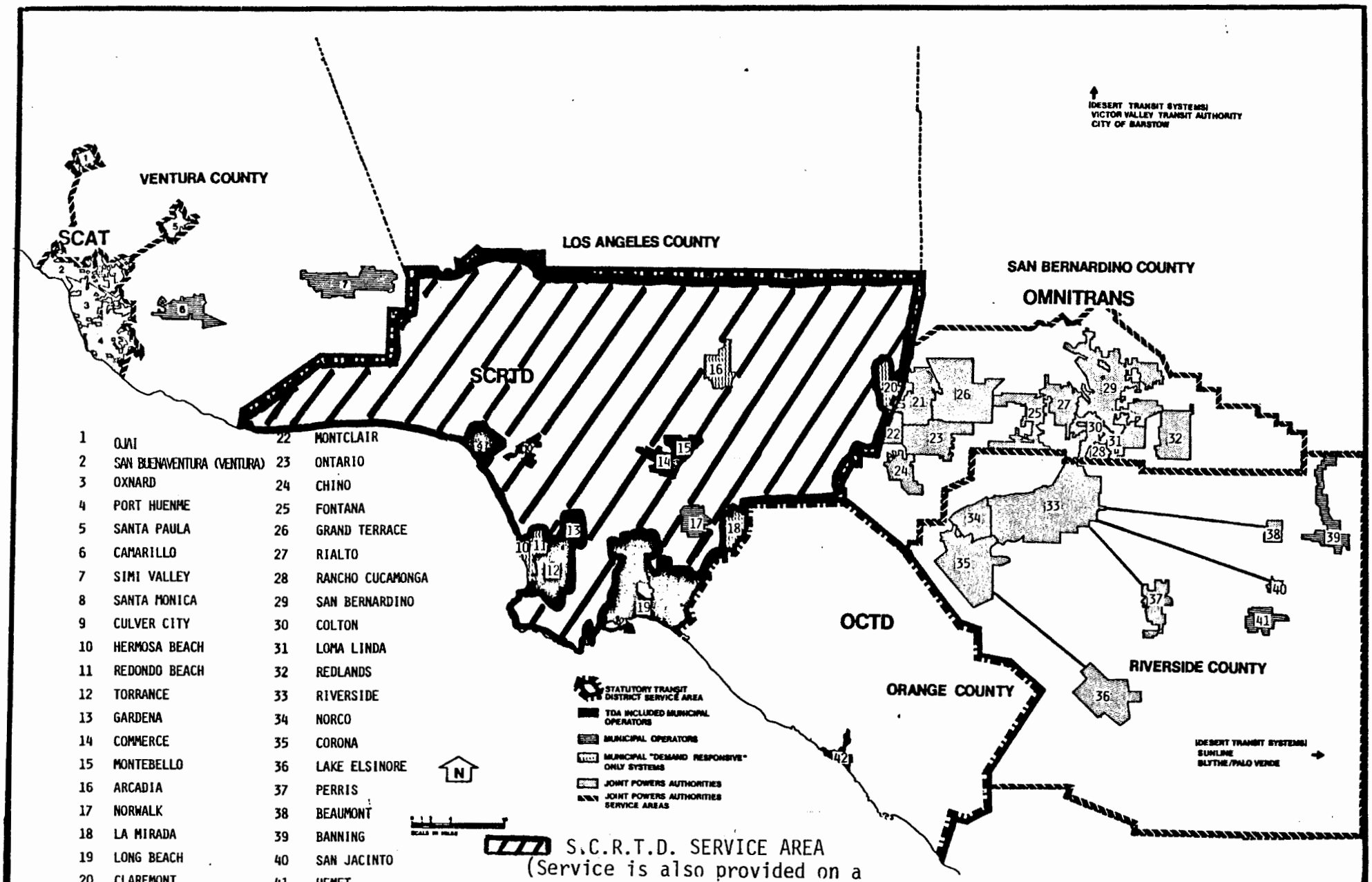
While evaluations of the impacts of strike-induced transit shutdowns are relatively scarce in the field of transportation research, strikes in the transit industry are becoming more common. Studies of transit strikes cover a number of concerns ranging from resulting economic impacts, (i.e., wages lost, retail sales) to influence on mobility of various targeted socio-economic groups. (See Brachman, et al.).

The importance of ridesharing and other transportation mode shifts occurring as a result of transit work stoppages should not be underestimated. Amidst fluctuating ridership trends, transit operating costs are increasing, as is labor union activity. The result has been an increased incidence of industry-wide strikes in recent years. In addition, there is a small but significant long-term decrease in ridership resulting from these transit strikes.

On August 26, 1979, the Southern California Rapid Transit District, (SCRTD), the third largest transit property in the nation in terms of ridership, was hit by a walkout of nearly 90% of its workforce. The stoppage forced 1.25 million daily boarding passengers within SCRTD's service area (2,280 square miles, comprised primarily of Los Angeles County but which also includes portions of other counties within the South Coast Air Basin) to find alternate modes of transportation for the duration of the work stoppage, (see Map 1). The strike continued

MAP #1

AREA AFFECTED BY WORK STOPPAGE



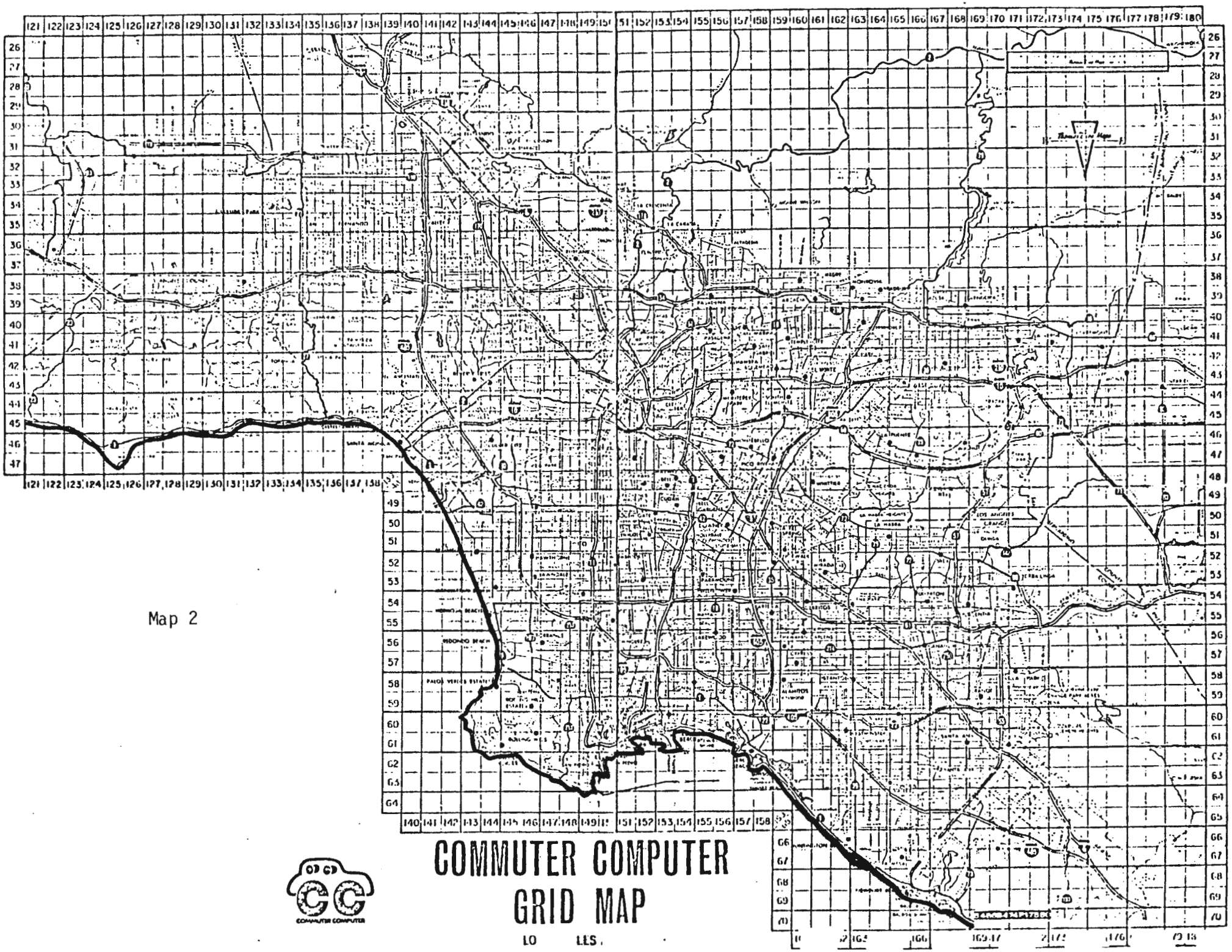
1	OJAI	22	MONTCLAIR
2	SAN BUENAVENTURA (VENTURA)	23	ONTARIO
3	OXNARD	24	CHINO
4	PORT HUENME	25	FONTANA
5	SANTA PAULA	26	GRAND TERRACE
6	CAMARILLO	27	RIALTO
7	SIMI VALLEY	28	RANCHO CUCAMONGA
8	SANTA MONICA	29	SAN BERNARDINO
9	CULVER CITY	30	COLTON
10	HERMOSA BEACH	31	LOMA LINDA
11	REDONDO BEACH	32	REDLANDS
12	TORRANCE	33	RIVERSIDE
13	GARDENA	34	NORCO
14	COMMERCE	35	CORONA
15	MONTEBELLO	36	LAKE ELSINORE
16	ARCADIA	37	PERRIS
17	NORWALK	38	BEAUMONT
18	LA MIRADA	39	BANNING
19	LONG BEACH	40	SAN JACINTO
20	CLAREMONT	41	HEMET
21	UPLAND	42	LAGUNA BEACH

from August 26th through September 18th (23 days), when 73% of SCRTD's 2,600 buses returned to service. Although less than 5% of the daily commute-to-work travel population had been served by SCRTD, there were obvious impacts on traffic congestion, mobility, air quality and commerce.

Commuter Transportation Services Inc. (CTS) is the regional ridesharing agency for the Greater Los Angeles Metropolitan Area which includes the counties of Los Angeles, Orange, San Bernardino, Riverside and Ventura. Consequently, its service area includes that region affected by the transit strike. Although the major focus of CTS's marketing effort is employer-oriented, ridesharing information and service to individual "dial-in" commuters is also provided, as is emergency travel information during short-term transportation "crises."

During the course of the transit strike, CTS received over 17,000 calls for information and assistance. CTS received an average of 500 calls a day in the first few days of the strike. In non-crises times this average is closer to 50. By day 5 of the strike the number of "dial-in" registrations reached 2,500, an increase of 500% over the total number of "dial-in" registrations for the entire month of August, 1978.

In March of 1979, CTS had implemented its "Energy Emergency Plan." The goal of the plan, to provide a "sufficient level of information in a timely manner on which commuters in the South Coast Basin (organizations and individuals) can act" was formulated primarily in anticipation of severe gasoline shortages in the coming months. Objectives for speeding up and increasing production of matchlists were also cited as part of the plan. Although drafted for a different type of transportation emergency, the plan was an excellent springboard from which to tackle the onslaught of ridesharing applications and calls of assistance received as a result of the transit strike.



Map 2

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GRID MAP

LO LES.

The strike posed a unique opportunity for CTS to compare the characteristics of transit emergency registrants and "typical" registrants. Thus, a major portion of the evaluation focuses on an analysis of the needs, expectations and emergency travel behavior of the transit-oriented commuters. This analysis is based on findings from surveys administered to "typical" registrants, "bus-strike" registrants, and SCRTD users who did not seek assistance from CTS, in conjunction with an extensive literature review of related materials.

This information, supplemented by various in-house data sources, will also be used to determine the effectiveness of the emergency service provided during the transit strike as well as its impact on ongoing CTS service and operations.

- COMMUTER TRANSPORTATION SERVICES

Commuter Transportation Services, Inc., CTS (or Commuter Computer) formed in 1974, is a private, non-profit corporation charged with addressing economic, environmental and mobility problems arising as a result of commuter travel patterns in the South Coast Air Basin (Los Angeles Metropolitan Area). CTS, with approximately eighty-five full-time employees, services an area encompassing ten million residents, 4½ million of whom are commuters.

The Company is governed by a board of directors representing public and private organizations within the five-county region. Funding is provided by the California Department of Transportation; the counties of Los Angeles, Orange, Riverside, San Bernardino and Ventura through their Federal Aid Urban Programs; the City of Los Angeles; the Southern California Association of Governments; and the private sector.

Employment in the Metropolitan area is decentralized, with 94% of all employment located outside of the Los Angeles Central Business District. In addition, the population distribution is widely dispersed, creating origin and destination commuting patterns that are very diverse. Over 90% of these commutes are made by automobile, and more than 80% with only one occupant.

CTS was created with the aim of serving commuters by relieving several environmental ills. CTS is directly concerned with the following problem areas via strategies focused on serving the commuter:

1) Energy Consumption
2) Air Pollution
3) Congestion
4) Commuter Costs
5) Commuter Mobility

These problem areas are addressed via the following action-oriented Corporate Goals cited in the Budget Report for Fiscal Year 1978/79.

1) Preparation of Commuters in the CTS Service Area for localized, regional and personalized emergencies which have the potential for reducing individual mobility;
2) Development of the Ridesharing Market Population as a viable transportation segment;
3) Assisting Commuters in the formation of regular shared ride arrangements.

CTS's basic objective of increasing ridesharing in Southern California has been achieved primarily through marketing efforts and promotional activities aimed at individual employers. As a result of these employer-directed efforts, 85% of all CTS's registrations for ridesharing are "company" registrants.

Although the major marketing thrust is employer-oriented, 15% of all requests for ridesharing assistance are the result of regional mass marketing efforts, including signs promoting car-pooling along freeways and freeway ramps. Those registrations arriving by mail or telephone are "dial-in/mail-in" registrants.

Prior to the SCRTD bus strike, the "dial-in" service was not a key element of CTS's marketing program. Therefore, two employees were able to handle incoming registrations, which averaged roughly 1,000 per month for the first half of 1979. All registrations, "company" and "dial-in" were then introduced into the data base and processed through identical computer channels. (See Appendix B for samples of registration forms).

The City of Los Angeles donates computer time for the processing of the registrations. The outcome of the registration process is a computer printed "matchlist" of potential ride-sharing partners (see Appendix B). The computer program is based on a grid system superimposed over a map of the entire serviced region. Each grid square is 1¼ miles on each side. Each applicant is "assigned" a "home grid" based on home address and a "work grid," based on work address. The computer seeks to match each registrant with others located within the same grids, with a plus-or-minus 30 minute work schedule variation. If no matches can be found, the program will automatically commence a search of the eight grids surrounding and adjacent to the home grid.

Since 1975, the Employer Registration program has increasingly focused on "Emergency Ridesharing" as a means of solidifying

employer commitment to employee transportation programs. The Southern California AQMD declares an air pollution emergency episode whenever atmospheric concentrations of pollutants exceed certain levels predesignated by state authorities as harmful to human health. These episodes range in severity from Stage I smog alerts (community requested to voluntarily reduce emissions by eliminating polluting activities); Stage II alerts (businesses, industries and government agencies with more than 100 employees are required by law to implement previously determined traffic abatement plans) and Stage III (business must close and give all non-emergency personnel the day off).

Commuters unwilling or unable to carpool regularly can turn to their "emergency" matchlist when Southern California Air Quality Management District (AQMD) Stage II smog alert requirements or personal emergencies generate a need.

The "Emergency Ridesharing Program" is supplemented by "regular" ridesharing matchlists for those interested in carpooling on an ongoing basis. Approximately 63% of all registrants also register for regular ridesharing. (See Appendix B for examples of matchlists). Depending on the source of the application, the entire "turn-around" time, from making a request to matchlist receipt required 10 to 30 days just prior to the transit strike.* (The company registration process is more involved and tends to take longer than the individual registration process).

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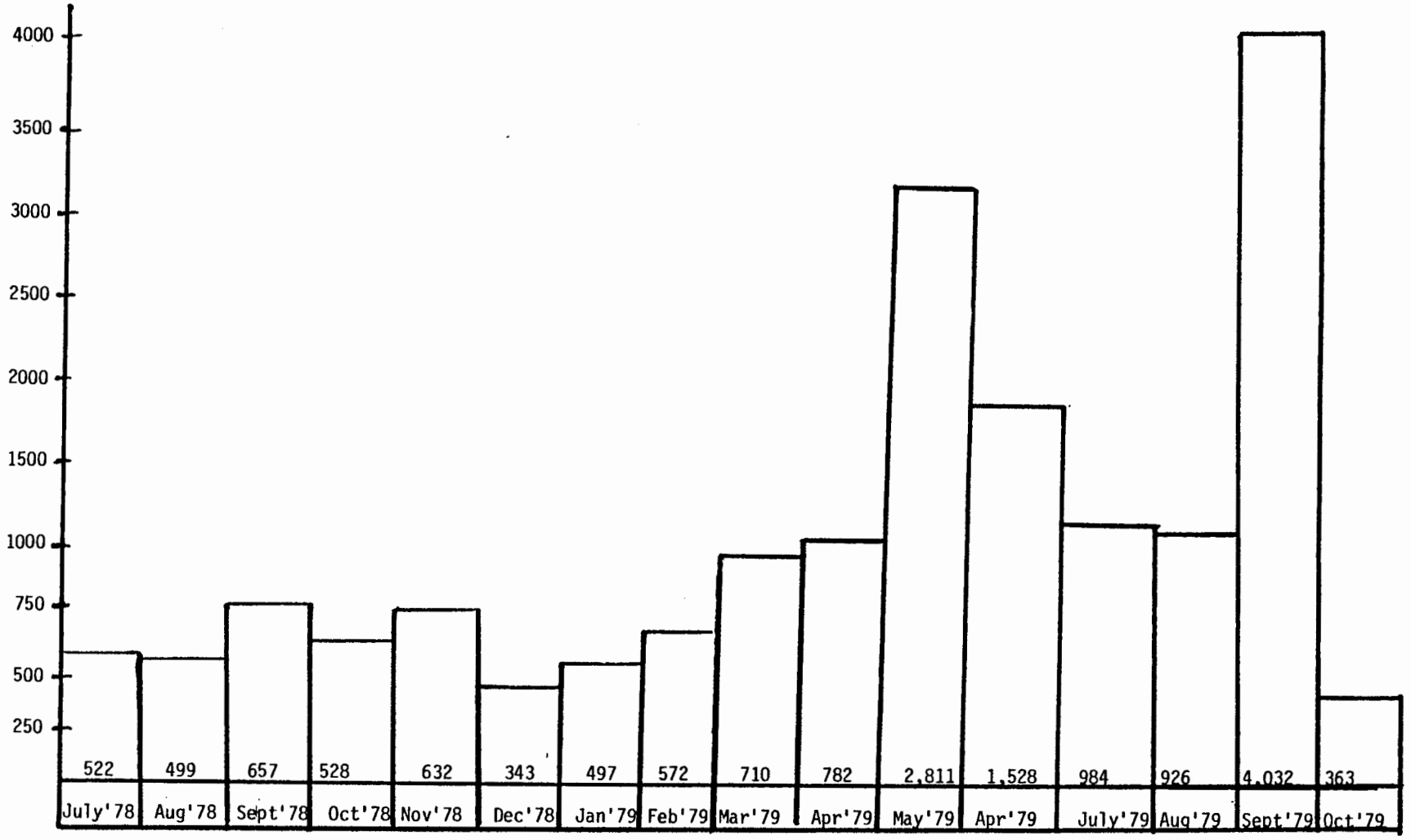
* Current turnaround time ranges from 5 days for individual requests to 15 days for employers with more than 1000 employees.



CTS DIAL-IN APPLICATIONS, JULY 1978 to OCTOBER 1979

FIGURE 1

The number of "dial-in" registrations received by Commuter Computer averaged under 600 a month during 1978. During the first half of 1979 this number increased to 1,000 per month, attributable mainly to the gasoline shortage which occurred during the sping (see Shu, J., 1980). This increase however, did not prepare CTS for the onslaught of "dial-in" registrations and requests for information brought on by the SCRTD bus strike. (See Figure 1).

SCRTD BACKGROUND

In April 1979 SCRTD began contract negotiations with representatives of the UTU (United Transportation Union, representing approximately 4,500 drivers), the ATU (Amalgamated Transit Union, representing approximately 1,200 mechanics) and BRAC (Brotherhood of Railway and Airline Clerks, representing approximately 485 clerical personnel). The contracts in question were due to expire at midnight May 31, 1979.

On May 29, the parties involved, unable to reach agreement, notified the State Labor Conciliator. As provided by law, Governor Brown appointed "Fact Finding Commissioners" on June 11th to study the issues and report recommendations for settlement.

The "Fact Finders" issued a preliminary report on August 6. Their final report, issued on August 15, was deemed unacceptable by the unions, and all three unions threatened to strike if SCRTD management followed the recommendations of the Governor's committee.

On Sunday, August 26, following a 10-day "cooling down" period mandated by state law, the entire SCRTD transit system was shut down. Approximately 1.2 million bus patrons were forced

to locate alternative transportation for the duration of the strike.

Although not actually misleading, press coverage of the negotiations had been optimistic that the strike would be averted. Furthermore, SCRTD management and all three unions had maintained that a strike would be avoided by extending the expired contracts on a daily basis while negotiations continued.

CTS PREPARATION

In anticipation of the transit strike, Commuter Computer began to operationalize the "Transit Work Stoppage Component" of its Energy Emergency Program in early July, 1979. The goal of the "Contingency Plan" was to "mobilize the work commute segment of the transit population into subscription buses, car-pools, taxipools, and vanpools, for the duration of the work stoppage."

The Energy Emergency Program was based on the following assumption:

> "In crisis situations, people (and organizations) will take self-help methods of forming shared rides (or shared ride programs), provided they have sufficient information on which to act."

In order to disseminate emergency transportation information to the public at large, primary channels of communications were identified, and resources developed for each.

a) A cooperative ad proof between Commuter Computer, SCRTD, and LACTC was readied for placement in the Los Angeles Times. (See Figure 2)

b) Employers requesting CTS's services, and/or located along SCRTD's ten most heavily travelled routes and selected commuter express lines, were to be sent a "Transportation Emergency Information" kit including self-help information for each employee to form carpools, posters and instructions for employee ridesharing registration. (See Figure 3)

c) Public officials and local public information offices were also to receive the emergency transportation posters, in addition to copies of "Action Information" brochures.

d) Information tabloids were to be distributed at various locations throughout Los Angeles county to reach stranded bus riders not employed at organizations receiving Emergency Kits and not aware of public information offices.

e) Mass media (print/broadcast) sources were to be sent copies of emergency transportation information posters as part of a comprehensive media coverage effort.

