Assessing the Effect of Compressed Work Week Strategy on Transportation Network Performance Measures

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The focus of this paper is on evaluating and assessing the effect of a compressed work week strategy (say, not working a day each week) on transportation network performance measures such as link-level traffic speed, travel time, and volume-to-capacity ratio using data gathered for the Charlotte metropolitan area, North Carolina. The results obtained indicate that reducing 15% to 20% of work commute during the morning peak hours using compressed work week strategy would increase traffic speeds by up to 5 mph on at least 64% of center-lane miles (sum of the length of the center line of all lanes of traffic for each selected link). It would also decrease the travel time by up to two minutes on at least 61% of center-lane miles.

INTRODUCTION

The rapid increase in the population had a catalytic effect on travel demand during the past few decades. The infrastructure and system capacity provided to promote this growth has not seen the same trend, resulting in congestion on roads in the urban transportation network. Traffic congestion leads to excessive usage of energy resources (fuel consumption), which in turn leads to an increase in the emission of various pollutants produced through the combustion of fuel. The loss of time due to traffic congestion results in huge economic losses. According to the Texas Transportation Institute (TTI) Urban Mobility Report, traffic congestion resulted in losses exceeding $121 billion to the United States in 2011 (TTI 2012). These losses include time lost and waste of fuel but do not involve the total environmental costs and other associated indirect costs.

Recurring congestion is observed mainly during morning and evening peak hours on any given weekday. This recurring congestion on road links during morning and evening peak hours could be attributed to traffic generated by people traveling to work. The estimates from 2009 National Household Travel Survey (NHTS) indicate that 17% of the total daily trips in the United States account for personal work-related trips (NHTS 2011). Studies conducted in the past also show that 44% of the commuting trips are from a suburban residence to a suburban job location. These commuters cause localized congestion but do not travel to the downtown area or central business district (Pisarski 1996).

Generally, the road links that are connected to and around the downtown area are relatively more congested with increased travel times during the peak hours. Therefore, traffic congestion during peak hours on the road links connected to the downtown area could be primarily attributed to the travelers who work in and around the downtown area.

The reduction of traffic on the road links around the downtown area may help decrease travel time, enhance regional economy, and achieve greater prosperity and health. The reduction of traffic and associated improvement in transportation network performance measures can be easily achieved by decreasing the total number of commuters (employees or workers) traveling to the downtown area on a given day during a given time period. Since a significant percent of these commuters travel longer distances (from suburban areas), the effects on transportation network performance measures may extend beyond the downtown area (may not be completely localized), in particular on freeways and expressways.

Strategies to reduce the total number of commuters traveling to their work during peak hours on weekdays include compressed work week and telecommuting. According to these strategies, a percentage of employees are allowed to work four days a week (instead of normal five days a week in the United States) or allowed to work one or multiple days a week from home. Allowing 20% of employees to work four days a week or one out of five days a week from home could potentially reduce congestion associated with work trips by 20%.

The aforementioned travel demand strategies (compressed work week and telecommuting) have the potential to reduce congestion on roads. However, their effectiveness in achieving the desired objective has not been documented widely in the literature. Questions such as "does the strategy help reduce travel demand and lower congestion on roads?" and "what should be the optimum or appropriate but realistic percentage of employees that should be part of the compressed work week strategy?" are critical and have yet to be completely addressed. The objective and primary focus of this research is to identify the percentage of employees that should be part of a compressed work week strategy to help achieve amicable traffic flow conditions by reducing congestion on routes in and around the downtown area.

The findings assist practitioners understand the change in transportation network performance measures with an increase in percentage of employees that are part of the strategy. It also helps practitioners set targets for successful implementation of such a strategy.

LITERATURE REVIEW

Several studies were conducted to examine the effect of a compressed work week strategy on employee behavior, employee attitude, and transportation network performance. Ronen and Primps (1981) researched organizational changes, employee behavior, and attitudes toward compressed work week strategy. Their study suggests that employees' attitudes and job attitudes are positive in implementing a compressed work week strategy. They concluded that implementing the strategy would decrease employee absenteeism.

Hines (1982) assessed that 13% to 21% of employers, who have 100 or more employees, could implement flexi-time, staggered work hours, or compressed work week strategy. Based on a wide-scale basis and analysis using Baltimore data, Hines observed that 1,300 to 7,600 daily trips can be eliminated from the roads to help the city in meeting travel, air quality, and energy objectives.

Jin and Wu (2011) examined the factors that influence people's telecommuting behavior using data from the 1995 Nationwide Personal Transportation Survey, and 2002 and 2009 NHTS. Findings from their study indicate that telecommuters usually had longer distance and travel time to work compared with non-telecommuters. While non-telecommuters drove less than telecommuters, frequent telecommuters drove significantly less than the other group.