To serve the stranded SCRTD patrons most effectively, it was critical that carpooling information be made available as quickly as possible. CTS's experience in the 1976 transit strike demonstrated that the key element in minimizing match-list "turnaround" time was a substantial increase in the level

FIGURE 2
Cooperative Ad Proof

SAMPLE

HOW TO RIDE OUT THE BUS STRIKE.

COMMUTER ALTERNATIVES.

Take a good look at all the alternatives— there are at least eight better ways you can get to work in Los Angeles County.

One of them will work for you.

1 CARPOOLING. AND VANPOOLING.

You can set up your own carpool. Or Commuter Computer can help you with a Ridesharing Matchlist. Commuter Computer also operates a vanpool program, with a fleet of more than 130 vans. The program is designed primarily for commuters who travel longer distances to work, and some seats are available.

For more information, call Commuter Computer, (213) 380-RIDE.

HOW TO FORM A CARPOOL FAST.

Just follow these basic steps and you can form a fast, efficient carpool to work in less than a week.

1. Get the word out. Talk to friends. Put up signs in your company lunch room or on the company bulletin board. Don't forget to put up signs at other nearby companies and neighborhood centers, including the library and local supermarket.

2. Get together. Before you put the carpool on the road, call a brief meeting. Make a commitment to make ridesharing work for you. Then, discuss the practical questions—insurance, driving schedules, expenses and basic rules.

3. Set the rules. And stick to them. Chances are you're going to like the people you ride with. Still, it's important for the carpool to have rules. Some do's and don'ts you may want to discuss:

- Be on time.
- Get gas ahead of time.
- No personal detours, no matter how small.
- Make sure your car is in good running condition.
- Of course, drive carefully.
- Elect a Captain to resolve differences and coordinate changes if the unexpected happens.

4. You're on your way. Congratulations, your carpool is ready to roll.

2 PUBLIC BUS SERVICE.

Over 250,000 commuters now enjoy public bus service in Southern California every day. You'd be surprised. Depending on where you live and work, it's fast, economical—and more reliable than your own car.

Torrance Transit System.

The Torrance Transit System operates 33 buses on 19 lines in the South Bay area, including two to downtown Los Angeles. Basic fare is 35 cents. Transfers within the system are free.

Transfers to RTD, Long Beach, and Gardena buses cost 10 cents. Transfers are accepted from RTD, Long Beach, and Gardena buses.

For information, call 328-7402, or write to them at 3031 Torrance Blvd., Torrance, CA 90503.

Gardena Municipal Bus Lines.

The Gardena Municipal Bus Lines operates 32 buses on four lines, and will chauffeur you into downtown Los Angeles and portions of Compton, Willowbrook, and Lawndale.

Basic fare is 35 cents. Transfers within the system are free. Transfers to RTD and Torrance buses cost 10 cents. Transfers are accepted from RTD and Torrance buses.

For routes and schedules, write to them at 1700 W. 162nd St., Gardena, CA 90247, or call 324-1204 or 321-0165.

Santa Monica Municipal Bus Lines.

The Santa Monica Municipal Bus Lines operates 114 buses on 12 lines. Most of the service extends into Westwood, Venice, Century City, Pacific Palisades, Rancho Park, and Marina del Rey. On weekdays, there is direct service to and from downtown Los Angeles.

Basic fare is 25 cents, with token fare tokens at 5 for $1. Transfers within the system are free. Riders may transfer to buses operated by the RTD and Culver City Municipal Bus Lines for a cost of 10 cents. Transfers are accepted from the RTD and Culver City Municipal Bus Lines.

The Santa Monica Bus Lines... [illegible] of use are at a real bargain. A call to 451-5445 will get you routes and schedules, or you can write to them at 1620 Sixth Street, Santa Monica, CA 90401.

Culver City Municipal Bus Lines.

The Culver City Municipal Bus Lines operates 23 buses on three lines, including service to portions of West Los Angeles and Los Angeles International Airport.

Basic fare is 35 cents. Transfers within the system are free. Riders may transfer to buses operated by the RTD and the Santa Monica Municipal Bus Lines for a cost of 10 cents. Transfers are accepted from the RTD and Santa Monica Municipal Bus Lines.

For information, call 837-5211 or 559-8310. Or, write to them at 9820 Jefferson Blvd., Culver City, CA 90230.

Norwalk Transit System.

The Norwalk Transit System operates 26 buses on three lines and offers express service to Los Angeles International Airport.

Basic fare is 20 cents. Transfers within the system are free. Riders may transfer to RTD buses at a cost of 25 cents. Transfers to Long Beach Public Transportation buses cost 5 cents, payable when the rider boards the Long Beach bus.

For information, call 863-7077 or write to them at 11737 Plaza, Norwalk, CA 90650.

Long Beach Public Transportation Company.

The Long Beach Public Transportation Company operates 143 buses on 15 lines, and can also take you to portions of Lakewood, Paramount, Cerritos, and Compton.

Basic fare is 25 cents. Transfers within the system are free. Transfers to RTD and Torrance system buses are 10 cents. Transfers to Orange County Transit District buses are 10 cents, payable when you board the Orange County bus. Transfers are accepted from RTD, Torrance, Orange County and Norwalk (with a 5 cent payment) buses.

You can get information by calling 591-2301, or writing to the company at 1300 Gardenia Avenue, Long Beach, CA 90813.

Montebello Municipal Bus Lines.

Montebello Municipal Bus Lines operates 32 buses on nine lines, as well as a contract line in Santa Fe Springs. Eighty percent of the system's service is in Montebello, but buses can also take you to portions of East Los Angeles, Monterey Park, Pico Rivera and a small section of Rosemead.

Basic fare is 25 cents. Transfers within the system are free. Transfers to RTD and Norwalk buses are 10 cents. Transfers are accepted from RTD and Norwalk buses.

City of Commerce.

The City of Commerce operates 10 buses on four lines. Service is free. For information, call 722-4805, ext. 244.

Hermosa Beach.

One free bus on a single line serves the downtown area of the beach community. Call 376-6984.

3 TAXI SERVICE

Both the Southern California Rapid Transit District and the Orange County Transit District have parking lots set aside for people using these regional bus lines. Commuters can park in any one of 21 conveniently located parking lots, where express buses pick up passengers for longer freeway commutes.

A maximum one-way fare of $1.60 will carry you to or from downtown Los Angeles even if you live as far away as Canoga Park, West Covina or Pomona—with no parking expense at either end.

For information call the Southern California Rapid Transit District. Or, call the Orange County Transit District at 723-OCTD.

4 COMMUTER RAIL SERVICE.

Did you know that Amtrak operates a commuter rail service between San Diego and Los Angeles, through Orange County? They do. Call Amtrak for more information at (800) 648-3850.

5 PARK 'N CAR/ VANPOOL LOTS.

Special lots, sponsored by CALTRANS, provide centralized parking areas where commuters can meet to carpool to work. Easily accessible, these lots are located at convenient distant points from downtown areas. Here is a list of lots in Los Angeles County.

AGOURA
West of Kanan Road
Adjacent to Westbound Route 101

BALDWIN PARK
First United Presbyterian Church
4428 Stewart St. at Los Angeles St.

COVINA
United Methodist Church
437 N. San Bernardino Rd.

DIAMOND BAR
South side of Pathfinder Road
Between Brea Canyon Road and Route 57

DIAMOND BAR
Pomona Valley Land Company
Grand Avenue/Route 60

DOWNEY
Meralta Theater Parking Area
10912 S. Downey Ave.

EL MONTE
El Monte Fire Station Site
2613 Santa Anita Ave.

EL MONTE
First Christian Church
11025 Lambert Ave.

NEWHALL
West side of Via Princessa
South of Sierra Highway

POMONA
Air Spares Site
Garey at McKinley

SAN PEDRO
Stone Facility
Harbor Fwy./Channel St.

WILSHIRE
Congregational Church of the Messiah
7300 N. Manchester Ave.

WESTCHESTER
First Baptist Church of Westchester
8540 La Tijera Blvd./Manchester

WEST COVINA
Eastland Shopping Center
Route 10 and Barranca

WEST COVINA
K-Mart
W. Covina Parkway/Sunset Ave.

WEST COVINA
United Methodist Church
718 Azusa Ave.

WEST LOS ANGELES
National Guard Armory
1200 Federal Ave.

6 PRIVATE COMMUTER BUS LINES.

If you live in an outlying area, or you can get enough passengers together wherever you live, you can call a private bus service and arrange for a private bus to get you to work. It can be very economical. Your local private bus company can give you suggestions to help you get your private bus service organized.

These services are regulated by the Public Utilities Commission to insure mechanical safety, proper liability insurance coverage, and fare regulation. Following is a list of several of these operators.

Antelope Valley Bus, Inc. runs buses from the Antelope Valley, Santa Clarita Valley and San Fernando to El Segundo. Call (805) 948-8421 or 365-8555.

Con-Bus, in Huntington Beach, covers all of Los Angeles and Orange Counties, concentrating on the LAX Airport Area, South Bay, Hawthorne, Huntington Beach, and the West Side. They also have routes from Orange County to the Los Angeles Civic Center. Their numbers are (714) 846-3711, or (714) 522-1500 (24 hrs.).

Commuter Bus Lines operates all over Los Angeles and Orange Counties, chiefly in the LAX, Huntington Beach, Downey and Culver City areas. They are located in Long Beach, telephone (213) 428-1285.

Mark IV Charter Lines, Inc. travels from West Los Angeles to Huntington Beach in Orange County. They can be reached in Harbor City at (213) 775-8221.

7 TRY WALKING.

If you live less than three miles from work, you should give serious consideration to walking to work. Or jogging. Most of us can use the exercise. Try it one day a week at first, then two days, then three. Keep it part-time. Or work your way up to full-time. If you're not used to strenuous activity, talk with your doctor before you begin.

Once you get used to it you'll feel great.

8 RIDE A BIKE.

If you don't care to walk, try riding a bike. It's another great way to get exercise. And depending on your route and distance, it can be almost as fast as a car. Plus a lot easier to park.

AIRPORT TRANSIT.

Bus service to Los Angeles International Airport from Long Beach, the San Fernando Valley, Pasadena and Orange County.

Long Beach to LAX (213) 776-2142
Pasadena to LAX (213) 796-9108
Van Nuys to LAX (213) 994-5554
N. Orange County to LAX (714) 776-9210
S. Orange County to LAX (714) 581-3780

SPECIAL SERVICES.

Additional special transportation services are available in Los Angeles County for special needs.

Medical transportation.

Special medical transportation to hospitals and doctors' offices is available on an emergency basis both for medical emergencies and for regular patient care.

Medi-Cab provides van pick-up for wheelchair patients who need transportation to hospital or doctor appointments. Call (213) 370-1534.

Medi-Transit vans are available to get both wheelchair and ambulatory patients to doctor appointments, at the request of the attending physician. Their number is (213) 296-1024.

Senior Citizens and the Handicapped.

A number of agencies throughout Los Angeles County offer Dial-A-Ride transportation services for senior citizens and handicapped persons who cannot drive or for whom transportation alternatives are not practical.

Further information is available by calling the service in your area:

- Beverly-Fairfax-Hollywood-Wilshire-Westlake-West Adams-Venice—(213) 481-3910
- Greater Watts Demand Response Program—(213) 564-4401
- Harbor Area Shared Ride Taxi, Serving the San Pedro-Wilmington Area—(213) 549-6900
- North Hollywood-Northridge-Sepulveda-Van Nuys Senior Ride—(213) 822-0360
- Sunland-Tujunga Senior Ride—(213) 841-6022
- Adams-Exposition-Leimert-Baldwin Hills-South Vermont Senior Ride—(213) 754-3131.
- Eagle Rock-Atwater-Chapel Park Senior Ride—(213) 481-1550
- For general information about the senior rides above, call City Hall, Community Development Department Aging Division—(213) 485-4402
- East Los Angeles Dial-A-Ride for the Handicapped—(213) 263-5139
- Van Dial-A-Ride for the Transportationally Handicapped (East Los Angeles)—(213) 268-5101
- La Mirada Dial-A-Ride—(213) 943-6776
- Montebello Dial-A-Ride—(213) 724-2700
- Long Beach Public Transportation Company Special Services for the handicapped over 18—(213) 591-8753 ext. 21.
- City of Commerce Medi-Ride for medical appointments only—(213) 685-7363 ext. 220
- Norwalk Transit System Dial-A-Ride for the handicapped—(213) 863-7077.
- Pomona-Claremont Get About Transportation—(714) 593-7571.
- Compton Dial-A-Ride for the elderly and handicapped—(213) 639-6176
- Downey Dial-A-Ride for the handicapped—(213) 861-9216
- Lomita Dial-A-Ride for the elderly and handicapped—(213) 325-7110
- Lynwood Van Dial-A-Ride for the elderly and handicapped—(213) 537-0800 ext. 226
- Arcadia Dial-A-Ride—(213) 445-2211
- Manhattan Beach Dial-A-Ride for the elderly and handicapped—(213) 545-3500
- Redondo Beach Dial-A-Ride for the elderly and handicapped—(213) 372-1171 ext. 282
- Monterey Park Dial-A-Ride (213) 573-1211.

Other information on transit services for senior citizens is available from Senior Line (213) 488-1133.

In addition, Bay City Transit provides van pick-up for the handicapped. Call (213) 881-9890.

Emergency rides for the blind are available from Actives Blind, Inc. Their number is (213) 936-9110.

ADDITIONAL INFORMATION

You can get information by calling any of the following toll-free telephone numbers. If the number is busy during the day, try calling before 8 AM or after 8 PM.

- Central Los Angeles and Hollywood—626-4455
- Alhambra, Arcadia, West Covina, El Monte, Monrovia, Montebello, San Gabriel, Covina, Sierra Madre—443-1307
- Canoga Park, Mar Vista, North Hollywood, Reseda, San Fernando, Santa Monica, Sun Valley, Van Nuys—781-5890
- Burbank, La Crescenta, Glendale, Pasadena, Sunland, Tujunga—246-2593
- Compton, Lomita, Long Beach, San Pedro, Torrance—639-6800
- El Segundo, Gardena, Hawthorne, Inglewood, Redondo Beach, Marina del Rey—973-1222
- Pomona, Montclair, Chino, Claremont, Ontario, La Verne, San Dimas, Walnut, Diamond Bar, Cucamonga—(714) 620-1871

If you're in the area, you can also visit one of the local RTD offices to obtain passes, schedules, and other information.

- Main Office: 425 S. Main Street, Los Angeles
- ARCO Plaza: 505 S. Flower Street, Los Angeles
- RTD/Greyhound Station: 208 E. Sixth Street, Los Angeles
- Hollywood Office: 6249 Hollywood Boulevard, Hollywood
- El Monte Station: 3501 Santa Anita Avenue, El Monte

Of course, you can also write to the RTD, Los Angeles, CA 90001 for fare and schedule information. They usually are able to handle requests within 48 hours.

For more information on Commuter Computer ridesharing registration and matchlist services available direct through your company, contact your company's Personnel Office.

For additional information on other ridesharing opportunities in your area, contact Commuter Computer. In Los Angeles County call 380-RIDE. In Orange County 834-RIDE. In San Bernardino/Riverside Counties 825-RIDE. In Ventura County 647-RIDE.

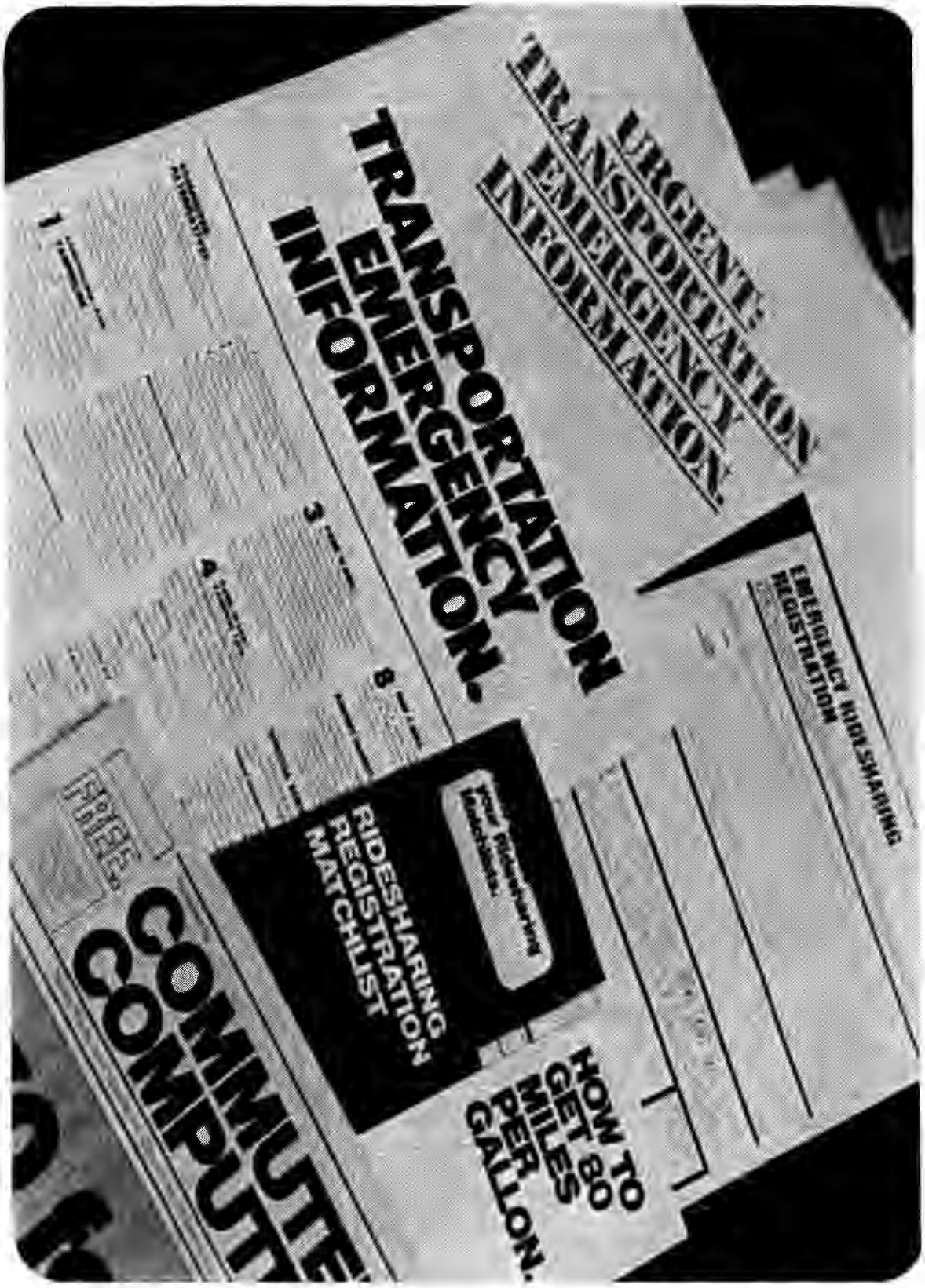
Commuter Computer, 3440 Wilshire Blvd., Suite 610, Los Angeles, CA 90010.

Jack Gilstrap

Arthur A. Schreiber

Commuter Computer is a non-profit corporation providing both commuter ridesharing services and regional emergency ridesharing services in Southern California, and is funded primarily by CALTRANS, the Southern California Association of Governments (SCAG), and the four counties of the South Coast Air Basin.

Figure 3
Contents of the "Transportation Emergency" Kit



of data processing service provided by the City of Los Angeles to improve efficiency in the face of the increased demand. Communications with political and departmental officials at the City of Los Angeles ensured sufficient computer access to meet any increased needs.

Strategies were developed to accommodate the anticipated needs of the transit users. To respond to the increased number of "dial-in" requests for assistance, CTS planned the following:

a) hiring of additional (temporary) telephone clerks, (including several Spanish speaking)...

b) installation of additional telephone lines at the L.A. office...

c) installation of additional telephone stations for call-back purposes at a separate location donated by CALTRANS...

c) rental of furniture to accommodate the added personel...

e) development of protocol for answering the call-in information and ridesharing requests...(See Appendix B)

f) development of a comprehensive transit referral listing... (See Appendix B)

g) training of <u>all</u> CTS employees in telephone procedures...

h) additional keypunching assistance...

i) development of special recording, processing and routing of applications for speedier and more efficient production, and the creation of a unique "bus-strike" registrant file.

Funding for the work stoppage related operations was provided by the Los Angeles County Transportation Commission's Energy Emergency funds.

The proposed budget needed to operationalize and maintain the "Transit Work Stoppage Component" for two weeks was $67,000. These costs would increase to over $77,000 in the event the strike continued through four weeks.

Due to the uncertainty of whether or not a strike would in fact occur, CTS's strike plan had to remain one of preparedness rather than action. Negotiations continued until the very last minute and there were real possibilities that the strike might successfully be averted.

These possibilities did not materialize however, and because authorization to use emergency funds could not be granted until an emergency in fact occurred, many of the plan's components were not realized until several days into the strike. Specifically:

- Temporary personnel could not be hired in advance and trained, and
- Emergency related materials could not be sent out.

RELATED LITERATURE

The purpose of this section is to acquaint the reader with prior transit strikes and their resulting impacts on transit behavior. This will be followed by and integrated with findings from studies concerning ridesharing behavior and marketing techniques in order to familiarize the reader with some of the theoretical foundations upon which much of this evaluation is

based.

"Impacts of Strikes on Transit Riding"

In the late 1960's the consulting firm of Simpson and Curtin conducted an analysis of transit strikes by 18 transit operators. The report concluded that there was a direct relationship between system ridership loss and length of the transit strike. Furthermore, a procedure was developed to estimate this loss.

The report concluded that:

- there is no discernable permanent loss in ridership following strikes of less than one week.
- for strikes lasting longer than one week, ridership loss during the first two post-strike months, can be estimated as 2% of the projected ridership for each week the strike lasts; 1.5% per week for the next three months; and 1% per week of strike for the balance of the first post-strike year.

1966 N.Y.C. Transit Strike

In 1966, the consulting firm of Barrington and Company evaluated the impact of a work stoppage by seven New York City transit properties from January 1 to January 13, 1966. The study's purpose was "to establish the effect of the strike on the public and on its furture travel patterns," (cited in Brachman, et al.).

The study, based on 10,400 telephone and home interviews concluded that after the strike ended:

- o 2.1% of regular transit using commuters in the four major boroughs did not return to the system,
- o the "non-returnees" were generally from younger, more affluent white-collar households, who had driven their own cars during the strike rather than carpool, and
- o 5% of the suburban users stopped using the city transit system for any purpose.

1967 Madison Bus Company

Box and Jenkins developed a stochastic model with which to measure strike effects on bus ridership levels. The basis of the study were data obtained during a 63-day work stoppage occurring in 1967 in Madison, Wisconsin, and a model for forecasting transit demand in the event of no service cessation. Passenger losses attributed to the strike were obtained by comparing the actual with forecasted post-strike demands.

Results indicated with a "fairly high degree of confidence" (Brachman, et al.), that ridership losses of up to 17.9% in the two years following the strike were caused solely by the strike.

1972 Transport of New Jersey Bus Strike

Transport of New Jersey (TNJ), is one of the largest commuter bus systems in the nation. Over 700,000 fares are

collected daily, with more than half either originating or terminating in Manhattan. In Spring of 1972, TNJ's drivers called a strike which lasted 75 days.

The effect of the bus strike on the modal choice of commuters was examined in a Master's thesis at Northwestern University in 1974. Data were collected through a mail survey and from TNJ records.

The area serviced by TNJ contained several competing transportation modes, including other bus lines and commuter rail. The study found that:

- a 20% decline in patronage several weeks after the strike's settlement occurred,
- during the strike there was a significant shift to competing bus modes and a marginally significant shift to carpools and commuter rail,
- more rail users remained in their newly found mode than did bus users, and
- the automobile was the least popular alternate mode.

1974 Southern California Rapid Transit District Transit Work Stoppage

Bigelow-Crain Associates conducted a study of the 1974 SCRTD work stoppage (which lasted ten weeks) to evaluate its effects on mobility and commerce in the impacted area. Interviews, a number of surveys, traffic data, and a carpooling report were utilized, with state-wide data used as a control.

The report findings included:

- o an increase in automobile occupancy rates in the downtown area from approximately 1.35 to 1.5 persons per car,
- o monetary impacts on employment and retail sales,
- o transit dependents, particularly the poor, handicapped and elderly were hardest hit,
- o the appearance of major congestion on selected freeways and arterials feeding into the downtown area, although regional traffic flow effects were small, and
- o a gradual recovery of most or all of pre-strike ridership.

A second study concerned with the 1974 SCRTD strike was conducted by CALTRANS (the California Department of Transportation). This study, one of the few concerned with the effects of transit strikes on ridesharing behavior, specifically examined the use of a designated freeway lane by carpools. For the duration of the strike, the El Monte Busway preferential lanes of the San Bernardino Freeway (I-10) were converted into official carpool lanes for carpools of three or more displaying official permits. Findings, based on occupancy counts of number of persons per vehicle, speed runs by floating car method, and volume counts before, during and after the strike revealed that:

- o the strike caused up to 15 minutes additional delay in travel time,
- o 1620 special carpool permits were issued,
- o the carpool lanes resulted in a 6 minute improve-

ment in travel time on the regular freeway lanes,

- carpools using the bus lane were able to save up to 30 minutes travel time each way,
- less than 25% of regular bus users utilized the carpool lanes -- almost 50% drove alone, and
- almost 50% of the carpool lane users were already in carpools prior to the strike.

1974 Alameda-Contra Costa Transit Strike

In July of 1974 the A-C Transit employees began a strike which lasted 62 days. Prior to the strike, patronage of the system approached 200,000 trips per day.

A study conducted by the Metropolitan Transportation Commission and USDOT concerned itself with the impacts of the A-C Transit strike on the Bay Area Rapid Transit District (BART). Through patronage and revenue counts, and from interview surveys, the study determined that:

- there was a 7% increase in BART ridership during the A-C Transit strike,
- 21% of work trips normally using A-C Transit were averted -- nearly 60% of non-work trips were not made. Overall, the strike impacts were felt most by the young and elderly, and
- the number of carpools (3 or more persons) using the carpool lanes in the toll plaza of the San Francisco-Oakland Bay Bridge increased 42%.

1976 SCRTD Transit Strike

Following the 1976 SCRTD transit strike, Commuter Transportation Services (CTS) conducted a telephone survey to determine the effectiveness of its matchlists in getting people into carpools. CTS was also interested in the subsequent reduction in trips generated and vehicle miles travelled, conservation of fuel, and reduction in air pollutants emitted and parking needed.

The study determined that:

- 23% to 34% of the sample carpooled during the bus strike,
- 6% to 9% of the sample carpools as a direct result of CTS matchlists, and
- 17% to 25% of the sample formed carpools independently of CTS matchlists.

1976 Golden Gate Transit Strike

On April 12, 1976, employees of the Golden Gate Transit District, serving San Francisco and parts of Marin and Sonoma counties initiated a strike which lasted over two months.

Brachman, et al., ventured that increased carpooling, initiated by suspension of the toll fare on the Golden Gate Bridge for carpools of three or more persons (a policy which was continued after the settlement of the strike), might explain some of the ridership loss experienced by Golden Gate Transit following resumption of service.

A survey conducted during the strike to gain insight into strike related carpooling behavior uncovered the following:

- o 65.5% of the carpools were composed of former bus riders,
- o 25.4% of the carpoolers were pre-strike poolers, and
- o 9.3% of the carpoolers were pre-strike single occupant automobile users.

Results of the post-strike survey suggested that a significant number of pre-strike bus patrons had permanently switched to carpools.

1977 Knoxville Transit Corporation Work Stoppage

The Knoxville Transit Corporation, serving up to 8,600 daily patrons, stopped service for six weeks in early 1977. A survey conducted by Wegmann, et al., determined:

- o the elderly and poor were the hardest hit, forced to cancel up to 32% of their trips, and
- o the transit system itself suffered by loss of revenue (and ridership following resumption of service).

Transit Climate Observations

There is little uniform analysis within transit strike-related studies. Although examining the same phenomena, existing studies have utilized a variety of investigative techniques, focusing on vastly different variables. Methodology has ranged from patronage, revenue and traffic counts to personal, telephone and mail back questionnaires. Primary areas of concern have ranged from economic impacts (i.e., retail sales and

employment) to personal impacts (i.e., mobility and convenience). The issues surrounding strike-induced transit work stoppages are very complex; the impacts and their interrelationships are even more so.

Transit strikes affect neighboring public transportation systems and paratransit operations. Increased automobile usage by semi-dependent and "choice" transit users increases traffic congestion, gasoline consumption and air pollution. For the transit dependent (usually the elderly, young, poor and handicapped), curtailment of their transportation mode can mean wages lost, school missed, and medical appointments cancelled.

Brachman, et al., determined that strike probability increases with system size, regardless of management. In the past seven years, Los Angeles has experienced a transit work stoppage of varying lengths each time union contracts have expired (four times in seven years).

Semi-dependent and independent ("choice") transit users may never return to the system once service is renewed. It appears that the majority turn to single occupancy vehicle (SOVs) as their primary transportation mode.

In the Los Angeles Metropolitan Area, there are few alternate modes of transportation providing the service supplied by the SCRTD system other than the automobile. Through careful marketing, ridersharing can be offered as a viable alternative during transportation emergencies. The El Monte Busway study, the 1976 CTS study and the Golden Gate study all found a fairly high incidence of carpooling in response to the transit strikes.

Information obtained on travel needs and behavior during transit strikes can be used as input into ridesharing emergency programs which could be activated in the event of future strikes.

Ridesharing would enable the transit dependent to remain mobile, while reducing rather than increasing traffic congestion, air pollution and parking needs and at the same time using the existing transportation system efficiently. In addition, a ridesharing emergency plan is probably the least expensive solution to the problem of alternative transportation in strike situations.

Ridesharing as a Transportation Option

In addition to the implementation of an emergency ridesharing program for use during transit work stoppages, CTS is also interested in capturing that segment of the transit using population which does not return to mass transit following such interruptions in service; while the rider may not return to transit, it is conceivable that (s)he could be persuaded to car/vanpool instead of driving alone. Market segmentation is very important in determining marketing strategy since not all individuals can be expected to exhibit similar perceptions, preferences or demographic profiles. Consequently, these individuals should not be considered together when developing new transportation services or marketing programs (Dobson & Tischer, 1976).

According to Margolin and Misch (1978), a significantly larger portion of the population would consider ridesharing if more attention were paid to the different needs, perceptions, lifestyles, resources and values of the various market segments. The transit user who switches modes following transit strikes is prime target for ridesharing. Moreover, the transit rider who does <u>not</u> return to transit is strongly exhibiting a change in his/her attitude or value toward the commute mode. Levin and Grey (revised, 1979) hypothesize that a thorough understanding of the individual decision processes and attitudes which underlie ridesharing behavior is a prerequisite to designing and

implementing effective ridesharing programs. Valk, (1978), citing Hartgen, concurs with the need for a greater knowledge of social and psychosocial factors which influence the ride-sharing modal choice decision. The marketing potential results from linking preference and perceptual information to transportation choices in order to uncover what is necessary to position ridesharing as the choice transportation option.

Dobson and Tischer (1976) and Margolin and Misch (1978) stress the importance of the individual's preconceptions about carpooling. These vary due to past carpooling experience, distance of commute, automobile availability, and even sex, age and occupation. A major hurdle any marketing approach will have to overcome is the misconception held by most people with no prior carpooling experience that carpooling is inconvenient, unreliable and time consuming, (Connerly and Kroger, 1979; Margolin and Misch, 1978). An even greater hurdle is the possible negative awareness of prior carpooling experience. The evaluation of carpooling during the 1979 gasoline shortage, (Shu, 1980) showed that 98% of the short-term carpoolers had previously carpooled, but for one reason or another had stopped.

A study conducted by Horowitz and Sheth (1977), determined that with proper promotional techniques, solo drivers could be persuaded to rideshare. Since bus riders are already ridesharers either by choice or necessity, with proper promotional techniques this group should be easy to divert into carpooling instead of driving alone during transit strikes.

The major operational obstacle to carpooling success is that most carpooling programs rely on passive matching systems. (See Margolin and Misch; Dobson and Tischer; Levin and Grey; Kurth and Hood). Generally, a computer generated matchlist of names of potential carpool partners based solely on common origin, destination and time frame, is the core of the carpool

program. The individual interested in carpooling receives the list of names, and it is required of him (or her) to contact people on the list. A large percentage of "interested" individuals do not use the carpool matchlist at all (Shu & Glazer, 1979). Several studies recommend that the process needs to be more active and personalized to be effective. (Margolin and Misch; Kurth and Hood; Levin and Grey).

The issue of matchlist utilization is very important when designing an effective emergency contingency plan. If up to 60% of those receiving regular matchlists do not use them, (Shu & Glazer, 1979), matchlist usefulness, and how to increase matchlist utilization in emergency situations must be evaluated.

Of utmost importance in preparing for transportation emergencies is the thorough examination of the needs and expectations of the targeted group. What is the composition of this group? Is the decision process of the emergency ridesharer different from the regular ridesharer? Can transit users be marketed in the same way as regular CTS registrants? How should carpooling be positioned to capture those who switch transportation modes following transit strikes?

The SCRTD transit strike posed a unique opportunity for CTS to address some of these issues by examining the impact of the bus strike on travel behavior and subsequent effects on CTS services.

Three separate groups will be examined in this evaluation:

1) The bus strike registrant -- a random sample of the 3500 people who registered for CTS ridesharing services during, and as a result of, the SCRTD transit strike.

2) The non-registrant transit user -- a sample of

transit patrons who were affected by but did not register with CTS during the strike.

3) The "typical" registrant -- a random sample of CTS registrants who registered prior to the SCRTD strike.

CHAPTER 2
THE EFFECT OF THE SCRTD TRANSIT STRIKE ON CTS OPERATIONS

INTRODUCTION

The strike had a direct effect on all facets of CTS's operations, ranging from impacts on manpower due to the increased demand for commuter telephone information and subsequent match-list production, to delays in development and implementation of new programs by both the Planning and Marketing Departments.

CTS' On-Going Operations Prior to the SCRTD Strike

a. The Executive Department was responsible for:

- o interfacing with the Board of Directors,
- o participation in a public liaison rule, and
- o overall organizational management.

b. The Marketing Department was responsible for all facets of marketing ridesharing. To perform most effectively, the department was composed of three divisions:

- o Employer sales: responsible for marketing vanpools to employers, and ridesharing to employers,
- o Vanpool marketing: responsible for marketing vanpools to employers, and
- o Market research: responsible for coordination of sales records and conducting market research.

c. The Client Services Department was responsible for:

- o manually processing ridesharing registrations in preparation for entry into the computer system,

- o key punching and actually entering the registrations into the system,
- o mailing out matchlists, and
- o taking dial-in registrations.

d. The Transportation Planning and, Evaluation Department concentrated its efforts on:

- o program development (planning),
- o consumer research, and
- o evaluation of special and on-going projects and programs.

e. The Vanpool Fleet Services Department was charged with the operations and maintenance of the vanpool fleet.

f. Finally, the Administrative Services Department, provided:

- o on-going support for all company operations,
- o organizational development,
- o accounting services
- o office services (operating expenses) and
- o personnel services.

PRIOR PREPARATION

The organization was not unprepared for the challenge. A detailed "Energy Emergency Program Work Plan" (see Appendix B) had been completed in March of 1979 in anticipation of increased demand on CTS services resulting from predicted fuel shortages

in the upcoming months. This was adapted for use during the SCRTD walkout.

In July, the organization began to gear up and prepare for the anticipated transit shutdown even while in the midst of the energy shortage. The upcoming problems and issues were addressed and strategies planned. The increased demand on CTS service resulting from the 1976 SCRTD strike helped to target these problems and solutions.

The source of financing for the expected increase in activities was the Los Angeles County Transportation Commission's Energy Emergency Program Funding.

In early August, provisions were made to increase the data processing service time donated by the City of Los Angeles in order to speed-up matchlist turn-around-time. By late August, all systems were ready to augment the Client Services and inhouse-keypunch staff.

Protocol for answering the "dial-in" information and ride-sharing requests were developed. A comprehensive transit referral information listing was developed. A special system for recording, processing and routing of applications for speedier and more efficient production was devised.

Collateral materials were developed or earmarked for distribution including posters, "Action Information" brochures, commuter information tabloid, and "Emergency Transportation Information" kits. A list of public information agencies was developed for dissemination of these collateral materials.

A listing of employers located along SCRTD's ten most heavily travelled routes and selected commuter express lines was also developed in order to target those employers with the highest

potential need for the "Transportation Emergency Information" kits.

Due to the uncertainty of the status of the pending strike from day to day, CTS's "Transportation Emergency Work Program" remained one of preparedness rather than action until the strike was officially declared.

Strike's Effect on Client Services

The brunt of the strike's effect was felt by the Client Services Department. Prior to the strike the majority of Client Services' time was spent in processing ridesharing registration: scanning for errors in the forms, locating home and work grid squares, sending completed registrations on to be keypunched, forwarding keypunched registrations to the City to run and finally picking up and mailing out the completed matchlists. Less than 15% of Client Services' time was spent taking "dial-in" registrations.

During the course of the strike, 17,000 calls for assistance were logged (6,000 in the first two days) and almost 4,000 bus-strike-induced registrations were taken. In addition, Client Services was still receiving a greater than average number of "dial-in" registrations as a result of increased interest in carpooling following the gasoline shortage earlier in the year. (See Figure 1).

Prior to the strike, a maximum of two employees was needed to handle "dial-in" registrations, although the entire division was trained for backup purposes. Forty-five additional temporary telephone clerks were hired to assist the regular personnel in manning the phones the first few days of the strike. Hours of operation fluctuated in order to meet the "dial-in" demands and

varied from 6 a.m. to 9 p.m., including weekends. In order to accommodate the increased personnel, ten additional phonelines had to be installed and furniture rented. In addition to the increased staff at CTS's offices, CALTRANS donated space for 10 of the temporary personnel to work in their offices to assist in calling transit patrons back.

The "dial-in" process was expedited by the development of special bus strike procedures and protocol. The caller was first asked if (s)he was calling because of the bus strike. If so, a blue registration form was used to take the necessary infomation and differentiate the individual registrations as bus strike information requests. Simultaneously, the individual was screened for potential vanpool services. Each "dial-in" registration took approximately five minutes. During especially busy periods a scanning device (cardboard template with cut-outs) was used to fill in the information required to call the individual back.

Besides the registration process, the telephone bank had to assist those callers who were not really commuters (and consequently were unable to take advantage of CTS services) by referring them to other agencies, or if possible, other transportation modes.

During the first few days of the strike, from August 26th through August 31st, approximately one-third of the regular Client Service's staff time was spent answering the phones. Several employees spent 100% of their time assisting. This of course delayed ongoing work responsibilities.

By Friday of the first week, August 31st, the number of calls had dropped appreciably, and the temporary staff was reduced to 15. Due to the increased free time, employees began to do some manual matches for those registrants who seemed particularly in need, and/or those registrants working in high density employment areas

(i.e., downtown, Wilshire corridor). The bus strike "hand-matching" continued for only a few days as a special radio promotion commenced on September 4th and required handmatching.

The final responsibility of Client Services was the computer processing of the increased number of registrations. Although CALTRANS and Los Angeles County assisted in the keypunching, additional keypunching personnel had to be hired.

Effect on Administrative Services

The processing of paperwork and coordination of all the additional temporary personnel, furniture, telephone lines, etc., prevented the Personnel division from proceeding with its ongoing functions. There were also additional demands on the Accounting division keeping track of all the costs.

Effect on Executive and Transportation Planning, Evaluation and Research Departments

For the most part, these two areas felt the strain more so prior to the strike due to the needed preparation not required of the rest of the organization.

Effect on Employer Sales

This division was least impacted by the strike. Transportation Representatives were forced to work out of their own homes to free up space and phones for the additional help hired to assist "dial-in" registrants.

Increases in company registrations were directly attributed to an AQMD "reminder" letter mailed out on September 3, rather than

the bus strike.

Costs of the SCRTD Strike

The intangible costs - delay in anticipated program enhancements, and set-backs in ongoing activities, are not measurable.

Even the direct costs tend to overlap and become meshed with ongoing costs. For example, the strike related telephone costs were $2,000 greater than any other month in 1979, due to installation of additional lines and increased need to return calls, yet telephone costs were not included in the "Transit Strike Expenditures" listed by the Accounting Division. Increased costs incurred by producing and mailing out almost 4,000 matchlists also seem to have been absorbed by on-going accounts. Additional costs were also incurred for rental of desks.

Besides payroll, which including temporary personnel costs approached $50,000, public relations, advertising and printing were responsible for the next biggest portion of the expenses ($37,300). The balance of the $100,000 officially required to finance the strike operations was spent on keypunching services.

Problems Encountered In Strike Operations

During the first few, most critical days of the strike, the post office refused to pick up the completed matchlists. They had been left for pick-up in boxes, and post office regulations required that batches of a large size be left for pick-up in sacks. This caused a temporary delay in matchlist receipt.

The second problem was not realized until this evaluation was conducted. The listing of the 1,500 companies located within

grid squares serviced by the 10 most heavily travelled SCRTD routes was outdated and contained several hundred duplicate listings, reducing the effectiveness of the "Transportation Emergency Information" kit mailing.

Measures of Effectiveness

The standard measures of effectiveness (MOE's) used in estimating CTS's effectiveness are not really valid in evaluating the effectiveness of the bus strike service.

Although matchlist turn-around time was drastically reduced (one week compared with 4.5 weeks in the gasoline shortage sample) and quality of matchlist substantially increased (fewer blank lists), matchlist utilization and subsequent direct carpool formation rates, were disappointingly low. The operational improvements were not enough to meet the needs of the strike-induced registrant. However, the strike-induced registrant had much different needs than the registrant CTS usually serves.

In comparison, those registrants who entered into long-term carpools showed much higher than average matchlist utilization and direct carpool formation rate. This suggests that CTS was fulfilling the needs of some registrants admirably. However, it was unable to serve the majority as effectively as intended.

CHAPTER 3
THE TRANSIT PATRON

INTRODUCTION

A successful transportation emergency program cannot be developed without a thorough examination of the needs and expectations of the population the program intends to serve. This chapter will provide market segmentation profiles for those who sought CTS' services during the strike as well as those who did not. The profiles will focus on pre-strike and emergency home-to-work travel behavior as well as socioeconomic demographic attributes.

Where appropriate, these profiles will be compared with those of the "typical" CTS registrant. Findings will also be compared with those of earlier studies.

Pre-Strike Travel Behavior (See Table 1)

Although actual travel behavior of both groups of transit patrons was similar, (number of days a week using SCRTD, number of trips per day, time of day travelled, etc), closer scrutiny reveals that the registrant group respondents consistently exhibited a lesser degree of dependence on SCRTD than those of non-registrants.

In the overall transit sample, 88% of the respondents stated that they were dependent on the SCRTD system for most of their travelling needs prior to the bus strike. The 12% not categorizing themselves as SCRTD dependent were all from the "bus-strike" registrant group (telephone survey group).

It is possible that the "bus-strike" registrant group represented a portion of the transit using population which really is not dependent on mass transit for anything other than the home-to-work commute. This is supported by the finding that 9% of

TABLE 1

PRESTRIKE TRAVEL CHARATERISTICS OF TRANSIT PATRONS

VARIABLES	ALL TRANSIT USERS N = 262	BUS STRIKE REGISTRANTS N = 152	BUS STRIKE NON-REGISTRANTS N = 110
Dependence on RTD	88%	79%	100%
Number of Days per week use RTD			
$\bar{x}$	5.104	5.333	4.855
s		.714	1.057
Number of trips per day			
$\bar{x}$	2.20	2.261	2.145
s		.887	.466
Destination			
Work	87%	97%	76%
School	2%	0	4
Other	11%	3	20
Number of buses used heavily			
1	32%	38%	26%
More than 1	68	62	74
Miles travelled per trip			
$\bar{x}$	12.075	14.430	9.394
s		9.920	7.789
Don't know		9%	14%
Trip Travel Time			
$\bar{x}$	53.774	58.417	48.709
s		28.624	22.701
Time of Day Usually Travel*			
6:30-9:30 am	84%	87%	80%
9:35-noon	13	8	19
12:05-3:30 pm	12	8	16
3:35-6:30 pm	78	79	76
6:35-6:25 am	7	9	4
Type of RTD Service			
Commuter Bus	30%	38%	22%
Non-commuter bus	70	62	78

* Multiple response.
Based on the questions:
- Before the bus strike, did you depend on RTD buses for most of your travelling needs?
- How many days a week did you travel on RTD buses?
- How many trips did you usually make each day?
- Where were most of your trips made to and/or from?
- What bus line or lines did you travel the most?
- How many miles did you usually travel one way?
- How much time did you need to travel one way?
- What time(s) of day did you usually travel on the bus?

the "telephone" group responded that most of their SCRTD trips were to get to/from work, compared with 76% of the "non-registrant transit" group. Moreover, twenty percent of the "transit" non-registrant sample responded that most of their SCRTD trips were for purposes other than work or school, implying a greater dependence on RTD for overall travel needs as opposed to just home-to-work travel needs.