The Washington State legislature passed the commute trip reduction law in 1991 (Washington State Department of Transportation 2013). A major goal of this law was to promote employer-based programs that would decrease the number of commute trips made by people driving alone to reduce traffic congestion, emissions, and fuel consumption. Strategies considered to achieve the goal included carpool, vanpool, transit, compressed work week, and telecommuting.

Hung (1996) researched and demonstrated that the amount of work commutes decreased after implementing the compressed work week strategy. Zhou et al. (2009) applied generalized ordered logit models to evaluate the effect of commute trip reduction activities, journey to work distance, job characteristics, and business type on telecommuting. Results indicate that longer journey time to work, promotion of telecommuting through employers, and commute trip reduction plays an important role in commuters telecommuting choices.

Legislators passed the Commute Trip Reduction Efficiency Act in 2006. This act required all local governments in urban areas with traffic congestion to develop programs that reduce drive-alone trips and vehicle miles traveled per capita. As a result of this act, three years after enabling the

act, the State of Washington has observed a reduction of 30,000 morning weekday work-based trips (Washington State Department of Transportation 2013). Another observation was the reduction in traffic delays by 8% in the Central Puget Sound Region. The rush-hour commuters have saved about $59 a year in fuel and time. Similarly, by driving 154 million fewer miles since 2007, participants in the commute trip reduction programs have saved about three million gallons of gasoline in the years 2009-2010 and prevented about 69,000 metric tons of greenhouse gases from entering the atmosphere each year with a total monthly savings of about $30 million (Washington State Department of Transportation 2013).

Telecommuting allows commuters to work at home or close to home thereby eliminating some vehicle trips. According to past research, telecommuting reduces total trips (especially peak-period trips), generating positive effects on the environment (Hamer et al. 1991; Quaid and Lagerberg 1992; Choo et al. 2005).

Literature documents research on employee behavior and attitude toward compressed work week strategy. In general, reducing one complete work day a week without incorporating other policies (such as working extra hours on other days) may result in losses to the business. It will not help in the decrease of traffic on the remaining work days unless a proportionate percentage of traffic is reduced on each work day so as to not exceed the congestion levels. Also, a business firm or any organization may not afford to have all its employees adopt such a policy. There will be some employees who need to be on site (at the office) all days of the work week (due to the nature of their work). Likewise, there may be individuals who may not prefer to be part of the strategy due to their personal constraints; for example, if they have to work extra hours on other days to compensate for lost time. Such effects can only be assessed by hypothetically varying the percentage reduction and evaluating its effect on transportation network performance. However, none of the past researchers have discussed the variations in the traffic flow and transportation network performance measures in order to reduce congestion during peak hours by adopting a compressed work week strategy and reducing work trips.

METHODOLOGY

The methodology adopted to evaluate the changes in the transportation network performance measures upon implementing a compressed work week strategy includes the following steps.
- Gathering existing travel demand forecasting model data - base case scenario
- Defining compressed work week strategy and target reduction
- Generating new origin-destination (O-D) trip tables
- Identifying the changes in the traffic pattern

A brief description of each step is presented next.

Gathering Existing Travel Demand Forecasting Model Data - Base Case Scenario

The Charlotte Department of Transportation has developed a regional travel demand forecasting model that runs on TransCAD (Caliper Corporation 2004). The regional travel demand model is used to assess existing travel demand and future travel demand based on future projections of population and employment as well as incorporating any improvements to the transportation system (CRTPO 2014). The data and output from this model are the best and most reliable sources at the time of this writing for regional-level analysis such as the one discussed in this paper.

The regional travel demand forecasting model incorporates origin-destination (O-D) trip tables based on travel surveys and a spatial gravity model (Allen 2007). However, the surveys do not include information on commercial vehicles, medium trucks, and heavy trucks. The trips related to these vehicle types are evaluated from the Freight Planning Manual developed by Cambridge

Systematics for the United States Department of Transportation's Travel Model Improvement Program.

The development of O-D trip tables involves the first two steps of the traditional four-step transportation planning process: trip generation and trip distribution. The trip generation model estimates the number of trips entering and leaving each traffic analysis zone (TAZ) on the basis of that zone's demographic, land use, and socioeconomic characteristics. All trip ends are modeled as either trip productions or trip attractions. Trip productions are those trip ends that are associated with the home end (origin or destination) of a home-based trip or origin of a non-home-based trip, while trip attractions are trip ends that are associated with the non-home end (origin or destination) of a home-based trip or destination of a non-home-based trip. Trip distribution is based on the well-known spatial gravity model. The spatial gravity model helps estimate the number of trips from a given origin to a selected destination as a function of trip productions, trip attractions, friction factors and other calibration parameters. Using a mode choice model, the mode of transportation for each trip is determined as the third step.