The "bus-strike" registrants also depended on fewer buses than the non-registrant, and were more inclined to be dependent on a "commuter bus" (one routed on freeways) as opposed to buses using surface streets only. Although not totally transit dependent, the registrant group spent more time travelling a longer distance per trip than the non-registrant (bus-strike registrant trips averaged 58 minutes as compared with 49 minutes for the non-registrant).

The bus strike group travelled a shorter distance from home-to-work than did the "typical" registrants for CTS services and "gasoline-crisis" registrants. The average distance travelled by the "typical" registrant was 21 miles (Shu & Glazer, 1979). The "gasoline-crisis" registrants (Shu, 1980) commuted 18 miles. In contrast, "bus-strike" registrants' average bus commute was 14 miles, and the non-registrant commute only nine miles. It is worth noting that the "bus-strike" registrant group commute distances resemble the non-applicant commute distance cited in Shu & Glazer (1979) of 14 miles. The average distance travelled by the two groups, 12 miles, is identical to the "General Public" figure cited in the same study. Thus, the travel distance of the bus using sample population is very similar to that of the general public.

As mentioned earlier, there were no major differences between the two bus strike groups in terms of number of days a week SCRTD service was used, number of trips per day or time of

day travelled. The typical SCRTD rider rode the bus at least five days a week, making a minimum of two trips per day. The heaviest travel periods coincided with traditional rush hour periods.

The buses used most by the sample were among those listed by SCRTD as having the heaviest patronage and fell within the grid squares targeted by CTS for dispersal of Emergency Transportation kits.

As stated earlier, the major difference in pre-strike travel behavior in the two transit groups was consistently degree of dependence on SCRTD. Overall home-to-work travel behavior was similar in all respects. However, the non-registrant group appeared to use the bus to fulfill other travelling needs besides commuting to work, whereas the registrant group depended on the bus primarily, if not solely for that purpose.

If the bus strike registrant was only marginally dependent on public transportation, using an automobile for all but the home-to-work commute, it would follow that (s)he would be more interested in CTS services than a transit patron who was totally dependent on the bus and under normal circumstances would have no need for carpooling services. This is supported by the finding that less than 45% of the non-registrant sample were even aware of CTS's existence at the time of the strike.

Strike Induced Travel Behavior (See Tables 2A and 2B)

Most of the transit sample were able to fulfill their transportation needs without the services of SCRTD.

Only 7% of those interviewed were so severely impacted that travel was totally interrupted. Those unable to fulfill any of

TABLE 2A.

WITHIN GROUP COMPARISON OF
HOW TRANSIT PATRONS TRAVELLED DURING THE BUS STRIKE

TOTAL TRANSIT SAMPLE N = 262		BUS STRIKE REGISTRANT (Telephone Group) N = 152	BUS STRIKE NON-REGISTRANT N = 110
30%	Carpool with spouse or friend	27%	35%
17	Carpool with co-worker or "other"	19	15
20	Drove alone	22	17
10	Walked/Hitchhiked	8	12
7	No travel	8	7
5	Other Public Bus	6	4
3	Various rides/paid people	5	-0-
2	Taxi	3	-0-
1	Agency similar to Dial-A-Ride	2	-0-
4	Dial-A-Ride	-0-	8
1	Motorcycle/Bicycle	-0-	2

Chi square = 30.86
($p < .002$)

Based on the question: How did you travel during the bus strike?

their transportation needs as a result of the strike were evenly split between the telephone (4%) and bus stop (3%) groups.

In the total transit sample (registrant and non-registrant) the majority (60%) shifted from SCRTD service to some other form of ridesharing. Forty-seven percent of the sample carpooled, 5% utilized a form of paratransit (including but not limited to Dial-A-Ride) and 3% responded that they took various rides with, and/or paid other people.

The 40% of transit patrons who did not turn to ridesharing as a transportation alternative fell into the following groups:

- 20% of the sample drove alone,
- 10% walked or hitchhike,
- 2% took taxis,
- 1% used motorcycles or bicycles, and
- 7% were unable to locate any viable alternative at all.

Within the subpopulations, 59% of the "registrant" group participated in some form of ridesharing. A slightly larger percentage of the non-registrant group (62%) turned to ridesharing for its transportation needs. Carpooling was the most popular ridesharing mode, capturing 51% of the registrant and 50% of the non-registrant groups.

Twenty-two percent of the telephone group, despite having registered for carpooling assistance, were forced to solve their travel needs by driving alone during the strike. In comparison, only 17% of the non-registrant group drove alone. This suggests that although the registrant group was predisposed and ready to rideshare, there may not have been adequate opportunity or motivation to do so. Sixty-two percent of the SOVDrs were found in the

TABLE 2B

BETWEEN GROUP COMPARISON OF
HOW TRANSIT PATRONS TRAVELLED DURING THE BUS STRIKE

TOTAL TRANSIT SAMPLE N = 262		BUS STRIKE REGISTRANT (Telephone Group) N = 152	BUS STRIKE NON-REGISTRANT N = 110
30%	Carpool with spouse or friend	50%	50%
17	Carpool with co-worker or "other"	63	37
20	Drove Alone	62	38
10	Walked/Hitchhiked	46	54
7	No travel	58	42
5	Other Public Bus	67	33
3	Various rides/paid people	100	-0-
2	Taxi	100	-0-
1	Agency similar to Dial-A-Ride	100	-0-
4	Dial-A-Ride	-0-	100
1	Motorcycle/Bicycle	-0-	100

Chi square = 30.86
($p < .002$)

Based on the question: How did you travel during the bus strike?

registrant group.

Strike Induced Carpool Behavior

Although the carpool formation rates of the transit groups were almost identical, the formation dates indicate that the formation processes were different. In the entire sample, 89% of the carpoolers remembered forming their carpools in August, at the immediate onset of the transit interruption. This included the entire bus stop (non-registrant) sample. The registrant group however, remembered forming only 78% of its carpools immediately. Seventeen percent of these carpools were not formed until several days into the strike. The fact that 5% of the carpools were formed before or after the strike, suggests that their formation is attributable to other causes.

The difference in formation dates can be the result of any number of variables. It is possible that, as previously suggested the registrant group had fewer immediate ridesharing opportunities than the non-registrant group, and that is precisely why CTS services were needed. Unassisted, the registrant group would have probably produced fewer carpools, as CTS efforts were directly responsible for 9% of the registrant carpools. This is supported by the finding that the registrant group tended to carpool with co-workers or "others" as opposed to the non-registrant group which had access to "instant" or "natural" carpools with spouses or friends (See Table 2B).

However, the registrant group may also not have been as dependent on carpools to fulfill its transportation needs. Earlier findings indicated that the telephone (registrant) group may not be a transit dependent group, but instead relies on mass transit for the home-to-work commute only. Automobile availability rates comply with this supposition. The automobile availability rate per

TABLE 3

AUTOMOBILE AVAILABILITY

	BUS STRIKE REGISTRANT	NON-REGISTRANT	TYPICAL REGISTRANT	TYPICAL AREA RESIDENT *
Licensed driver				
Yes	66%	60%	NA	NA
No	34	40	NA	NA
# Licensed drivers in home				
0	18%	22%	1%	NA
1	31	39	24	NA
2	35	20	44	NA
3	11	13	22	NA
4 or more	5	6	9	NA
$\bar{x}$	1.6	1.5	2.2	1.7
s	1.1	1.3	1.0	NA
# Vehicles available per household				
0	35%	42%	1%	NA
1	34	36	32	NA
2	21	16	46	NA
3-4	8	6	21	NA
5 or more	2	-0-	**	NA
$\bar{x}$	1.1	.88	1.9	1.6
s	1.2	.9	.9	NA
# Vehicles available per licensed driver	.7	.6	.9	.9

* Source: Los Angeles Area Transportation Study, (LARTS 1976)
** Less than 1%
NA Not Asked

Based on the questions:
How many passenger vehicles are available in your household?
Are you a licensed driver?
How many licensed drivers are in your household (including yourself)?

TABLE 4A

THE STRIKE'S EFFECT ON TRAVEL TIME

Total Sample N = 243 Chi Square = 17.426 ($p < .001$)		Bus Strike Registrant N = 150	Bus Strike Non-Registrant N = 93
31%	increase	25%	41%
42%	decrease	39%	46%
27%	same	36%	13%

TABLE 4B

THE STRIKE'S EFFECT ON CARPOOL TRAVEL TIME

Total Sample N = 243		Nonpoolers N = 120	Carpoolers N = 123
31%	increase	56%	44%
42%	decrease	40%	60%
27%	same	57%	43%

Based on the question: During the bus strike, did the amount of time spent travelling to and from places...increase?
decrease?
remain the same?

household in the telephone group was higher than that of the non-registrant group (1.1 versus .9). There was also a slightly higher percentage of licensed drivers in the telephone group (66% versus 60%). (See Table 3).

Aside from driving alone, the registrants showed a greater tendency to take alternate public transportation, pay people for rides, and use taxis and paratransit (other than Dial-A-Ride). Having a wider range of transportation alternatives other than carpooling may have negated the registrants' motivation to carpool. The non-registrants may not have had as many alternatives. In addition to the immediate carpool formations found within this group, other travel behavior during the strike indicated fewer transportation alternatives: a lesser degree of driving alone and use of other public transit, and a higher level of walking/hitchhiking and Dial-A-Ride usage. The non-registrants' lack of alternatives may have contributed to a more critical need for carpooling as a solution to their transportation problems than experienced by the registrants (who could easier turn to other solutions).

It is important to note that although not totally dependent on mass transit, the telephone group were not necessarily transit riders entirely by choice. Household automobile availability rates of regular CTS registrants and the "typical" Los Angeles resident are substantially higher, demonstrating that the crisis registrant has fewer transportation alternatives than the norm. (See Table 3).

In contrast to the experiences of SOVD'ers that switch to carpooling, 42% of the sample recalled travel time as decreasing during the strike, (60% of which were crisis carpoolers). The majority of the 31% of the sample recalling travel time as increasing were located in the non-carpooling group. (See Tables 4A and B). Crisis carpooling for bus riders thus provide an added benefit

TABLE 5

CARPOOL CHARACTERISTICS

	Transit Population	Registrant	Non-Registrant	1978 Carpool Evaluation
Carpool Size $\bar{x}$	2.4	2.5	2.3	2.9
Alternate Driving	12%	10%	15%	< 75%
Always Drive	3%	5%	2%	< 10%
Never Drive	85%	85%	83%	< 20%

of trip-time reduction, in addition to being able to get to work.

Emergency carpoolers differed from the typical CTS carpooler characterized by Shu & Glazer (1979) in a number of respects. Their carpools tended to be smaller than the "typical" carpool, (2.4 versus 2.9) suggesting that in transit emergencies carpooling arrangements may be made hurriedly without waiting to complete a larger, more formal carpool. (See Table 5).

Transit emergency carpools also differed from regular CTS carpools in the allocation of driving responsibilities. While 75% of regular CTS carpool members alternate driving, only 12% of the strike induced poolers did so. Over 80% of the crisis poolers never drove their carpools. This figure did not vary significantly between the two transit groups. In light of the fact that the transit groups had fewer licensed drivers and automobiles available for use, a disparity in allocation of responsibilities should be expected. However this difference is extreme. One can almost define the majority of transit emergency carpoolers as "passive" poolers as opposed to "active" poolers found in regular carpools.

The overriding difference between the transit emergency and regular carpools is that the emergency carpoolers did not choose to carpool voluntarily. The cessation of their transportation mode forced them to switch from their regular mode to an alternate mode -- in the majority of cases, carpooling was the only viable alternative. Shu & Glazer (1979) determined that most regular CTS carpoolers had other alternatives and chose to carpool.

Most of the emergency carpools were small, formed hurriedly and informally with spouses and/or friends. Due to the nature of the situation, there was no time for the luxury of "shopping around" for the ideal potential carpool partners. The transportation need was immediate and crucial. Carpools transported the impacted transit patrons to and from work, and often in less time

TABLE 6A

DATES OF CARPOOL DISSOLUTION

TOTAL n=112		BUS-STRIKE n=58	BUS-STRIKE NON-REGISTRANT n=54
80%	September 1979	67%	94%
17	October 1979	28	6
1	November 1979	2	-0-
2.	February 1980	3	-0-

Chi square 13.369
($p < .004$)

Based on the question: When did you stop carpooling?

than their prior mode, the bus, yet most of the poolers returned to mass transit once service was restored.

Shu & Glazer (1979) report that from 15 to 25% of all carpools formed can be expected to dissolve naturally within five months under normal conditions. Of the carpools formed in response to the interruption in transit service, 71% dissolved immediately after the strike (in less than five weeks). Fifteen percent disbanded shortly afterwards. By the time of interview, six months after the strike's conclusion, only 13% of the carpools formed were still in existence. Within six months 87% of the carpools had dissolved. (See Table 6A).

The primary reason given for disbanding the emergency carpools was "convenience," (71%). (See Tables 6B and C). This was followed by reasons directly related to convenience: scheduling difficulties, lack of independence and personal conflict (18%). Another 6% returned to mass transit because it was "cheaper" or "more reliable" (than carpooling). The remaining 5% terminated their carpools due to a change in work or home location, or work hours.

Within the subpopulations, the non-registrant group found convenience most important, (79%), followed by scheduling difficulties (9%). The registrant group also found convenience most important (but to a lesser degree, 64%), followed by independence (10%), and reliability of bus service (8%).

These findings contrast sharply with those of Shu & Glazer, who determined that the most common reason for disbanding a "mature" carpool is change in work or home location of one or more carpool members. The crisis carpools did not remain intact long enough to exhibit any expected traits or tendencies of mature carpools.

TABLE 6B

REASONS FOR CARPOOL DISSOLUTION

TOTAL n=101		BUS-STRIKE REGISTRANT n=49	BUS-STRIKE NON-REGISTRANT n=52
71%	Bus More Convenient	64%	79%
7	Independence	10	4
7	Scheduling Problems	4	9
4	Bus More Reliable	8	-0-
4	Personal Conflicts	4	4
3	Changed Work Location	6	-0-
2	Bus Cheaper	2	2
1	Changed Home Location	2	-0-
1	Changed Work Schedule	-0-	2

Chi square = 12.88
($p < .12$)
Based on the question: Why did you stop carpooling?

TABLE 6C

BETWEEN GROUP REASONS FOR DISBANDING CARPOOL

OVERALL		REGISTRANT	NON-REGISTRANT
71%	Bus more Convenient	43%	57%
7	Scheduling Difficulties	29	71
7	Independence	71	29
4	Personal Conflicts	50	50
4	Bus more Reliable	100	-0-
3	Changed Work Location	100	-0-
2	Bus Cheaper	50	50
1	Changed Home Location	100	-0-
1	Changed Hours	-0-	100

Chi square = 12.88 Based on the question: Why did you stop carpooling?
($p<.12$)

In summary, the emergency carpools were not "regular" carpools. The poolers were "crisis-compelled" as opposed to choice poolers. Greater than 80% were "passive-poolers" depending on others for driving and supplying the automobile. Returning to mass transit restored a semblence of choice and control over their travel mode.

Socio-Demographics of the Transit Patron (See Table 7)

It is generally agreed that demographics are limited in value in predicting carpool demand but rather serve as a guide for a commuter's predispositions to ridesharing. The demographics in this section are presented to compare the transit registrant and non-registrant with other CTS registrants for basic marketing purposes.

Perhaps the most striking demographic finding was that the sexual composition of the transit crisis registrant group was drastically different from the typical registrants for CTS services. The vast majority, 74% was female, as compared with roughly 40% of the regular registrants. This is particularly surprising since according to SCRTD, only 57% of its ridership is female. It can only be presumed that the males affected by the transit strike had more ready transportation alternatives than the women, or that one-car households allocated the "family" vehicle to the "primary" bread winner (often male). The implications of this finding merit further study.

Comparisons of occupation and income findings show large differences between the transit groups and typical registrants which are directly attributable to the market SCRTD services. Whereas the typical CTS registrant and gasoline crisis registrant is a manager or professional with a household income greater than $20,000, the typical transit registrant, (and non-registering

TABLE 7

SOCIODEMOGRAPHIC VARIABLES

	BUS STRIKE REGISTRANT	NON-REGISTRANT	"TYPICAL" REGISTRANT
Sex (chi square 48.240) ($p < .001$)			
male	26%	28%	60%
female	74	72	40
Age (chi square 43.467) ($p < .0001$)			
under 25	22%	17%	12%
25-29	19	10	12
30-39	27	29	28
40-49	14	14	24
50-65	13	13	23
over 65	5	17	1
$\bar{x}$	37	42	41
Education (chi square 52.633) ($p < .0001$)			
gradeschool	1%	4%	2%
high school	21	49	22
voc/trade	5	10	2
some college	43	21	31
college	21	8	26
adv. degree	9	8	17
Occupation (chi square 109.119) ($p < .0001$)			
clerical	47%	46%	27%
production	8	1	18
student	1	5	2
manager	8	3	10
professional	21	10	41
other	10	17	2
unemployed	5	18	NA
Income (chi square 36.954) ($p < .0001$)			
under $10,000	29%	25%	7%
$10-$19,999	37	47	32
$20-29,999	20	15	33
more than $30,000	14	13	28

counterpart) was a clerical worker with a household income under $20,000.

Major differences in the education patterns of the two transit subpopulations suggest that education might well be an important factor in whether or not a transit patron will call CTS for assistance in emergency situations. Although not so highly educated as the average typical registrant, 73% of the transit registrants had attended college compared with only 37% of the non-registrant group.

The typical transit crisis registrant tended to be slightly younger (37 years), than the typical registrant (41 years), and closer in age to the typical gasoline crisis registrant (39 years). Since this is the segment with which CTS marketing efforts have the most success, it is possible that these crisis groups are very aware of CTS services, but under normal circumstances do not need or want them. However, since non-registrants also tended to be from the same age group, age in the transit registrant group may be more a factor of the market served by SCRTD than CTS.

Comparison With Other Impact Studies

It is difficult to compare the present study's findings with those of other studies concerned with impacts of transit shutdowns due to lack of uniform approach in analysis. Evaluations are performed for different purposes using different tools and measurement criteria. Cross comparisons of strike impacts in other cities are not useful as each city has its own unique problems and solutions.

For example, comparing strike-induced travel behavior in Trenton (cited in Chapter 1) with travel behavior in Los Angeles would be unproductive as the Trenton commuters had several

competing modes (other than automobile) to shift to when their chosen mode, the bus, terminated service. Most Los Angeles commuters had only one -- the automobile.

Bigelow-Crain's evaluation of travel behavior during the 1974 SCRTD strike found a slightly lower carpooling rate than did the present study (45%), indicating that the incidence of carpooling in transit emergencies may be on the rise.

However, carpool findings from a study of the 1976 SCRTD strike conducted by CTS are actually higher than the 1979 figures (52%). This does not necessarily mean that carpooling decreased between 1976 and 1979. It is an example of the difficulty of comparing the different studies to determine trends in emergency carpooling behavior. To do so would require the use of identical sampling and measuring techniques, which unfortunately have not been used.

The findings of SCRTD's study, "Impact of RTD Strike on Riders," released in December, 1979 is another example of the broad differences in evaluation methodology. Ridesharing was not considered an alternate transportation mode and consequently few findings are comparable.

One can venture due to the proximity of the figures that carpooling is not only a viable, but a popular solution to transportation problems resulting from transit interruptions in Los Angeles. With proper preparation and market positioning, a larger segment of the transit using population would use carpooling to successfully solve their transportation problems.

SUMMARY

The structure of pre-strike travel behavior within the two transit subpopulations examined was very similar. The registrant

group however tended to be dependent on mass transit only for the home-to-work commute rather than for all of its transportation needs.

The registrant group had fewer carpooling opportunities and more transportation alternatives than the non-registrant group. The registrants had more difficulty forming a carpool, but once formed the only major difference in the carpools of the two groups was that the registrants carpooled more often with coworkers or "others" than the non-registrants who tended to carpool with spouses or friends.

Characteristics of the strike-induced carpools did not resemble those of regular carpools. They were smaller, less formal, travelled a shorter distance and had an unequal distribution of driving responsibilities among members.

The crisis-compelled carpoolers were not carpoolers by choice, as is the regular CTS carpooler, and this showed in carpool "life." Although carpooling usually decreased travel time, very few strike induced carpools survived beyond the strike period. The primary reason cited for dissolution was "convenience" of the choice mode, the bus. Emergency poolers may not be motivated enough to deal with the inconvenience of carpools to mature into regular carpoolers. Regular carpools tend to disband due to change in home or work location, or work hours of one or more carpool members, rather than lack of convenience.

The transit patron is demographically quite different from CTS's prime marketing target. The major differences in the transit patron and the regular CTS registrant is that overall the transit group has more females earning smaller incomes and employed in clerical as opposed to professional or managerial positions.

The major difference between the average transit registrant

and non-registrant is that the registrant tends to be better educated.

Comparisons with other studies of strike induced travel behavior are not fruitful in determining or predicting trends in emergency carpooling behavior.

CHAPTER 4
THE STRIKE-INDUCED REGISTRANT

INTRODUCTION

This chapter examines several aspects of the crisis registrant's involvement with CTS: awareness of CTS services, utilization of those services and the registrant's level of continuing interest in CTS services.

Awareness of CTS (See Table 8)

Though CTS had been in operation for five years at the time of the strike, the typical strike registrant had been aware of its existence for less than a year. This recent awareness, coupled with the high level of unfamiliarity found within the non-registrant group indicates that CTS's marketing efforts have not been reaching the busriding market. This is not surprising however, as CTS has not targeted bus riders on an ongoing basis, but has aimed its marketing strategies at solo drivers. The 1978 Carpool Evaluation determined that two-thirds of the general public was aware of CTS although most were unaware of the exact services provided. In the transit non-registrant group, less than half were aware of CTS's existence.

The focus of CTS's marketing efforts has been employer oriented. In the past, the companies marketed have tended to be medium to large organizations employing mostly white collar workers with higher than average education and income; the typical SCRTD bus rider tends to have less education and a smaller income.

The typical "bus-strike" registrant was first introduced to CTS through freeway signs, as was the typical non-strike "dial-in" registrant. (See Table 9). A larger percentage of "dial-ins" are introduced through this medium (40% versus 32%) which serves to show that the bus riding public has not yet been reached by (or perceives a need for) CTS's regular marketing methods.

TABLE 8

LENGTH OF BUS-STRIKE REGISTRANTS' AWARENESS OF CTS'S SERVICES

Less than one year	56%
1 to 2 years	14
2 to 2½ years	11
More than 2½ years	19

Based on the question: How long have you known about the 380-RIDE number or Commuter Computer?

Sources of Awareness

The manner in which information about CTS is gathered in emergency situations is very different than the general responses offered by regular registrants.

The "strike" registrant's ordering of sources did not resemble that of any other type of CTS registrant, including the "gasoline-crisis" registrant.

Word of mouth was the primary source of awareness for 21% of the strike registrants. This is more than double the percentage cited by "dial-ins" in the 1978 Carpool Evaluation (7%). This suggests that although CTS may not have directly reached the impacted group, a fair percentage were reached indirectly. A larger percentage of the transit registrant group heard about CTS through mass media (radio, television and newspapers) than regular "dial-ins" (32% versus 24%), which suggests that increased media marketing may have played a role in introducing the transit group to CTS.

Although emergency carpool information was dispersed to public information offices and agencies, less than 1% of the registrants learned of CTS through this medium -- presumably they were unaware that such sources exist.

It is noteworthy that 75% of the "gasoline-shortage" registrants heard about CTS from their employer compared with only 9% of the "bus-strike" registrants. The reason for this may be that the transit group is less likely to be employed by a company that CTS has marketed than the "gasoline shortage" registrant. This may also be due to employers' unawareness of their employees' need for transportation information during the SCRTD strike. Employers were as likely to feel the impact of the gasoline shortage as employees. However, it is unlikely that many employers were directly impacted by the transit strike.

TABLE 9

"BUS-STRIKE" REGISTRANTS' SOURCE OF AWARENESS OF CTS

TOTAL n=145		NON-POOLER n=79	SHORT-TERM POOLER n=49	LONG-TERM POOLER n=17*
32%	Freeway signs	38%	25%	4
21	Word-of-Mouth	18	27	3
14	Television	9	18	4
14	Radio	16	12	2
9	Employer	8	12	1
3	Newspaper	4	2	1
3	Flyers	2	-0-	2
4	Other	5	4	-0-

*Figures in this column are observed frequencies, not percentages.

Based on the question: How did you first hear about Commuter Computer (CTS)?

Motivation for Contacting CTS (See Table 10)

The overwhelming response to why CTS was contacted was "no way to work" (65%). The overwhelming reason usually given by "dial-in" registrants is to "to form or expand a carpool" (92%). This reason was offered by only 25% of the emergency registrants. Another 6% of the emergency registrants offered "seeking transportation information" as their reason for calling. These findings imply that the registrant was not really aware of the services provided by CTS and was basically calling out of desperation.

The 25% of the registrants calling specifically for carpooling service tended to produce a disproportionate number of long-term carpoolers suggesting that those with more complete knowledge of CTS services may be predisposed to carpool on a long-term basis as opposed to a short-term crisis-induced basis.

Looking only at those who began carpooling during the strike, 82% of the short-term carpoolers responded that they had called because they had no way to work. In the long-term group only 47% cited this as a reason. Another 47% of the long-term poolers called to form or expand carpools compared with only 10% of the short-termers.

Matchlist Utilization

A comparison of the timeliness and quality of CTS transit emergency service with findings from the 1978 Carpool Evaluation shows that the level of service was improved.

Ninety percent of the strike registrants recalled receiving a matchlist of potential carpooling partners. This is a slight improvement over the 82% matchlist receipt rate reported by all

TABLE 10

BUS-STRIKE REGISTRANTS' REASONS FOR CALLING CTS

TOTAL n=150		NON-POOLER n=80	SHORT-TERM POOLER n=51	LONG-TERM POOLER n=19
65%	Need way to work	58%	82%	48%
25	Get into Carpool	30	10	42
6	Transportation Info.	6	8	-0-
3	Curiosity	5	-0-	5
*	Expand Carpool	-0-	-0-	5
*	Volunteer Service	1	-0-	-0-

Chi square = 23.5995
($p < .009$)

* Less than 1%.

Based on the question: Why did you call Commuter Computer (CTS) during the RTD bus strike?

applicants, and 75% rate reported by "employer registrants" in the earlier study, and 74% found in the composite "typical registrant" group derived from the gasoline evaluation study data. (See Appendix C).

Turn-around-time, (time between registration and matchlist receipt) was also greatly improved. More than half of the bus strike matchlists were received within a week -- the average wait was 11 days compared with 4.6 weeks during the gasoline shortage, and the typical registrants' reported rate of 5.5 weeks.*

Matchlist quality was also superior. The bus-strike registrant received an average of 7.4 names per matchlist while the regular "dial-in" registrant received an average of 3.3 names. The "composite" regular registrant (from the Gasoline Evaluation Study) received an average of 5.5 names, a figure closely resembling that reported by the employee registrants in the 1978 study. Twenty-eight percent of the matchlists were blank (no potential carpool partners found within adjacent home and work grid squares), a much lower figure than the 44% of "dial-in" registrants reported by Shu & Glazer.

Presumably, the bus strike group would be highly motivated to use their matchlists to aid the decreased mobility experienced as a result of the strike and would have a high matchlist utilization rate. However, the figures do not show this.

Of those bus strike registrants receiving names on their lists, only 41% tried to reach one or more people. This is a very slight improvement over the 39% of the registrants reported

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* This figure is affected by the delay experienced by the "employer" registrants who received their matchlists indirectly through their companies. The average "dial-in" wait was 4.4 weeks.

by Shu & Glazer. It is much less than the percentage of "dial-in" registrants in Shu & Glazer's sample (49%). Shu & Glazer attributed the high matchlist usage to greater motivation among "dial-in" registrants based on the increased difficulty in applying as a "dial-in" registrant compared to an "employer" registrant.

Twenty-six percent of the "bus-strike" registrants did not call anyone because by the time they received their matchlists, they were already in carpools (13%) or the strike had ended (13%). (See Table 11).

The overriding concern volunteered by the remaining registrants for not using the matchlist related to the registrants' perceptions of poor matching potential. Twenty-six percent felt the matches lived too far away. Twenty percent complained that driving arrangements were too difficult to work out. Seven percent stated that no one on their list had a car. Another 8% determined work location too far or schedules incompatible for carpooling.* These observations are not unusual considering that transit users tend to walk short distances to their bus stops (less than ¼ mile) and their lower auto availability (or perceived stress in using an auto for commute purposes).

The high indirect carpool formation rate (without use of the matchlist) shows that the bus strike group was motivated to carpool. However, it appears that they anticipated greater

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* The transit registrant travelled a shorter distance from home to work than the "typical" registrant and this may explain the limited number of "good matches." In addition, the bus-strike registrants were a less mobile group than typical registrants having fewer licensed drivers and automobile available for use. Consequently, there was a high incidence of dependence on the carpool partner to provide the automobile.

TABLE 11

"BUS-STRIKE" REGISTRANTS' REASONS FOR NOT USING MATCHLIST

TOTAL n=53		NON-POOLERS* n=22	SHORT-TERM POOLERS* n=25	LONG-TERM POOLERS* n=6
26%	Matches lived too far away	6	6	2
20	Driving arrangements a problem	4	5	2
13	Strike ended (Before received list)	3	4	-0-
13	Already pooling (When received match-list)	2	4	1
8	None of the matches had cars	-0-	4	-0-
6	Changed work location (Before receiving matchlist)	2	1	-0-
4	Matches worked too far away	2	-0-	-0-
4	Work schedule variance	1	1	-0-
4	Lost interest in carpooling	1	-0-	1
2	Had only dated match-list	1	-0-	-0-

*Figures in these columns are observed frequencies, not percentages.

Based on the question: Why did'nt you call anyone? (on your matchlist)

problems in arranging carpools than did typical registrants whose major reasons for not using their matchlists were different work schedules (23%), lived too far away (18%), already joined a carpool (15%) and no interest (11%). This apprehension may have been due to the fact that as mentioned earlier, the "crisis" group tended to have fewer licensed drivers and cars available for equitable carpooling arrangements than regular registrants. This exaggerated apprehension must somehow be dissipated in order to increase matchlist usage.

Aside from the discomfort (or anxiety) associated with contacting a stranger which will always be experienced unless some sort of counselor or coordinator intercedes, the low matchlist utilization rate of the bus strike group may be because unlike typical registrants, the "bus-strike" registrants were not "choice" carpoolers. They were forced to switch their usual and probably preferred transportation mode. Even the gasoline-shortage registrant was exercising some freedom of choice in registering for carpool assistance. This lack of choice may have made it even more difficult to contact a potential carpooling partner. Shu & Glazer (1979) reinforced the assertion that prior acquaintanceship may be the key factor leading to the formation of a carpool. When <u>forced</u> to carpool, acquaintanceship may be even more crucial to the process -- thus the high level of carpools formed with spouses, friends and co-workers rather than strangers from a CTS matchlist. In addition, Margolin and Misch (1978) determined that women want more information about prospective carpooling partners than men. Some of the hesitance in matchlist utilization might be attributable to the fact that the majority of the bus-strike registrants were female.

Hand Match Utilization

As mentioned earlier, hand matches were devised for a small segment of the bus strike group. Within the sample, 15% reported receiving such personalized assistance. This percentage represents 22 people and consequently, several statistical concerns come into play. The statistical tests used in analysis must be extremely conservative, thus very few results are statistically significant. Though it is impossible to formulate many concrete conclusions from the findings, they can shed some light on the hand match process.

Almost 85% of those processed with the hand match activity received their information in less than one week. Only 3 people remember receiving no matches. The average number of names given was 4.4, slightly less than the average matchlist.

Of those receiving a hand match, roughly 50% tried to reach one or more persons. This percentage is higher than the matchlist use percentage, but it represents only nine individuals.

The breakdown of reasons for not acting upon the hand matches falls into cells to small for analysis. Similarly, there are no figures on carpools formed specifically due to the hand match process.

Factors Affecting Carpool Formation

Thirty-three percent of the bus strike registrants who reached anyone on their matchlist or were contacted by another CTS registrant subsequently began carpooling with the contact.

These carpoolers represented only 9% of the total emergency

registrant sample. This direct carpool formation rate is on par with the regular direct carpool formation rate found by Shu & Glazer in the 1978 Carpool Program Evaluation.

Considering the nature of the need for transportation within the strike impacted group, this direct carpool formation rate is unexpectedly low. However, a number of factors generic to this group come into play.

The transportation need was immediate. The "typical" registrant who waits several weeks for a matchlist and does not consider the wait exceedingly long would not be found in the group. The "typical" registrant can afford to wait and rely on CTS's services.

Although registering for assistance, the strike-impacted registrant no doubt continued to seek out alternatives. While awaiting the matchlist, (s)he still had to get to and from work. Thus, although the matchlist might arrive within days, transportation behavioral initiated prior to receipt which proved satisfactory might be continued.

In an earlier section, the possibility of the transit registrant having fewer carpooling possibilities than the average transit patron was discussed. The limited number of licensed drivers and available automobiles would certainly account for fewer carpooling opportunities than a regular registrant no matter how motivated.

The primary reason cited by "bus-strike" registrants for not carpooling with any of their prospective matches after contact was that the individuals lived too far away to be carpool partners (see Table 12). Since potential matches reside in the same home grid or an adjacent home grid to matchlist recipients, few matches can live a greater distance than one mile from the

TABLE 12

REASONS WHY BUS-STRIKE REGISTRANTS WHO CONTACTED POTENTIAL CARPOOL PARTNERS CHOSE NOT TO CARPOOL WITH THEM

TOTAL n=65		NON-POOLER n=34	SHORT-TERM POOLER n=23	LONG-TERM POOLER n=8*
32%	Person lived too far away	38%	31%	1
21	No auto available	20	26	1
14	Varying work schedules	15	13	1
11	Strike ended prior to arrangements	9	18	-0-
8	Work locations too far apart	6	4	2
8	Changed mind about car-pooling/lost interest	6	-0-	3
3	Not acquainted with person	3	4	-0-
2	No passenger insurance	3	-0-	-0-
1	Already pooling	-0-	4	-0-

* Figures reflect observed frequencies, not percentages.

Based on the question: What are some of the reasons why you didn't begin carpooling with any of these people?

registrant.

It is possible that "bus-strike" registrants have a different perception of distance than "typical" registrants since they are less likely to have an automobile available for use. Consequently, the "bus-strike" registrant would be more "distance" oriented than the "choice" carpooler who tends to be more flexible. The "bus-strike" registrant is likely to travel a short distance (on foot) to the bus stop. Travelling up to a mile (or more) to carpool may be beyond the bus user's transportation perceptual threshold.

Also, the "bus-strike" registrants generally travelled a shorter distance from home-to-work than the "regular" registrants which would reduce the number of compatible carpooling partners, and increase the sensitivity to modal access time/distance

Lastly, the "bus-strike" registrants were matched with the "Emergency Ridesharing" pool of regular registrants. The Emergency Ridesharing registrants are generally concerned with either long-term carpooling arrangements, or carpooling during smog alerts or personal emergencies only. It is very likely that they were just not interested in carpooling for the duration of the bus strike with someone who would probably not even be able to share in the driving responsibilities.

The Long Term Carpooler

Although perhaps not able to serve the immediate short-term needs of the impacted transit users, CTS was very useful in the creation of long-term carpools.

A long-term carpooler was one who continued to carpool for at least two months after the resumption of SCRTD service.

More than half of the long-term carpoolers in the sample either contacted or were contacted by someone on a CTS matchlist.

Of those 11 people, seven proceeded to long-term carpool with this person. Consequently, 37% of the long-term carpools were a direct result of CTS efforts.

The entire long-term carpooling group received a matchlist (100%), compared with only 86% of the short-term poolers, and 90% of the non-poolers. Seventy-three percent of the long-term poolers received their matchlist in less than a week, whereas only 56% of the short-term, and 45% of the non-poolers received theirs so expeditiously.

Those registrants who later entered long-term carpools also seemed to be more motivated than other registrants. Sixty-two percent tried to reach someone on their matchlist compared with only 32% of the short-term and 45% of the non-poolers. The long-term poolers also tried to contact more people on their matchlists (up to 3) than did the short-term and non-poolers (up to 2).

Meaningful analysis of the reasons why those long-term carpoolers who did not use their matchlists chose not to was impaired by the small number in the group. Those who formed short-term carpools (and who chose not to call anyone) volunterred the same types of reasons as the overall sample. Basic concerns referred to anticipated difficulty in arranging carpools with the matches (live too far, driving arrangements, no cars available). The non-poolers volunteered a larger variety of reasons, including job related aspects, lack of interest and "already pooling" (which is suspect), but the majority voiced the same anticipated carpool organization problems.

Suggested Improvements in CTS Service (See Table 13)

The respondents' suggestions for improvements did not bring to light any unsuspected flaws in CTS service. Although turn-

TABLE 13

BUS-STRIKE REGISTRANTS' SUGGESTED SERVICE IMPROVEMENTS

TOTAL SUGGESTING n=108		NON-POOLER n=60	SHORT-TERM POOLER n=35	LONG-TERM POOLER n=13*
34%	More names on Matchlist	40%	23%	5
29%	Closer matches	25%	34%	4
17%	Sent out Matchlist sooner	14%	20%	3
9%	Set up carpool for me	10%	9%	1
5%	Provide additional special services (non-specific)	5%	8%	-0-
4%	Sent a list to me	3%	6%	-0-
2%	Special services for handicapped	3%	-0-	-0-

*Figures in this colum are observed frequencies, not percentages.

Based on the question: How would Commuter Computer have served you better during the bus strike?

around time was reduced, and quality of matchlist increased, it was not enough to serve the immediate transportation needs of the impacted transit patron.

In the total registrant sample, 34% felt that there had not been enough names on their matchlists. Another 29% suggested that the matches were not close enough to be of use. The next most common response was that the matchlist did not arrive soon enough to use effectively (17%).

Nine percent wanted CTS to organize the carpools for them. Six percent suggested special service for the transit patron but did not elaborate on specifics. Four percent mentioned that they never received a list, and 2% requested special services for the handicapped.

Examining the suggestions for improved service across the pooling and non-pooling groups does not produce any enlightening differences between the groups. The non-poolers and long-term poolers were concerned equally with increasing the number of names on a matchlist. The short-term poolers were slightly more concerned about the closeness of the matches than the other two groups. Non-poolers were least concerned with decreasing the matchlist turn-around-time.

The majority of the bus-strike registrants (67%) surveyed wished to remain in CTS's data base for continued service.

Correctness of Data Base (See Table 14)

An easily overlooked factor which affects carpool formation rate is the "correctness" of the data base. Incorrect information appearing on the matchlists can inhibit subsequent carpool formation.

TABLE 14

BUS-STRIKE REGISTRANTS' DESIRE TO REMAIN IN DATA BASE

TOTAL n=150		NON-POOLER POOLER n=79	SHORT-TERM POOLER n=52	LONG-TERM POOLER n=19
67%	yes	57%	79%	74%
33	No	43%	21%	26%

Chi square = 7.240
($p < .03$)

Based on the question: Would you like to remain in the Commuter Computer matching system for possible future carpooling?

One-third of the 485 names selected at random from the bus strike data base to be interviewed had useless phone numbers (disconnected with no forwarding number, employee unknown, etc.). Unlike the regular data base where a registrant's information might remain "un-updated" for years, the "bus-strike" registrants had only entered the data base six months prior to interview. This suggests that the bus strike applicant may even be more transient than the typical registrant for CTS services creating a need for more frequent update if intended to remain current. Consequently, it seems unreasonable that a transit emergency "file" can be reactivated prior to a subsequent transit emergency without continual updating in the interim period.

Even among those registrants contacted who wished to remain in the data base, 30% required changes in some information on home or work address, telephone number or schedule. Proportionnately, a larger percentage of long-term pooler information remained the same (79%) than in either the short-term (70%) and non-pool (64%) groups, suggesting that the long-term carpooler may be somewhat more stationary.

SUMMARY

Overall, strike induced registrants did not resemble typical registrants in either source of awareness of CTS services or motivation for registering for them. Registrants who formed long-term carpools were most likely to mention a carpool related reason for calling for assistance.

Matchlist utilization was low even though overall, matchlists were of higher quality and dispatched more expediently than in any other time period, (including the gasoline shortage).

Although the "spontaneous" carpool formation rate (without use of matchlist) was high, carpools formed as a result of matchlist utilization were few. This supports the previous assumption that acquaintanceship is an important factor in carpool formation. It is unlikely that there were any acquaintances on the matchlists.

Too few handmatches were surveyed for meaningful analysis.

Direct carpool formation rate was affected by the immediate nature of the registrants' transportation need. It was also greatly affected by how far away potential matches resided from the registrant, and by automobile availability.

Suggestions on how CTS could improve its services centered around matchlist generation. Specifically:

- o increase the number of names on the matchlists,
- o have "closer" (distance) matches, and
- o get matchlists out sooner.

CHAPTER 5
THE CRISIS-COMPELLED CARPOOLER

INTRODUCTION

To gain further insight into how to best serve the needs of the crisis-compelled carpooler an analysis of the differences between those who did carpool during the strike and those who did not was performed. The carpooling group was divided into "short-term" carpoolers (those who carpooled for the duration of the strike only), and "long-term" carpoolers (those who continued to carpool for at least two months after transit service resumed).

The analysis is somewhat impaired by the very small number of long-term carpools included. By definition, the non-registrant group (which was interviewed at bus stops) has no long-term carpoolers -- they are all back on the bus. Thus, those non-registrant carpools which continued on after the strike are not represented. Within the registrant group, only 15% of the carpools fit the necessary criterial to qualify as long-term. This percentage represents 19 carpools.

Due to the limited number of long-term carpools, the statistical tests used in analysis were exceptionally conservative. Consequently, very few findings are statistically significant.

Awareness of CTS Services (See Table 15)

Prior awareness of CTS services may have had an indirect effect on crisis carpooling. More than three-quarters of the carpools formed during the transit strike were formed by respondents aware of CTS services (regardless of whether they were used or not). This is particularly interesting as only 74% of the respondents remember being aware of CTS at the time of the

TABLE 15

SOURCES OF AWARENESS OF CTS

TOTAL AWARE n=194		NON-POOLER n=101	SHORT-TERM POOLER n=76	LONG-TERM POOLER n=17*
31%	Freeway signs	39%	22%	4
19	Word of mouth	15	24	3
14	Employer	12	20	1
12	Television	8	15	4
11	Radio	14	8	2
4	Newspaper	4	4	1
3	Saw CTS Van	2	5	-0-
2	Flyers	2	-0-	2
2	DMV	3	-0-	-0-
1	Public Info. Office	1	1	-0-
1	Billboards	-0-	1	-0-

*Figures in this column are observed frequencies, not percentages

Based on the question: How did you first hear about Commuter Computer (CTS)?

strike.

Differences in how that portion of the sample became aware of CTS services approach significance ($p < .10$). To some extent, source of awareness of CTS is useful in predicting crisis carpooling. With this knowledge, specific marketing of emergency program efforts could be concentrated into the most effective channels.

The primary source of awareness of CTS services was freeway signs (31%), indicating awareness through regular marketing channels as opposed to crisis-specific media. The 1978 Carpool Evaluation found freeway signs to be the most popular source of awareness for the "dial-in" registrant (43%). Unfortunately, the majority of the non-poolers fell into this category. Although the most pervasive medium, freeway signs are not the most effective source of information during a transit emergency. Long-term awareness of CTS services is not crisis-specific. In addition, access to these signs is limited to those commuters who travel on freeways, excluding a large segment of SCRTD riders.

Word of mouth was mentioned as the second most common source of awareness (19%). Although fewer transit riders were introduced to CTS in this manner, a larger percentage tended to carpool. Fifty-eight percent of those respondents who heard of CTS through word of mouth carpooled during the strike. In contrast, only 35% of the respondents who learned about CTS through freeway signs carpooled. This supports the suggestion that freeway signs are too passive a medium in transit emergency situations. Face-to-face interaction may be perceived as a recommendation of services rather than just an advertisement.