All vehicle types are converted into passenger car units using the following equation (Allen 2007). The conversion is done primarily to account for the effect of heavy vehicles on transportation system capacity and operation performance.

PCU = SOV + POOL2 + POOL3 + COM + 1.5*MTK + 2.5*HTK

where,

PCU	= Total passenger car units
SOV	= Single occupancy vehicles
POOL2	= Two-person carpool vehicle trips
POOL3	= Three or more person carpool vehicle trips
COM	= Commercial vehicles
MTK	= Medium trucks
HTK	= Heavy trucks

In the above equation, heavy trucks (HTK) include all trucks with more than three axles such as tractor- and semi-trailers, dual trailers, and buses. Medium trucks (MTK) include trucks with three axles and six tires, and single-unit trucks as well as light-duty trucks with dual rear wheels. The commercial vehicles (COM) category includes all light-duty vehicles (passenger cars, light trucks, vans, and sports utility vehicles) used for delivery and other business purposes.

The regional travel demand forecasting model adopted a user equilibrium method for trip assignment as the fourth step. The user equilibrium method is an iterative process to achieve a convergent solution in which no travelers can improve their travel times by shifting routes (Caliper Corporation 2004).

The model parameters are calibrated and validated by the Charlotte Department of Transportation planners by comparing estimated traffic volumes with actual annual average daily traffic (based on field counts) for selected links. The model is regularly updated and maintained by the city planners.

The following equation is used to compute the travel time for each selected link in the network (Allen 2007).

$$T = T_f * \left(1 + \alpha \left(V/C\right)^{\beta}\right)$$

where, T is travel time accounting for congestion due to traffic volume, T_f is free flow travel time, V/C is volume-to-capacity ratio, and, α and β are coefficients established by the city planners. The travel times obtained from the above equation are used to compute traffic speed (distance divided by travel time) for each link in the network.

The data and outputs directly obtained from the calibrated regional travel demand forecasting model are considered and used to indicate the base case scenario. In this base case scenario, no reduction in the percentage of employees is considered.

Defining Compressed Work Week Strategy and Target Reduction

Reducing a work day for all employees may not help in achieving the free traffic flow in the downtown area on remaining working days. The strategy must therefore comprise five work days but resulting in a smaller percentage of trips on each day. A reduction of a small percentage of employees from each business firm or organization proportionally on each day may help in achieving this objective. This percentage of employees working in the downtown area may be part of telecommuting or working additional hours on the remaining work days so that the total numbers of hours worked per week stays the same.

The appropriate or optimum percentage of employees that should be part of the compressed work week strategy for improved network performance is not known and has to be estimated. According to the United States Bureau of Labor Statistics (1997), the percentage of full-time wage and salary employees with flexible work schedules on their principal job is estimated to be around 27.6%. Therefore, variations in traffic patterns were assessed from 0% to 30% for every 5% increase in the number of employees that are part of a compressed work week strategy.

The implementation and the effect of the compressed work week strategy could be localized. However, as a significant number of commuters travel longer distances, improvements in the transportation network performance measures may be seen on freeways, expressways and other major roads throughout the core urban area. For implementation, only downtown area where congestion is usually high during peak hours was considered for illustration of the method and evaluation of effectiveness of the compressed work week strategy. The entire urban area transportation network was considered for assessment of the transportation network performance measures. However, the method could be easily adopted or replicated to enhance transportation system performance for the entire study area (not just downtown) or other local areas with significantly high office activity.

Generating New Origin-Destination (O-D) Trip Tables

The O-D traffic patterns vary for morning and evening peak hours. Traffic volume could be high on links towards downtown during the morning peak hours, while traffic volume may be high on links away from the downtown during the evening peak hours. Only morning peak hours were considered for illustration of the method and possible merits due to implementing the compressed work week strategy in this paper.

New O-D trip tables were generated from the gathered O-D trip tables by deducting the selected percentage of employees from each TAZ depending upon the location and its characteristics. These O-D trip tables were also computed separately for both morning and evening peak hours.

To generate the new O-D trip tables, firstly, the TAZs in the downtown area were selected. The trip attractions to these TAZs from every other TAZ (if any) were reduced by selected percentage (say, 15%). Similarly, the trip productions from the selected TAZs to each and every other TAZ were reduced by the same percentage (15%). This would also ensure that trip attractions and trip productions after deducting the selected percentage of employees would be equal. This process was repeated for each percentage reduction in the number of employees to generate the respective set of O-D trip tables.