The percentage of crisis carpoolers found within the group which learned about CTS through employer (14%) concurs with the

supposition that the more personalized the source, the more likely the receiver will act upon the information, either directly or indirectly. Fifty-seven percent of this group carpooled.

The mass media -- television, radio and newspaper combined were responsible for 27% of the CTS aware group. The majority of the carpoolers (56%) were from the television group -- the most active medium.

Within the carpooling group, there were no outstanding differences in long versus short-term carpooling behavior which could be attributed to source of awareness.

In summary, the majority of the emergency carpoolers were aware of CTS services, and learned of them through an active, crisis-specific means. It is important to stress that this awareness did not necessarily translate into use of the service. Concentrating emergency information and marketing efforts into employer channels and television spots in as personal a manner as possible may be more effective than spreading efforts into a larger number of more passive vehicles.

Predictors of Emergency Carpooling Behavior

Differences in type of SCRTD service used by the transit patron (commuter versus non-commuter) were not particularly revealing in predicting emergency carpooling behavior. However, that portion of the sample which did not define itself as transit dependent exhibited some unexpected behavior.

Forty-two percent of the long-term carpoolers were located within the non-transit dependent group. This is very surprising as this group represents only 12% of the entire sample. However,

TABLE 16

COMPARISON OF PRE-STRIKE AND

STRIKE INDUCED TRAVEL BEHAVIOR

Chi square = 28.407
p .0001
Total Sample
n=262

		Non-RTD Dependent n=32	Commuter Bus User n=70*	Non-Commuter Bus User n-160**
52%	Non-pooler	16%	26%	58%
41%	Short-term Carpooler ***	2%	29%	69%
7%	Long-term Carpooler ****	42%	21%	37%

Total Sample n=262		Non-RTD Dependent n=32	RTD Dependent n=230
52%	Non-pooler	69%	50%
41%	Short-term	6%	45%
7%	Long-term	25%	5%

*SCRTD buses routed on freeways (Freeway Fliers, Park & Rides)
**SCRTD buses routes on surface streets only
***Carpooled for duration of strike only
****Carpooling continued for at least 2 months after resumption of SCRTD service

in a number of respects, notably auto availability, education, occupation and income, the long-term strike induced carpooler resembles the regular CTS carpooler. (See Table 16).

The major difference between the non-dependent group and the dependent group was greater automobile availability. (See Table 17). This increased accessibility could be responsible for decreasing the need for carpooling during the strike, while increasing the potential for convenient carpooling on an ongoing basis. The findings support this. Besides the disproportionate number of long-term carpoolers in this group, there was a miniscule short-term carpooling rate (6% versus 45% in the transit-dependent group), and a large percentage of non-poolers (69% compared with 50%).

Within the telephone group, the only one containing both long and short-term carpoolers, a large difference in automobile availability was also evident. Long-term carpoolers' households tended to have more cars available (1.47 per household) than short-term carpoolers (.78), and consequently, may have had a car available for carpooling more frequently.

These findings suggest that it is the transit user who is not totally dependent who is the likeliest candidate for long-term carpooling. In this group, the issue of convenience as a prerequisite for long-term carpooling is not as prominent as it is in the transit population as a whole. There are serious marketing implications in this finding. This quasi-dependent transit user is very likely to be part of the transit using segment which switches to an alternate transportation mode following a transit interruption. The potential for long-term carpooling (vs driving alone) could be capitalized upon with the development of an appropriate marketing strategy.

The long-term carpoolers also tended to share driving

TABLE 17

AUTO AVAILABILITY OF CRISIS-COMPELLED CARPOOLERS

TOTAL n=259	NON-POOLERS n=135	SHORT-TERM n=105	LONG-TERM n=19
Vehicles			
0	40%	39%	16%
1	31%	41%	32%
2	16%	17%	42%
3 or more	13%	3%	10%

Chi square = 21.52
($p < .09$)
Based on the question: How many passenger vehicles are available in your household?

responsibilities more often than did the short-term poolers who rarely drove at all. The shared driving responsibilities may have been simpler to manage than organizing a compensation system and thus minimized the "inconvenience" aspect.

There were no outstanding differences between the groups in overall transit usage (destination, number of days used, number of trips daily, travel time or distance) or in socio-economic characteristics. As in the comparison between the registrant and non-registrant groups, the difference between whether a transit patron carpooled or not depended on level of previous dependency on SCRTD.

It must be reiterated that due to the small size of the long-term carpooling sample and conservativeness of the accompanying statistical tests, differences between the groups which may have exist might have been overlooked.

CHAPTER 6
EFFECTS OF THE SCRTD STRIKE ON EMPLOYERS IN THE IMPACTED REGION

INTRODUCTION

Prior to the onset of the SCRTD work stoppage a "Transit Emergency Information" kit was developed for distribution to employees located within the areas (i.e. CTS grid squares) serviced by the ten most popular service routes. (See Appendix B). A listing of 1,500 companies located within the targeted area was compiled, and shortly after the onset of the strike 1,500 kits were mailed out. An enclosed cover letter listed suggestions as to how employers could assist employees by providing information on how to get to work during the strike. In addition, posters, brochures and a tabloid were included with further transportation information.

Although the Employer Marketing staff was the least impacted of CTS's employees during the transit strike it was decided that a survey of those employers to whom the kits were mailed should be undertaken to measure the kits' usefulness in contending with employee problems arising as a result of the strike, and to gain a profile of the employers located within the targeted area.

METHODOLOGY

A sample of 110 companies was drawn from the mailing list. Four categories were established within which the companies could fall. These categories were:

- o "marketed, and accepted services";
- o "marketed, and declined services";
- o "marketed, company decision pending"; and
- o "not selected for marketing."

The companies selected for survey were: marketed, (accepting or declining services) and not selected for marketing. Companies pending were excluded so as not to interfere with the marketing process.

The employer questionnaires used in the "Evaluation of the Gasoline Shortage" were adapted for use in this study. A questionnaire was tailored for each of the three marketing categories.

The final return after telephone follow-up on the 110 questionnaires mailed out was 51% (or 56 companies). Six percent of the questionnaires were returned as undeliverable as addressed. The return rate of those companies declining CTS services was much lower than that of companies accepting CTS services and those companies which had not been officially contacted.

Marketed Companies

Of the companies marketed, 89% were satisfied with their working relationship with CTS. This figure was the same whether services were accepted or declined.

One-third of the contacts at companies marketed could not recall when they had first heard of CTS. Although 6 companies had been aware of CTS since 1974, the overwhelming majority, 13 (40%) had only been aware of CTS for a few months to a year prior to the time of the transit strike.

When asked how they had learned about CTS, (and allowed several possible responses), most companies responded "through contacts initiated by CTS Transportation Representatives" (14 or 32%). Media exposure was responsible for introducing CTS

to 8 companies. Six companies were introduced to CTS through freeway signs.

Only one company reported learning about CTS via the Transportation Emergency Kit. However, it must be remembered that the companies were not surveyed until six months after the kits had been received.

A large percentage of the employers surveyed stated that they were interested in CTS services to assist them in solving their employees' needs (31%). Another 29% were concerned with satisfying AQMD requirements. Concerns about the cost of gasoline were responsible for 23% of employer interest with CTS services. There were no major differences in the responses of companies who ultimately declined services and those who accepted them.

Although the bus strike was listed as a possible reason for being interested in carpooling services, no employer selected it. This coupled with the fact that the majority of the bus-strike registrations were individual "dial-ins" and the majority of the gasoline shortage registrations were through employer channels, suggests that employers perceive employee transit ridership as too low to merit their concern.

Of those companies declining services, two responded that CTS services were too expensive (with no explanation), two reported that they disliked CTS procedures (Manager Meetings), two replied that they had instituted in-house programs of their own, and two stated that there were shift problems which would hamper ridesharing. One employer representative said that there was no management support, and one reported that the company was interested in promoting its own in-house program. However, 60% did mention that they would be interested in carpooling in the event of future transit emergencies.

Companies With No Official Marketing Contact

Of those companies with no official contact, 78% were aware of CTS, most for less than one year.

Thirty-one percent became aware of CTS via freeway signs, and another 24% learned about CTS through some form of media coverage. No employer mentioned the Transportation Emergency kit.

When asked why there was no interest in CTS's services, 19% reported that CTS would not be able to institute ridesharing because of the nature of the employees' home to work patterns or because of expense. Sixteen percent stated that there was no employee interest in ridesharing.

Fifty-seven percent of the employers reported that they would be interested in CTS services in the event of future transportation emergencies.

SUMMARY AND CONCLUSIONS

The questionnaire was designed to be very brief and supplied only superficial information about the surveyed employees. A major objective in surveying the companies was to see if the Transportation Emergency kit had any measurable impact on the employers receiving it. A secondary objective was to determine employer receptiveness to active involvement in assisting employees during future emergencies.

Only one employer of the 56 surveyed recalled the Transportation Emergency kit as a source of awareness of CTS services. This could be due to the length of time between receipt of the kit and the survey.

However, in the course of the survey it became apparent that the mailing list contained a great deal of obsolete information. There was a high level of duplicate listings, which reduced the actual number of employers receiving the kit. In addition, many addresses and contact names were dated. It is very possible that a large percentage of employer contacts never received the kits.

Approximately 60% of the employers contacted responded favorably to the question regarding their interest in CTS services in the event of future transit emergencies, although they did not wish them on an ongoing basis. Findings suggested that employer awareness of employee dependence on public transit was very low. If this awareness could be enlightened, it is possible that more companies would be interested in assisting their employees in future emergencies.

These findings have valuable implications for a generic emergency program. If employers who are <u>not</u> CTS client companies are receptive to transit emergency service, CTS will be able to reach and assist a greater portion of the transit using public.

An unexpected finding worthy of further inquiry was the issue of "expense" as a reason for declining CTS services. CTS carpooling assistance is <u>free</u>. It is possible that those employers concerned with expense were only aware of one aspect of CTS, the Vanpool Program, which is not free, or they were considering "in-house" costs as expenses. If there is a gross misunderstanding of the actual mechanics of CTS services, it must be alleviated. This issue is of greater importance as CTS intends to phase out the Vanpool Program in the near future.

CHAPTER 7
CONCLUSIONS AND RECOMMENDATIONS

INTRODUCTION

Carpooling is the most viable alternative open to SCRTD transit patrons in the event of a transit work stoppage in the Los Angeles Metropolitan Area. The SCRTD system, unlike public transportation systems in other metropolitan areas has only one competitor -- the automobile. If the entire transit-using population switched to single-occupancy-vehicles for the duration of a strike, the ensuing congestion and accompanying pollution could cripple the entire region.

Carpooling is a means of moving the entire commuter population in as few vehicles as possible, with little lead-time or investment of large amounts of capital required. It is actually capable of reducing energy consumption while utilizing the existing transportation system efficiently.

The primary goal of this evaluation was to investigate implications for the design and implementation of a generic emergency program which would provide significant increases in CTS' services at short notice. The primary objective was to examine the effect of the SCRTD work stoppage on commuter behavior, focusing on ridesharing, and its subsequent effects on CTS service.

Meeting the Challenge

Prior to the SCRTD work stoppage (January to July, 1979), Commuter Transportation Services, Inc., received less than 1,000 "dial-in" registrations for carpooling assistance per month. In the 23 days of the SCRTD strike, CTS registered almost 4,000 strike-induced "dial-in" and handled 17,000 calls for transportation information.

Although greatly taxed, through careful planning, the hiring of temporary personnel and expanded hours of operation, CTS was able to reach 90% of the registrants with a matchlist of potential carpooling partners within seven days.* In addition, several hundred registrants received handmatches as well as matchlists.

In spite of the increased demand, matchlist turn-around-time (length of time between registration and delivery of matchlist) and quality (number of names on matchlist) were greatly improved over regular service and even service during the gasoline shortage.

Registrant Use of Matchlist

Despite the expeditious dispatch of matchlists, CTS' effectiveness was hampered by low utilization on the part of the registrants. This low utilization rate may have been due to any of several reasons including:

- o although matchlists were received in less than one week, this may not have been soon enough considering the immediate transportation need;
- o matches may not have been adequate, either due to lack of automobile availability, or distance residing from registrant;
- o regardless of timeliness or quality of matchlist, the "bus-strike" registrant may have a greater reluctance than regular registrants to call a stranger to arrange a carpool.

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* Both survey respondents and internal sources agree on this "wait" time.

Due to the immediacy of the transportation need, many registrants were unable to wait for matchlist receipt and were either carpooling or had found another transportation mode prior to its arrival. If the alternative mode was serving their needs successfully, there would be no need to switch.

The "bus-strike" registrant group had a much lower automobile availability rate and fewer licensed drivers than regular registrants, increasing the need for a match with an automobile driver who lived within "walking" distance of the registrant. Plus, because they had shorter home-to-work commutes than regular registrants, number of potential matches was reduced.

The majority of the group was female, and research has shown that they tend to require more information on potential partners than men -- more than provided on the matchlists (Margolin and Misch). Also, the "bus-strike" registrants had less of a chance of finding acquaintences included on the matchlist than did regular registrants, and research has shown that the desirability of carpools decreases proportionately with the number of non-acquaintences included (Levin and Grey).

A further contribution to the hesitancy in calling anyone on the matchlists may have been the issue of choice. Whereas the typical, and even gasoline-shortage registrant exercises an option when registering to carpool, the "bus-strike" registrant was forced to switch from the preferred mode to another. This is supported by the finding that the overwhelming majority of the strike-induced carpoolers returned to the bus once service was resumed.

Improvements in CTS Service Resulting from the Transit Strike

Several elements of CTS operations which were developed to accommodate crisis demands were integrated into ongoing program elements which improved CTS' ability to assist in future emergencies.

The Data Processing Department's transition from keypunch machines to the UDS 2000 keydata entry equipment has speeded up turn-around-time capabilities. Using a "batch system," a "dial-in" registrant could be gridded, keypunched and put into the system in one day and a matchlist produced the following morning.

This coupled with the Information Center which will shortly be capable of personally handmatching all "dial-in" registrants greatly enhances CTS potential to assist speedily. With expanded personnel, the matchlist will be screened, and matches contacted for current interest and availability. The pertinent information will be forwarded to the "dial-in" and the match(es). "Case files" will be kept and there will be a follow-up every six months.

With both these programs elements in operation, CTS is in a better position to handle short-term emergencies requiring increased output on short notice. Theoretically, a registrant could have a personally selected and screened list of potential matches within 24 hours.

In addition, current plans call for the acquisition of an "in-house" mini-computer system by late spring, 1981. Once operational, the data base would be accessible in moments. This would enable a "crisis" registrant to receive a personalized match the same day.

It is possible that the expedience and personalized nature of the matching process may have a positive effect on registrants' reluctance to call any of the matches. In addition, the matches would have the registrants' phone numbers, doubling the chance of contact.

The process outlined would also reduce the "computerized" and "impersonal" nature of the matching method which is an area of major concern. Minor revisions in registration form and subsequent matchlists to include additional information useful in emergency situations would also enhance the process.

Transit Emergency Marketing Procedures

If CTS is to be utilized as a source of assistance during strikes, dissemination of information must begin prior to the transit interruption. The surveys showed that public awareness of CTS -- Commuter Computer -- the 380-RIDE number -- has grown exceedingly in recent years. However, of the hundreds of thousands of commuters whose transportation mode was curtailed, only 17,000 called for assistance.

Current marketing procedures are aimed at single-occupancy-vehicle drivers, (SOVDr's) through employer work sites. Thus, transit users' awareness of CTS is lower than that of the general public. Although transit users are not a prime market for ongoing carpooling, during strike periods carpooling for many is the only alternative. For others with the option of becoming SOVDr's, carpooling is a means to avoid the congestion and pollution which would ensue.

The transit using market segment can be further divided into two categories:

- semi-dependent, those who have available automobiles

and/or driver's license; and

- o dependent, those who do not have an automobile available and/or a driver's license.

These groups, especially the transit dependent do not necessarily need to be motivated to carpool -- they need to be supplied the information necessary to carpool.

If possible, appeals for emergency carpool registration should begin in advance of a strike. The positive aspects or incentives which would appeal specifically to transit users should be included in all marketing mediums. Among others, these include:

- o transit patrons are ridesharers -- so are carpoolers,
- o carpooling is as relaxing, if not more so than the bus,
- o carpooling often reduces travel time, and
- o carpooling is probably the most financially reasonable of alternatives.

Another angle worth promotion would be the enlargement of "current" small carpools.

The use of "active" media, as TV and radio, and employer, would promote face-to-face, word-of-mouth transmission of information which is the most effective source. As a non-profit agency, CTS should utilize public service space provided by broadcasters. All ads should include the sources and phone numbers of more detailed information so as to give the user information that they can act on.

Employer Involvement

The registrant survey determined that the employer is an effective source of emergency information, although underutilized. The employer surveys determined that most companies in the region although not receptive to assistance during transit emergencies. Currently, level of employer awareness of the degree of SCRTD use by employees is low. If this awareness could be enhanced, it is possible that even more companies would be amenable to assisting their employees during transit strikes.

Not all transit emergency employers need be as actively involved in the process as is usually expected of client companies. Providing bulletin board space and perhaps allowing dispersion of brochures and/or registration forms would be appropriate. If possible, providing for the dispersal and collection of registrations forms would be exceptionally useful.

The experience with the "Transportation Emergency" kit demonstrated that optimally, the contact with employer should be personal. This would be a labor-intensive process however. With prior preparation and research, a comprehensive listing of the employers with the greatest potential need for transit emergency assistance could be compiled long enough in advance for prior interaction of some type to be guaranteed. The correct contact person should at least be identified and kept current. If computerized, the list could be accessed and acted upon speedily.

The Transit Emergency Registrant File

Ideally, a situation of commuter "preparedness" should be achieved prior to any emergency. Through a combination of techniques, including all those mentioned earlier, mass disper-

sion (via "stuffers" in bills, flyers and posters in several locations, and any other means feasible), a data base of "transit-emergency" registrants could be in existence long before the development of a transit shut-down. The updating process could be maintained on a continuing, revolving basis, although it would be an expensive process. The foundation of the data base could be the present "bus-strike" registrant file.

Additional Suggestions for Emergency Service

- At the very minimum, marketing of some sort must reach the bus-riding population to increase their awareness of the emergency services available. Bench ads, and on-bus advertising would increase overall awareness if pursued.
- Stressing the importance of matchlist utilization might increase the usage rate even if personalized handmatches are not possible.
- A current listing of employers likely to be most impacted by a transit work stoppage must be maintained. This need not be a complex, time-consuming process.
- Since it is likely that transit users do not always register with CTS in the course of employer marketing, current emergency registrations could be revised to include a question about interest in special assistance during transit emergencies. Processing could identify those interested and create a special file for use later.
- Quality of the additional personnel hired to assist in meeting increased demands of emergency situations must be a high priority. Perhaps a "borrow-on-call"

agreement could be negotiated with other public service agencies. Not only could money be saved, but the agreement could ensure advance training, or at least some familiarity with CTS operations.

- Quality of the data base is also very important in any emergency plan. Regular carpool registrants may have the time and opportunity to call potential matches that are outdated. However, the immediate need of the emergency registrant renders the selection process impossible. The emergency information must be current. If the data base cannot be updated every six months, provisions for updating the emergency and/or "dial-in" data bases might be made.
- A recommended formula for determining a compensation system for carpools where only one member provides the automobile should be developed for bus-strike carpoolers.
- The role of the Public Affairs Coordinator can be very important in an emergency plan. It is this person in conjunction with the Public Relations firm, who has the contact with government agencies and officials, media sources and private industry.

The preparation of an Emergency Plan must take into account a wide variety of concerns. Some of the more important aspects to include are:

- spatial, data processing and communication needs required for operation,
- additional personnel required to fulfill all aspects of operation,

- o projected budget needed to cover increased activities,
- o sources of funding,
- o special forms and collatoral materials,
- o the expedience with which operations must be able to start,
- o work schedules,
- o training procedures,
- o employer interest, and
- o referral information for those individuals that cannot be served directly.

CONCLUSIONS

CTS' area of expertise is assisting commuters to form carpools. The home-to-work commute has the same origin, destination, arrival and departure time daily. During transportation emergencies CTS should concentrate its focus on its assistance to commuters. Designing special programs to assist callers with special needs, (i.e., medical appointments or shopping) would be beyond the scope of CTS' present expertise and would diminish effectiveness of the service for commuters. For individuals with special needs, CTS is most valuable as a referral service.

APPENDIX A

GLOSSARY

GLOSSARY

1. Handmatch - matches selected manually from computer generated lists of the total registrant data base.

2. Long-term carpool - initially formed in response to transit strike and continuing for at least two months after the strike was settled.

3. Matchlist - computer generated list of names of prospective carpooling partners.

4. SOVD'rs - single occupancy vehicle drivers.

5. Short-term carpool - formed in response to transit strike and dissolved prior to or immediately following resumption of transit service.

6. "Spontaneous" carpool - also known as "instant" or "natural" carpool; formed without CTS assistance.

7. Turnaround time - period between registering for carpooling assistance and receipt of matchlist or handmatch.

APPENDIX B

CTS MARKETING MATERIALS

EMERGENCY RIDESHARING REGISTRATION

Important—your cooperation is required to help prevent disruption of your work during a Federal Fuel Allocation Emergency or Stage II Alert air quality emergency. Complete and return this emergency information (California State Health and Safety Act, Sec. 40001) to your employer.

Yes [ ] No [ ] Have you ever applied to a Commuter Computer ridesharing program before?

PLEASE PRINT all information. Use only one letter per box. Abbreviate where necessary. Be specific in home address. Example: Is it a Street (St.), Road (Rd.), Avenue (Ave.), etc? Provide apartment (Apt.) number where applicable.

NAME: Last Name _____ First Name _____

HOME COUNTY: (Check only one.)
1 [ ] Los Angeles
2 [ ] Orange
3 [ ] San Bernardino
4 [ ] Riverside
5 [ ] Ventura

HOME ADDRESS: Number and Street _____

SAMPLE

City _____ Zip Code _____

_____ AT _____

Major street or boulevard intersection nearest your home. (Example: Wilshire Blvd. at La Cienega Blvd.)

[ ] Check here only if you do not want your home address printed on ridesharing matchlists.

COMPANY NAME:

WORK ADDRESS:

NORMAL WORK HOURS:

BEGIN WORK: Hour [ ][ ] Minutes [ ][ ] 1 [ ] a.m. 2 [ ] p.m. (Check one.)

LEAVE WORK: Hour [ ][ ] Minutes [ ][ ] 1 [ ] a.m. 2 [ ] p.m. (Check one.)

EXAMPLE: Show 4:30 p.m. as Hour [0][4] Minutes [3][0] [✓] a.m. [ ] p.m. (Check one.)

DO NOT GIVE MILITARY TIME.

PHONE NUMBER: Home or work number where you may be reached. 1 (213) 2 (714) 3 (805) Area Code (Circle one). Phone Number [ ][ ][ ]—[ ][ ][ ][ ] Extension (If Any) [ ][ ][ ][ ][ ] [ ] 1 If home phone, check here.

E.I.D.

COMPUTER USE ONLY.
Home Grid [ ][ ] Work Grid [ ][ ][ ]

DISTRIBUTION CODE: [ ][ ][ ][ ][ ][ ][ ][ ]

NORMAL TRAVEL METHOD: How do you usually travel to work? Check only one.

[ ] 1 Auto, Driving Alone [ ] 2 Auto Carpool [ ] 3 Public Bus [ ] 4 Motorcycle

[ ] 6 Commuter Van [ ] 7 Commuter Bus [ ] 5 Other _____

SAMPLE

RIDESHARING:

Yes [ ] 1 No [ ] 2 Are you interested in receiving free information on regular ridesharing opportunities now available to you, and a list of other interested people who live and work near you? (Answering yes does not obligate you to rideshare.)

Yes [ ] 1 No [ ] 2 Do you have a car available for carpooling?

V.P.I.
Yes [ ] 1 No [ ] 2
PROGRAM: ___ 10 ___ 12 ___ 15

This information is true and correct. I release it for confidential use in ridesharing.

FORM ER-01 3/27

SIGNATURE: _____ **DATE:** _____

Write. Do not print.

Commuter Computer. 3440 Wilshire Blvd., Suite 610, Los Angeles, CA 90010. Phone (213) 380-RIDE./Orange County: (714) 834-RIDE./San Bernardino County: (714) 825-RIDE. Riverside County: (714) 684-RIDE./Ventura County: (805) 647-RIDE.

- - - COMMUTER COMPUTER EMERGENCY CARPOOL LIST - - -

1234567-121 EMPLOYER ID: E2345

08/18/78

SMITH DARLENE WORK ADDRESS: 2401 E. MAIN HOME MAP SQUARE: 56-157

4124 ELLEN AVE. WORK HOURS: 7:30 AM - 4:00 PM WORK MAP SQUARE: 57-154

LAKEWOOD CA 90713 PHONE: (213) 513-9999 x WORK CAR AVAILABLE: YES

NAME		WORK ADDRESS	WORK HOURS	CAR AVAILABLE	PHONE	LOC/E)
FROM YOUR HOME MAP SQUARE:						
CAPPS	DOLLIE	2401 E. MAIN BLVD.	7:00-3:30	YES	(213)513-9998	WORK
MILLER	D Z	2401 E. MAIN BLVD.	7:30-4:00	NO	(213)513-9997	WORK
BERGER	HAROLD	2401 E. MAIN BLVD.	7:30-4:00	YES	(213)513-9996	WORK
JONES	DONALD F	2605 PRAIRIE BLVD.	7:30-4:00	YES	(213)257-1234	HOME
FROM OTHER MAP SQUARES NEAR YOUR HOME:						
KELLY	GEORGE W	2401 E. MAIN BLVD.	7:00-3:30	YES	(213)513-9993	WORK
BUSH	ROBERT	2401 E. MAIN BLVD.	7:30-4:00	NO	(213)513-9991	WORK
MERRILL	CHARLENE	2703 OLIVE	7:30-4:00	YES	(213)593-1788	WORK
HANNA	FRED	2280 IMPERIAL	7:30-4:00	NO	(213)942-4087	3314

(105)

COMMUTER RIDESHARING REGISTRATION

Important – please complete and return this registration as soon as possible to obtain optimum computer information on commuter ridesharing opportunities.

Yes No

Have you ever applied to a Commuter Computer ridesharing program before?

PLEASE PRINT all information. Use only one letter per box. Abbreviate where necessary. Be specific in home and work address. Example: Is it a Street (St.), Road (Rd.), Avenue (Ave.), etc? Provide apartment (Apt.) number where applicable.

NAME: Last Name | First Name | Middle Initial

HOME ADDRESS: Number and Street

City | Zip Code

AT

Major street or boulevard intersection nearest your home. (Example: Wilshire Blvd. at La Cienega Blvd.)

Check here only if you do not want your home address printed on ridesharing matchlists.

HOME COUNTY: (Check only one.)

1 Los Angeles
2 Orange
3 San Bernardino
4 Riverside
5 Ventura

COMPANY NAME:

WORK ADDRESS: Number and Street

City | Zip Code

AT

Major street or boulevard intersection nearest your work. (Example: Hollywood Blvd. at Vine St.)

WORK COUNTY: (Check only one.)

1 Los Angeles
2 Orange
3 San Bernardino
4 Riverside
5 Ventura

NORMAL WORK HOURS: BEGIN WORK Hour | Minutes | 1 a.m. 2 p.m. (Check one.) LEAVE WORK Hour | Minutes | 1 a.m. 2 p.m. (Check one.)

EXAMPLE: Show 4:30 p.m. as Hour 04 | Minutes 30 | ✓ p.m. (Check one.) DO NOT GIVE MILITARY TIME.

PHONE NUMBER: Home or work number where you may be reached. 1 (213) 2 (714) 3 (805) Area Code (Circle one). Phone Number — Extension (If Any) | 1 If home phone, check here.

E.I.D.

NORMAL TRAVEL METHOD: How do you usually travel to work? Check only one.

1 Auto, Driving Alone
2 Auto Carpool
3 Public Bus
4 Motorcycle
6 Commuter Van
7 Commuter Bus
5 Other _____

RIDESHARING: 1 2 You will receive free information on regular ridesharing opportunities now available to you, and a list of other interested people who live and work near you.

Yes No

Do you have a car available for carpooling? 1 2

COMPUTER USE ONLY.

Home Grid

Work Grid

Yes No driver?

V.P.I. Yes No

PROGRAM: ___10 ___12 ___15

This information is true and correct. I release it for confidential use in ridesharing.

FORM ER-04 11/1/79

SIGNATURE: _____ **DATE:** _____

Write. Do not print.

Commuter Computer. 3440 Wilshire Blvd., Suite 610, Los Angeles, CA 90010. Phone (213) 380-RIDE./Orange County: (714) 834-RIDE./San Bernardino County: (714) 825-RIDE.

--- COMMUTER COMPUTER CARPOOL LIST ---

8008001-112
2/11/77

(SAMPLE)

EMPLOYER ID: E1623
MAIL LOC.: 1769

KNOUSE CHARLES

* 716 CHELSEA RD

REDONDO BCH CA 90287

WORK ADDRESS: 100 TEMPLE ST

WORK HOURS: 8:00 AM - 4:30 PM

PHONE: (213) 378-8652 X Home

HOME MAP SQUARE: 55-145

WORK MAP SQUARE: 45-151

CAR AVAILABLE: YES

NAME		HOME ADDRESS	WORK ADDRESS	WORK HOURS	CAR AVAILABLE	PHONE	LOC/EX
FROM APPROX. 1.25 MILES OF YOUR HOME:							
FISHER	RONALD J	4136 ANDREWS PL	100 TEMPLE ST	8:00-4:30	NO	(213) 860-4545	HOME
GLOVER	MARY		155 N LOS ANGELES ST	8:30-5:00	NO	(213) 482-6895	HOME
GLORIA	LARRY	14123 SEPULVEDA BLVD.	155 N LOS ANGELES ST	8:30-5:00	NO	(213) 376-8952	HOME
GNANN	WAYNE		155 N LOS ANGELES ST	8:30-5:00	NO	(213) 482-5339	HOME
FROM AREAS FURTHER FROM YOUR HOME:							
OREAR	ROBERT		100 TEMPLE ST	8:00-4:30	YES	(213) 860-3435	HOME
KNIGHT	DAVID		135 THIRD ST	7:45-4:15	YES	(213) 378-9895	HOME
FLEER	LILLIAN	3323 W ARTESIA BLVD	300 BROADWAY	8:00-4:30	YES	(213) 456-8877	HOME
SIMPSON	ARTHUR	215 S LUCIA AV	200 N SPRING ST	8:00-4:30	YES	(213) 485-3325	HOME
KNOX	JOHN	2911 GIBSON PL	300 BROADWAY	8:00-4:30	YES	(213) 456-9873	HOME
KNOWLES	SIDNEY	822 W 173 ST	220 TEMPLE ST	8:00-4:30	YES	(213) 456-2323	HOME
FLORES	GLORIA	1614 GOODMAN AV	100 TEMPLE ST	8:00-4:30	YES	(213) 532-6161	HOME
KNAPP	RICHARD		220 TEMPLE ST	8:00-4:30		(213) 532-1092	HOME
BUCK	MARTHA	525 SAPPHIRE AV	200 N SPRING	8:00-4:30	YES	(213) 378-6648	HOME
KNUDSEN	TERRY	532 HELBERTA AVE	125 TEMPLE ST	8:20-4:45	NO	(213) 620-1970	554
SIGNER	A J	802 S CATALINA AV	155 N LOS ANGELES ST	8:30-5:00	YES	(213) 482-5522	145
BUNYARD	JIM	649 26TH ST	155 N LOS ANGELES ST	8:30-5:00	NO	(213) 482-6660	HOME
KNOTTS	ROSEMARY		155 N LOS ANGELES ST	8:30-5:00	NO	(213) 482-7538	HOME
MARTINO	LARRY		200 N SPRING ST	8:00-4:30	YES	(213) 485-5028	HOME
GLASS	CHARLENE	87214 PICO BLVD	200 N SPRING ST	8:00-4:30	NO	(213) 482-9310	HOME
GLOYNE	ELVIN	1512 MONTEREY BLVD	200 N SPRING ST	8:00-4:30	YES	(213) 485-2323	HOME
GLISTER	JOSEPH	5421 VICTOR DR	250 MAIN ST	8:00-4:30	YES	(213) 456-1237	HOME
STENEN	SHARON L	703 E ARLINGTON AVE	200 N SPRING ST	8:00-4:30	NO	(213) 456-8873	928
GLEED	ROBERT	7852 N OARK RD	300 BROADWAY	8:00-4:30		(213) 372-5258	HOME
GLOWA	DONALD		125 TEMPLE ST	8:20-4:45	NO	(213) 620-8585	HOME
GLEASON	SUSAN	5542 N SANDS DR	125 TEMPLE ST	8:20-4:45	YES	(213) 620-7889	HOME

* AT YOUR REQUEST, YOUR HOME ADDRESS DOES NOT APPEAR ON THE MATCH LIST OF OTHERS.

--- SEE OTHER SIDE FOR ADDITIONAL INFORMATION AND INSTRUCTIONS ---

COMMUTER COMPUTER
3440 Wilshire Blvd. • Suite 610 • Los Angeles, Ca 90010 • Telephone: (213) 380-RIDE

"ENERGY EMERGENCY PROGRAMS"

ASSUMPTION: In crisis situations people (and organizations) will take self-help methods of forming shared rides (or shared ride programs), provided they have sufficient information on which to act.

GOAL: Commuter Transportation Services, Inc.'s charge in this crisis is to provide that sufficient level of information on which consumers in the South Coast Basin (organizations and individuals) can act. This information takes the forms of:

A. Emergency Rideshare Matchlists

B. Alternative Transportation Modal Information and/or Access

C. Regular Carpool Matchlists

OBJECTIVES:

A. Develop capacity to process and issue 50,000 *Emergency Matchlists in a thirty day (30) period, enabling a total emergency matchlist production of 250,000 to 500,000 during a six (6) month period.

B. Modify peak demand to alleviate over saturation of Commuter Transportation Services, Inc.'s capabilities.

C. Generate consumer information prior to or immediately following "critical" energy shortage period.

STRATEGIES:

A. Capture of Individual Data on Mass Audience Basis

1. Enlargement of existing "individual" call-in program
2. Extension of existing Department of Motor Vehicles "Come Together" registration program
3. Residential Distribution (source for program information and/or registration)
   a. Mailouts (e.g. creditcard/utility statement stuffer)
   b. "Retail Outlets"

*See attached Derivation of Market Potential

c. Periodicals

d. Branch Offices

1. Local procedures

B. Data Base Maintenance

1. Existing Registrations: Verify Continued Interest

a. Carpool

b. Vanpool

2. New Registrations

a. Update Procedures

3. Inelligible Registrations

a. Referral to appropriate entity

C. Organizational Data Capture with Reduced Labor Intensiveness

1. Existing Procedures

a. Modify to reduce staff burden

1. Sales Representative as initial contact

2. Greater company responsibilities for internal marketing

3. Commuter Transportation Services, Inc. representative for transmittal and collection

4. Sales representative for presentations where appropriate

2. Management Seminars

a. Geographically grouped program presentations for many companies

b. Preparation and transmittal of employee materials for company self-distribution

c. Bulk return

d. Employee sales presentations where necessary

3. "Do-It-Yourself" Marketing

a. Presentation of program to companies with less than 100 employees through pamphlet medium (mail-out)

b. "Self-implementation of registration process"

c. Bulk return

DERIVATION OF APPROXIMATE MARKET POTENTIAL

(PEAK PERIOD)

A.	10 million	vechile trips
B.	4.5 million	vehicle trips for home-to-work purpose
C.	2.25 million	one-way vehicle trips
D.	1.89 million	one-way home-to-work person trips (assuming 1.19 persons per vehicle)
E.	567,300	commuters living greater than 10 miles (one-way) from work (approximately 30% of total trips)
F.	500,000	commuter maximum market potential (accounting for persons whose trips can not be accommodated in rideshare mode)
G.	250,000	commuter minimum market demand

Input needed no later than Tuesday, July 16, 10 AM.

Please plan to attend a planning wrapup meeting at that time in my office

Confidential

COMMUTER COMPUTER

3440 Wilshire Blvd. • Suite 610 • Los Angeles, Ca 90010 • Telephone: (213) 380-RIDE

TO: CLAUDE DAVIS
PETER VALK
LAURA BOWIE
HANK SCHWARZ
RICHARD KLINE
KAREN BROWN

FROM: NANCY KLEIN

SUBJECT: TRANSIT WORK STOPPAGE CONTINGENCY PLAN

DATE: JULY 13, 1979

In order to respond in the event of a transit work stoppage, we must be able to quickly mobilize a measurable segment of transit commuters into other ridesharing modes. The success of such a plan is the prior identification and readiness of alternatives, coupled with on-the-spot matching. The issuance of our emergency matchlist is useful under these conditions only as a backup activity unless transit commuters can be mobilized ahead of such a work stoppage to have registered with Commuter Computer for their emergency matches.

Attached is a description of the major issues and procedures which we have already identified as important to such a contingency plan and a designation of primary responsibility for preparation of each.

As I will be out of the office for several days after July 16, I am requesting that you give immediated attention to this plan, and be prepared to make your input at a staff planning meeting in Mr. Schreiber's office at 9 AM, Tuesday, July 16.

Thanks for your response on such short notice.

cc: Art. Schreiber
Ray Cockrell

dmb

ENERGY EMERGENCY PROGRAM

TRANSIT WORK STOPPAGE COMPONENT

GOAL

Mobilize the work commute segment of the transit population into subscrition buses, carpools, taxipools, and vanpools, for the duration of the work stoppage.

(Quantify into mode objectives).

CONSIDERATIONS IN DEVELOPING THE PLAN:

PERSON	ELEMENT
C. Davis	Size of RTD daily ridership
C. Davis	Estimated proportion which are regular commuters
C. Davis P. Valk	Where in the RTD system the commuters can be found: - Commuter Cruiser Lines - Park 'n' Ride Service - Limited Stop Lines - Other regular line service with heavy commuter patronage
C. Davis P. Valk	How many "key" lines are there and how can we pick up on them? E.g. - Install a subscriber bus on a Cruiser line to duplicate RTD service - van picks up clusters at Park 'n' Ride lots or busy stops - ? - key stops - literature distribution on form-your-own carpool or taxipool, with how-to-do
C. Davis P. Valk	Estimated proportion of <u>commuter</u> subset of RTD ridership we can accommodate into instant modal switch on <u>Day 1</u> of strike: Into buspools: Into carpools: Into taxipools: Into vanpools:
C. Davis	In-crisis conditions: - estimated number of calls which will come in from stranded bus riders. - Assistance procedures: . on the spot . call back/sameday . taxi referral . daily computer access

PERSON	ELEMENT
C. Davis L. Bowie	Followup assistance: - estimated number of matchlists which will be issued and mailed out in response to transit call-in/write-in
H/S B&K	Pre-strike public info - What channels should be used? . RTD buses & ticket offices? . Public officials offices? . Retail outlets previously identified? . print media? . broadcast media? . others? - What can (politically) and should (action) the public message(s) contain? . . . - What Budget?
H/S B&K	Post strike public info - What should be said? . how you can prevent future personal crisis - for whatever reason - register now . how great Commuter Computer was in time of public need . other? How should it be said? . media? . tabloid? . other? - Budget
C. Davis I. Jones P. Valk	Mode planning logistics - subscriber buses . availability . PUC registrations - taxis . procedures . regulations - carpools . internal procedures . staffing - vans . availability . driver's . fares . procedures . insurance and regulations - telephone reg/inquiry . increased capacity/lines/installation . staffing . staff training
K. Brown	
Everyone	What else?

COMMUTER COMPUTER

3440 Wilshire Blvd. • Suite 610 • Los Angeles, Ca 90010 • Telephone: (213) 380-RIDE

CARPOOL PROGRAM

We take an application over the phone, and we will match you up with people who live and work close to you. THIS IS A FREE SERVICE.

We will send you a list of their names and phone numbers, so you can call them and make carpool arrangements. We suggest that you share DRIVING or GAS EXPENSES with them.

It takes about a week to get the list to your home address.

SCREEN FOR VANPOOL PROGRAM

How far do you travel to work one-way?

If less than 15 miles - do not offer vanpool program.

If more than 15 miles - We have a van service, but we do charge a monthly fare.

If interested in more about vanpool -

We will give your name and phone number to our vanpool department. They will call you back ONLY if there is a van available in your area. Do NOT expect a call from our vanpool department. They will call you ONLY if there is a van in your area.

DO YOU NEED A RIDE TO WORK EACH DAY?

TRANSIT REFERAL INFORMATION

*MEDICAL TRANSIT

Medi-Cab
(213) 370-1534
Van pick-up for wheelchair patients
(Doctor and hospital appointments)

Bay City Transit
(213) 881-9890
Bus pick-up for handicapped ONLY.

Medi-Transit
(213) 296-1024
Van pick-up for wheelchair and ambulatory patients
(per Doctor's request).

Active Blind Inc.
(213) 936-9110
Emergency rides for the blind ONLY.

*SENIOR CITIZENS TRANSIT

Dial-A-Ride
(213) 481-2910 — Beverly-Fairfax-Hollywood-Wilshire-Westlake-West Adams-Venice.

(213) 564-4401 — Greater Watts Demand Responsive Program.

(213) 549-6900 — Harbor Area Shared Ride Taxi Serving the San Pedro-Willimington area.

(213) 822-0360 — North Hollywood-Northridge-Sepulveda-Van Nuys Senior Ride.

(213) 841-6022 — Sunland-Tujunga Senior Ride.

(213) 754-3131 — Adams-Exposition-Leimert-Baldwin Hills-South Vermont Senior Ride.

(213) 481-1550 — Eagle Rock-Atwater-Glassell Park Senior Ride.

(213) 485-4402 — For general information about the senior rides above call City Hall, Community Development Department Aging Division.

(213) 263-5139 — East Los Angeles Dial-A-Ride for the Handicapped.

(213) 268-5101 — Van Dial-a-Ride for the Transportationally Handicapped (East Los Angeles)

Dial-A-Ride (cont'd)

(213) 943-6776 La Mirada Dial-a-Ride for anyone.

(213) 724-2700 Montebello Dial-a-Ride for anyone.

(213) 591-8753 ext. 21 Long Beach Public Transportation Company Special Services for the handicapped over 18.

(213) 685-7363 ext. 244 City of Commerce Medi-Ride for medical appointments ONLY.

(213) 863- 7077 Norwalk Transit System Dial-a-Ride for the handicapped.

(714) 593-7511 Pomana-Claremont Get About Transportation.

(213) 639-6176 Compton Dial-a-Ride for the elderly and handicapped.

(213) 861-0361 Downey Dial-a-Ride for the handicapped.

(213) 325-7110 Lomita Dial-a-Ride for the elderly and handicapped.

(213) 537-0800 ext. 226 Lynwood Van Dial-a-Ride for the elderly and handicapped.

(213) 445-2211 Arcadia Dial-a-Ride for anyone.

(213) 545-3500 Manhattan Beach Dial-a-Ride for the elderly and handicapped.

(213) 372-1171 ext. 252 Redondo Beach Dial-a-Ride for the elderly and handicapped.

(213) 573-1211 Monterey Park Dial-a-Ride for anyone.

Senior Line
(213) 488-1133
Transit and other information for Senior Citizens.

*LONG DISTANCE TRANSIT

Amtrak
(800) 648-3850
Train.

Travel Mate
(800) 547-0933
Matching service for long distance commuters.

*AIRPORT SERVICE TRANSIT

Airport Service
(213) 766-2142
Long Beach to LAX (213) 994-5554
Pasadena to LAX (213) 796-9108
N. Orange County to LAX (714) 776-9210
S. Orange County To LAX (714) 581-5780
Large bus transit for anyone.

*PRIVATE COMMUTER BUS LINES

Antelope Valley Bus, Inc
(805) 948-8421
(805) 365-8555

Com-Bus
(714) 846-3711
(714) 522-1500
Los Angeles and Orange County Commuter Bus Lines.

Commuter Bus Lines
(213) 428-1285
Los Angeles and Orange County Commuter Bus Lines.

Hunt Transportation
(213) 860-0198
(213) 684-8264
Offers routes from El Segundo south to Orange County and back.

Mark IV Charter Lines, Inc.
(213) 775-8221
Services West Los Angeles to Huntington Beach.

*COMMUTER COMPUTER

Los Angeles Commuter Computer
(213) 380-RIDE
Carpool and Vanpool matching service.

San Diego Commuter Computer
(714) 234-POOL
Carpool and Vanpool matching service.

Orange County Commuter Computer
(714) 834-RIDE
Carpool and Vanpool matching service.

Colton Commuter Computer
(714) 825-RIDE
Carpool and Vanpool matching service.

Ventura Commuter Computer
(805) 647-RIDE
Carpool and Vanpool matching service.

*GENERAL TRANSPORTATION INFORMATION

Caltrans
(213) 620-3550
(213) 620-3874
Public information.

*PUBLIC BUS SERVICES

Culver City Municipal Bus Lines
(213) 837-5211
(213) 559-8310

Santa Monica Municipal Bus Lines
(213) 451-5445

Long Beach Public Transportation Company
(213) 591-2301

Montebello Municipal Bus Lines
(213) 721-3588

City of Commerce Bus Lines
(213) 722-8407
(213) 722-4805 ext. 244

Hermosa Beach Bus Lines
(213) 376-6984

Torrance Transit System
(213) 328-7402

Gardena Municipal Bus Lines
(213) 324-1304
(213) 321-0365

*SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT (RTD)

(213) 626-4455 - Central Los Angeles and Hollywood.

(213) 443-1307 - Alhambra, Arcadia, West Covina El Monte, Monrovia, Montebello, San Gabriel, Covina, Sierra Madre.

(213) 273-0190 - Beverly Hills, Culver City, West Los Angeles.

(213) 781-5890 - Canoga Park, Mar Vista, North Hollywood, Reseda, San Fernando, Santa MOnica, Sun Valley, Van Nuys.

(213) 246-2593 - Burbank, La Crescenta, Glendale, Pasadena, Sunland, Tujunga.

(213) 639-6800 - Compton, Lomita, Long Beach, San Pedro, Torrance.

(213) 973-1222 - El Segundo, Gardena, Hawthorne, Inglewood, Redondo Marina del Rey.

(714) 620-1871 - Pomona, Montclair, Chino, Claremont, Ontario, La Verne, San Dimas, Walnut, Diamond Bar, Cucamonga.

*PARK N' CAR/VANPOOL

Park n' Pool
(213) 620-2870
Provides parking lots for carpoolers.

AGOURA	West of Kanan Road, adjacent to Westbound Route 101.
BALDWIN PARK	First United Presbyterian Church 4428 Stewart Street at Loas Angeles Street.
COVINA	United Methodist Church 437 N. San Bernardino Road.
DIAMOND BAR	South side of Pathfinder Road, between Brea Canyon Road and Route 57.
	Pomona Valley Land Company Grand Avenue/Toute 60.
DOWNEY	Meralta Theater Parking Area 10912 S. Downey Avenue.
EL MONTE	First Christian Church 11025 Lambert Avenue.
EL MONTE	El Monte Fire Station Site 3613 Santa Anita Avenue.
NEWHALL	West side of Via Princessa, south of Sierra Highway
POMONA	Air Space Site, Gary at Mc Kinley.
SAN PEDRO	State Facility, Harbor Fwy/Channel Street
WESTCHESTER	Congregational Church of the Messiah 7300 N. Manchester Avenue.
WESTCHESTER	First Baptist Church of Westchester 8540 La Tijera Blvd./Manchester.
WEST COVINA	Eastland Shopping Center, Route 10 and Barranca.
WEST COVINA	K-Mart, West Covina Parkway/Tolouca Avenue.
WEST COVINA	United Methodist Church 718 Azusa Avenue.
WEST LOS ANGELES	National Guard Armory 1300 Federal Avenue.

COMMUTER COMPUTER

3440 Wilshire Blvd. • Suite 610 • Los Angeles, CA 90010 • Telephone: (213) 380-RIDE

September 6, 1979

Dear Employer:

This is a time of serious concern for your company and your employees who commute to work on the Southern California RTD.

An extended public transit strike could have serious consequences for your employees, your company's productivity and for our region's economy.

While we are hopeful that current transit negotiations may yet resolve the issues without a lengthy service disruption, it is vitally important that you take action now -- to protect your company and give employees the information they need to get to work in case of a serious transportation emergency.

As a responsible employer concerned about the welfare of your employees, we urge you to take the following steps immediately:

1. Assign an Emergency Transportation Coordinator. Assign a senior executive to provide effective coordination of your company's emergency transportation plan. Many companies rely on the Director of Personnel, or Operations.

2. Get the word out to employees. Your employees will need to know now what transportation alternatives are available. The enclosed Transportation Emergency Information Package contains complete basic information on all of the transportation options available to your employees -- and more information materials are available, in quantity, for employee distribution.

3. Contact Commuter Computer. We will assign a Service Representative to help you plan for the emergency, answer any questions and supply additional informational materials you may require. There is no cost to your company for this emergency service. Commuter Computer is a non-profit

corporation providing both commuter ride-sharing services and regional emergency ridesharing services in Southern California, and is funded primarily by CALTRANS, the Southern California Association of Governments, and the five counties of the South Coast Air Basin.

4. Schedule your company's registration for emergency ridesharing. Plan now to register your company for computer-matched emergency ridesharing with Commuter Computer as soon as possible to help your employees cope with future emergencies.

Move to protect your employees and company now from transportation emergencies in the future. These transportation emergencies include; fuel allocation shortages, air quality alerts, AQMD regulations, public transit interruptions, and even everyday personal emergencies.

One extra benefit -- companies registered with Commuter Computer computer-matched emergency and computer ridesharing transportation frequently report improved employee morale and reduced absenteeism.

We look forward to hearing from you.

Sincerely,

Arthur A. Schreiber
President

dmb

Enclosure

APPENDIX C

METHODOLOGY

METHODOLOGY

OVERVIEW

The theoretical foundations of this evaluation are drawn from transportation planning, marketing and social science perspectives on ridesharing. The research plan rests on the assumption that public transportation plays an important role in meeting crucial mobility demands of its users. When public transit is unavailable, regular users are faced with a complex dilemma -- they must locate alternative transportation modes, or be unable to travel.

Initial phases of the evaluation involved intensive review of existing literature pertaining to impacts of transit work stoppages, and ridesharing as a transportation option. Concurrently, information about CTS's on-going functions, and special SCRTD strike activities was compiled via interview and existing documentation. This prior preparation provided the framework from which later methodological decisions were made.

Information on the transit users themselves was gathered by questionnaire. Two separate but compatible instruments were developed. The first was administered by telephone to a random sample of 152 people who registered for CTS ridesharing services as a direct result of the SCRTD transit strike. The second was administered in person at selected bus stops and SCRTD customer service centers to a sample of 110 transit patrons who did not register with CTS during the strike. The questionnaires were designed to gather demographic, behavioral, and to some degree, attitudinal information about the transit commuter.

A sample of 150 participants from a CTS survey conducted in 1979 (Shu, 1980) were selected at random for use as non transit controls. Although the earlier survey was devised for a different purpose, the demographic, and occasional behavioral information was compatible for comparison purposes.

The completed questionnaires were coded and keypunched on to data cards. The SPSS (Statistical Package for the Social Sciences, Nie, et al.) program was used for the statistical analysis. A bivariate analysis was best suited to the needs of the evaluation.

The statistical analysis began with frequency distributions of each variable to obtain a concise, easily readable description of the outstanding attributes of each group, facilitating between group comparisons.

This was followed by a series of crosstabulations of selected aspects of group attributes, attitudes and behavior. The crosstabs highlighted group variance along several key areas of interest including travel behavior, carpooling awareness, and demographics. In addition to discovering differences between groups, crosstabs were used to uncover differences within groups. Specifically, differences between carpoolers and nonpoolers in the registrant and nonregistrant samples were examined. Differences between short-term carpoolers (for the duration of the strike) and long-term carpoolers (continuing after the strike) were also investivated.

Although the thrust of CTS' marketing strategy is employer-oriented, initial investigation suggested that the bus strike had virtually no impact on employer marketing services. A brief mail-back questionnaire was sent to gain information on the impact of the bus strike on employers. The final return (including follow-up telephone calls) was roughly 50%.

THE SAMPLE

It was determined that there were four different populations CTS should target in order to conduct the most comprehen-

sive evaluation possible. In order to keep the evaluation manageable, it was necessary to draw a representative sample from each group.

The first population was composed of those transit-users who registered with CTS during the transit strike, the "bus-strike applicant." The second population was composed of all those transit patrons who did not contact CTS for assistance, the "non-registrant group." The third population consisted of "typical" registrants for CTS services. The final population included employers located in the impacted area.

SURVEY TECHNIQUE

A "non-response bias" can be introduced into survey results when a high return is not evidenced. It is generally accepted that people are more motivated to respond to surveys when they have a strong positive or negative position to expound upon, or have a high interest at stake. This unrepresentative, yet vocal group can bias results regardless of sample size.

Prior CTS experience with "purge" letters (for updating the data base of ridesharing registrants) indicated that a mailed survey would probably realize less than a 25% return. This return rate is consistent with the return range of 10 to 50% estimated by Selltiz, et al. (1976).

Consequently, although more labor intensive (and expensive) than mail-out survey techniques, telephone and personal interview methods were selected to obtain the most accurate and representative data on transit patrons. The less important employer survey was conducted by mail with telephone follow-up.

BUS STRIKE REGISTRANTS

Sample Selection

The criterion upon which sample size was based in the "bus-strike dial-in group" was carpool formation rate. Direct carpool formation rate was considered the prime measure of CTS effectiveness in assisting the "bus-strike" dial-ins.

The following formula was used to determine the number of completed questionnaires required in the "bus-strike" regitrant group.

$$n = \frac{Z^2 \pi (1 - \pi)}{e^2}$$

Where:
- n = # of completed questionnaires required
- Z = normal deviate for the confidence interval
- π = the proportion of applicants forming carpools with CTS assistance
- $(1 - \pi)$ = the proportion of applicants not forming carpools
- e = allowable error in estimating carpool formation rate

A 90% confidence interval and .05% allowable error were set as acceptable.

Shu & Glazer (1979) found CTS's regular direct carpool formation rate to be 9%. A conservative 10% direct carpool formation rate would require 97 completed questionnaires. A less conservative 15% would require 137 completed questionnaires. Estimating a 35% contact rate, 485 names and phone numbers of bus strike applicants were drawn at random by computer from the data base to ensure 150 completed questionnaires.

Survey Technique

Due to time and space constraints, a professional interviewing service was hired to conduct the telephone survey of bus-strike applicants. This was more efficient than hiring and training temporary personnel, installing additional telephone lines, etc. M.S.I. International, an independent marketing and opinion research firm located in Los Angeles conducted the telephone survey in March, 1980. M.S.I. was also responsible for verification and the editing (for completeness) of questionnaires.

Of the 485 names and numbers supplied by CTS, M.S.I. was able to reach 152 within a few days with no major problems. Interviews were conducted on weekdays, primarily between the hours of 9 to 5.

The questionnaire for this group was the first one developed.

The questionnaire was designed to be comprehensive enough to cover all of the areas CTS was interested in surveying, while remaining brief enough to hold the interviewee's interest.

The purpose of the questionnaire was to obtain a number of "snapshots" of the bus strike registrant:

1) Travel behavior prior to the strike
2) Awareness and expectations of CTS services
3) a) CTS assistance received
   b) CTS assistance utilized
4) Travel behavior during the strike
5) Demographics.

The questions were short and precise and followed a logical

progression. The form was designed to be easy for the interviewer to fill out, and easy to code. The survey was pretested on eight CTS employees and five members of the telephone sample (not included in the final results).

THE NON-REGISTRANT GROUP

Sample Selection

This group, although impacted by the bus strike, did not contact CTS for assistance and consequently represents an untapped market. Obtaining a truly representative random sample of transit users was virtually impossible given the financial and manpower constraints of this evaluation. (A recent study conducted by SCRTD contacted over 1600 people to locate 200 bus riders. [See Impact of RTD Strike on Riders, SCRTD, December, 1979]). In an attempt to obtain as representative a sample as possible, a home grid density map of "bus-strike" registrants was produced to locate the most traversed routes. Bus riders were "randomly" selected along these routes primarily during rush hours. Riders were also selected at the busiest SCRTD customer service locations.

Sample size was also a problem in this group. Direct carpool formation rate could not be used as a criterion. To facilitate analysis, 150 completed questionnaires were considered adequate to exhibit trends and tendencies within the group. Unfortunately, the interview process took much longer than anticipated and this number was later reduced to 110.

Although reduced, the sample size is still large enough to enable suggestions of trends and tendencies in the "transit using non-registrant" group and allows for comparisons with the registrant groups. In analysis however, the accompanying measures of statistical significance had to be especially powerful.

Survey Technique

According to the SCRTD study referenced earlier in this section, 24% of Los Angeles households are phoneless. Based on this, and the prohibitively high costs of a telephone survey, personal interview was chosen as the method for surveying the non-registrant group.

The cost of hiring personal interviewers was also extremely high. To keep costs down, the author conducted the bus stop interview survey part-time over the course of two months. Bus riders were interviewed at 25 bus stops and two customer service locations. The majority of the interviews were conducted during rush hours.

The rate of return was unexpectedly low, averaging under four per hour. In addition, a fare increase which took place in May could have biased the results. Subsequently, interviewing stopped prior to the completion of 150 questionnaires.

The purpose of this questionnaire was to compare snapshots of the "transit non-registrant" group with "bus-strike" registrants. However, this questionnaire also had to be brief enough to administer at bus stops and therefore could not be as extensive as the telephone survey. The snapshots obtained were:

1) Travel behavior prior to the strike
2) Awareness and use of CTS services
3) Travel behavior during the strike
4) Demographics

The questionnaire was pretested on several CTS employees and

five bus riders.

THE TYPICAL REGISTRANT GROUP

This group was selected to illustrate demographics and travel behavior of the "regular" registrant. To keep the study manageable it was decided that information on the normal registrant could be obtained from already existing data. The most recent was a survey conducted in late 1979 in response to gasoline shortage. (See Shu, 1980). A sample of 150 questionnaires was randomly drawn from the 275 which were completed in the survey.

Survey Technique

A regular registrant survey was not conducted as part of this evaluation. Information about the CTS regular registrant was collected in fall of 1979 as part of the "Evaluation of the Gasoline Shortage: Impacts on CTS" (Shu, 1979). Data from this study were simply repunched and rerun with the data from the telephone and bus stop surveys.

THE EMPLOYER SURVEY GROUP

In anticipation of strike impacts on employers, a "Transportation Emergency Kit" was developed and in early September, 1500 kits were mailed out to companies located within those grid squares serviced by the most heavily used transit lines. At the same time, AQMD mailed out a traffic abatement plan follow-up letter. Incoming calls from employers during the strike period were primarily in response to the AQMD letter.

Due to the negligible effect of the transit strike on

marketing operations, (and presumably on employers), the employer portion of the evaluation was limited to companies on the "Transportation Emergency Kit" mailing list. A sample of 110 companies was randomly selected from the list.

The Employer Survey

The Employer Survey, cover letter and self-addressed, stamped, return envelope was mailed to 110 employers located in the region affected by the strike. After two weeks, follow-up calls were made to those companies deliquent in the return of their questionnaires. The majority of the questionnaires were completed by phone. The follow-up process was necessary as the return rate was less than 10%. Most companies were fairly cooperative, and the final return rate was 50%.

Three similar questionnaires were used. The first was for companies that were using CTS services at the time of the transit strike. The second was for companies which had declined CTS services. The third was for companies with which CTS had made no formal contact prior to mailing the Transportation Emergency Kit.

The primary purpose of the Employer Questionnaire was to measure the impact of the "Emergency Kit". The questionnaire sent to those companies not using CTS services also included a question pertaining to use of CTS services during transit emergencies.

SURVEY PROBLEMS

The Telephone Group:

No major problems were experienced while administering the

telephone survey. MSI reported a high contact rate and low refusal rate. There were no language problems.

The Bus Stop Group

There were a number of problems in the survey administration to this group.

1) In order to reach commuters, most of the interviewing took place during rush hours when the buses run most often. This limited the number of interviews which could be conducted as people were not about to miss their bus to complete the interview.
2) Many non-English speaking commuters were excluded from the sample. This may bias the results.
3) Interviewing at customer service centers introduced a large number of transit pass using commuters which might also bias results.

The Regular Registrant

The only problem experienced with this group was that the survey data had been collected for a different purpose and was not entirely compatible with the other two groups. However, there was enough compatible material for meaningful evaluation.

The Employer Survey

Most of the problems experienced with this group are inherent in mail-back questionnaires.

1) A high incidence of "never received the questionnaire."

2) Several company representatives avoided calls rather than admit lack of interest in completing the questionnaire.

CODING AND KEYPUNCHING

Although the telephone interviews were conducted by an independent agency, all coding was done in-house. To control for the possibility of "sloppy" or inconsistent coding which can greatly influence results, all coding was performed by a single person.

Keypunching of the telephone and bus stop interviews was done directly from the questionnaires. Data from the regular registrant questionnaires were transferred to a record layout form before keypunching.

Each questionnaire represented one data case, and each case required two data record cards. There were 462 cases included in the analysis.

STATISTICAL PROCEDURES

Several statistical procedures were employed in the data analysis. The Statistical Package for the Social Sciences (SPSS; Nie, et al., 1975), a canned computer program was a great asset in the analysis.

Characteristics of the population were determined by frequency distributions by variable, overall and within each group. Due to the nominal nature of most of the data, the investiga-

tion of sets of relationships of selected variable depended primarily on crosstabulations.

Crosstabs are joint frequency distributions of cases according to two or more classificatory variables. The minimum acceptable frequency in any crosstab is 10, although 20 is preferable. The accompanying chi-square test (X^2) provided by the SPSS package determines whether findings are statistically independent (significant). The chi-square cannot be used with confidence if there are less than five cases in any crosstabulation cell.

Breakdowns of means and standard deviations were used with the interval data. This programming procedure summarizes the distribution of a complete row or column of crosstabs.

APPENDIX D

BIBLIOGRAPHY

APPENDIX D

BIBLIOGRAPHY

1. Bata, A. E., THE EFFECT OF THE 1972 TRENTON, NEW JERSEY BUS STRIKE ON THE MODAL CHOICE OF THE COMMUTER. Masters dissertation, Northwestern U., 1974.

2. Blalock, SOCIAL STATISTICS, McGraw-Hill, 1960.

3. Brachman, M. E., et al., THE EFFECTS OF LABOR STRIKES ON BUS TRANSIT USE. Purdue University, Indiana 1976.

4. Cohn, S. and R. Ellis, "Assessment of the impacts of the A.C. transit strike upon BART." UMTA, Washington, D.C., 1976.

5. Commuter Transportation Services, Inc., MEASURES OF EFFECTIVENESS OF THE REGIONAL RIDESHARING PROGRAM, Los Angeles, Ca., 1976.

6. Conerly, T. B., III and F. E. Kroger, "Public attitudes towards reducing air pollution through carpooling." Pacific Southwest Universities Air pollution Association, Los Angeles, Ca., 1972.

7. Crain, J. L. and S. D. Flynn, SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT 1974 STRIKE IMPACT STUDY. Los Angeles Bigelow-Crain Association, 1975.

8. Dobson, R. and M. L. Tischer, "Beliefs about buses, carpools, and single occupant autos: a market segmentation approach." Urban Planning Division, Federal Highway Administration, 1976.

9. Gallagher, M. P. et al., CARPOOLS USING BUSWAY DURING STRIKE, California Department of Transportation, District 7 Freeway Operation Brach, 1975.

10. Horowitz, A. D. and J. N. Sheth, "Ridesharing to work: an attitudinal analysis. "Transportation Research Record #637, TRB, Washington, D.C., 1977.

11. Kurth, S. B. and T. C. Hood, "Carpooling program: Solution to a problem?" Transportation Center, U. of Tennessee, 1976.

12. Levin, I. P., "Interpersonal factors in carpooling. "Final report DOT Grant 7-3-0072, U. of Iowa.

13. Levin, I. P. and M. J. Grey, "Evaluation of interpersonal influences in the formation and promotion of carpools." Institute of Urban and Regional Research, U. of Iowa, revised 1979.

14. Los Angeles, Area Transportation Study (LARTS), 1976.

15. Margolin, J. B, Misch, M. R., and R. Dobson, "Incentives and disincentives of ridesharing behavior: a progress report." Paper presented at 55th Annual meeting of the Transportation Research Board, January 22, 1976, Washington, D.C.

16. Margolin, J. B., M. R. Misch and M. Stahr "Incentives and disincentives of ridesharing." Transportation Research Records #673, TRB, Washington, D.C., 1978.

17. Nie., et al., STATISTICAL PACKAGE FOR THE SOCIAL SCIENCES, (2nd ed.). N.Y: McGraw-Hill, 1975.

18. Peat, Marwick, Mitchell & Co., A MARKETING APPROACH TO CAR-POOL DEMAND ANALYSIS, Summary Report. C-04-50179-00 Federal Energy Commission, Washington, D.C., 1976.

19. Seltiz, D., et al., RESEARCH METHODS IN SOCIAL RELATIONS, (3rd ed.). New York: Holt, Rinehart and Wilson, 1976.

20. Shu, J. and L. J. Glazer, CARPOOL PROGRAM EVALUATION. Commuter Transportation Services Inc., Los Angeles, Ca, 1972.

21. Shu, J., EVALUATION OF THE GASOLINE SHORTAGE: IMPACTS ON CTS. Commuter Transportation Services Inc., Los Angeles, Ca., 1980.

22. Southern California Rapid Transit District, "A report to public officials on the current RTD work stoppage." Los Angeles, Ca., 1979

23. Southern California Rapid Transit District, "Impact of RTD strike on riders." SCRTD Market Research, 1979.

24. The Los Angeles Times, 16 August-22 September, 1979.

25. The Rand Corporation, A MILLION RANDOM DIGITS WITH 1000,000 NORMAL DEVIATES, New York: The Free Press, 1955.

26. Summary of Facts for Exit Conference with Rideshare Steering Committee, "Impact of federally funded efforts to increase the use of ridesharing and mass transit in Southern California." U.S. General Accounting Office, September 1979.

27. Transportation Center, IMPACT OF A TEMPORARY INTERRUPTION OF TRANSIT SERVICE: A CASE STUDY OF THE KNOXVILLE TRANSIT CORPORATION STRIKE, 1977. U. of Tenn., 1978.

28. Valk, P. J., VANPOOL PROGRAM EVALUATION, Commuter Transportation Services Inc., Los Angeles, Ca., 1979.

29. Wegman, F. J., et al., "Impact of the 1977 transit strike in Knoxville." Transportation Research Record 719, TRD, Washington, D.C., 1979.