Identifying the Changes in the Traffic Pattern

From the new O-D trip tables, the link volumes of all the routes in and around the downtown area were computed using TransCAD software. The tools and algorithms/modules used by the Charlotte Department of Transportation-Planning Division, outlined in the "Gathering Existing Travel Demand Forecasting Model Data-Base Case Scenario" sub-section, were adopted while going through this process of travel demand forecasting.

TransCAD version 4.7 (Caliper Corporation 2004) was used to assign trips, adopting the user equilibrium method, to the transportation network in this paper. The traffic pattern, reduction in travel time, and increase in traffic speed on the road links were computed and compared to the base case scenario (zero percent reduction in the number of employees; compressed work week strategy is not implemented). The least possible percentage of reduction in the total number of employees was computed by observing the changes in travel time and traffic speed on the road links in the core urban area.

Overall, spatial maps were generated and analysis was performed to identify the reduction in the congestion levels on the links and routes in the core urban area by reducing the possible number of work trips proportionally on each day.

ANALYSIS AND RESULTS

Data for the Charlotte metropolitan area during the morning peak hours were obtained from the Charlotte Department of Transportation-Planning Division and used to illustrate the effect of the compressed work week strategy and identify the appropriate percentage of employees that need to be part of the strategy. As stated in the "Methodology" section, trips that are attracted to the downtown area from various TAZ's are reduced on a percentage basis starting with 5% to 30% with 5% equal intervals. These trips were assigned using TransCAD version 4.7 (Caliper Corporation 2004) to evaluate changes in traffic pattern with respect to traffic parameters such as average traffic speed, travel time, and volume-to-capacity ratio of each link.

Changes in Traffic Speed

Table 1 shows the change in traffic speed for every 5% reduction of work trips to the downtown area. The total center-lane miles (length of the center line of all lanes of traffic) of road links with an increase in traffic speed from 0-5 mph and greater than 5 mph are summarized for both away from downtown (AB) and toward downtown (BA) directions. From Table 1, the total center-lane miles with an increase in traffic speed are higher for links toward the downtown direction than when compared with away from the downtown direction of traffic flow, showing a decrease in traffic towards the downtown area. The total center-lane miles with an increase in traffic speed was observed to increase with the percentage reduction in trips to downtown area.

Figures 1 and 2 show the relation between the percentage of total center-lane miles by the percentage reduction in work trips for 0-5 mph and greater than a 5 mph increase in traffic speed, respectively. The percentage of total center-lane miles with an increase in traffic speed up to 5 mph increases with the percentage reduction in work trips (Figure 1). A substantial increase in the slope of the curve (increase in the percentage of center-lane miles with an increase in traffic speed greater than 5 mph) was observed from 5% reduction to 15% reduction. This was followed by a relatively constant slope up to 20% reduction in work trips, i.e., a 15%-20% reduction in work trips will be appropriate as the optimal percentage reduction of work trips to the downtown area to improve the traffic speed on the road links toward downtown (Figure 2).

Overall, reducing 15% to 20% of work commutes during the morning peak hours using a compressed work week strategy would increase traffic speed by up to 5 mph on at least 64% of center-

lane miles. Though a higher percentage of reduction in work trips may yield better performance, the reduction of work trips greater than 20% may be a difficult task for the employers or transportation system managers to target.

Table 1: Center-Lane Miles with an Increase in Traffic Speed for Every 5% Reduction in Work Trips

% Reduction in Work Trips	Center-Lane Miles & Change in Traffic Speed						% of Center-Lane Miles	
	Away from Downtown (AB)			Towards Downtown (BA)				
	<= 0 mph	> 0 & <= 5 mph	> 5 mph	<= 0 mph	> 0 & <= 5 mph	> 5 mph	0-5 mph	> 5 mph
5	791.6	552.7	1.7	579.5	765.2	1.2	56.9	0.1
10	793.8	550.2	1.9	520.7	821.7	3.5	61.1	0.3
15	737.6	604.6	3.7	473.8	860.0	12.1	63.9	0.9
20	755.9	586.4	3.6	436.3	897.5	12.1	66.7	0.9
25	711.9	628.3	5.7	416.8	903.9	25.3	67.2	1.9
30	695.1	645.5	5.3	392.3	917.7	35.9	68.2	2.7

Figure 1: Center-Lane Miles by % Reduction in Work Trips (0-5 mph Increase in Traffic Speed)
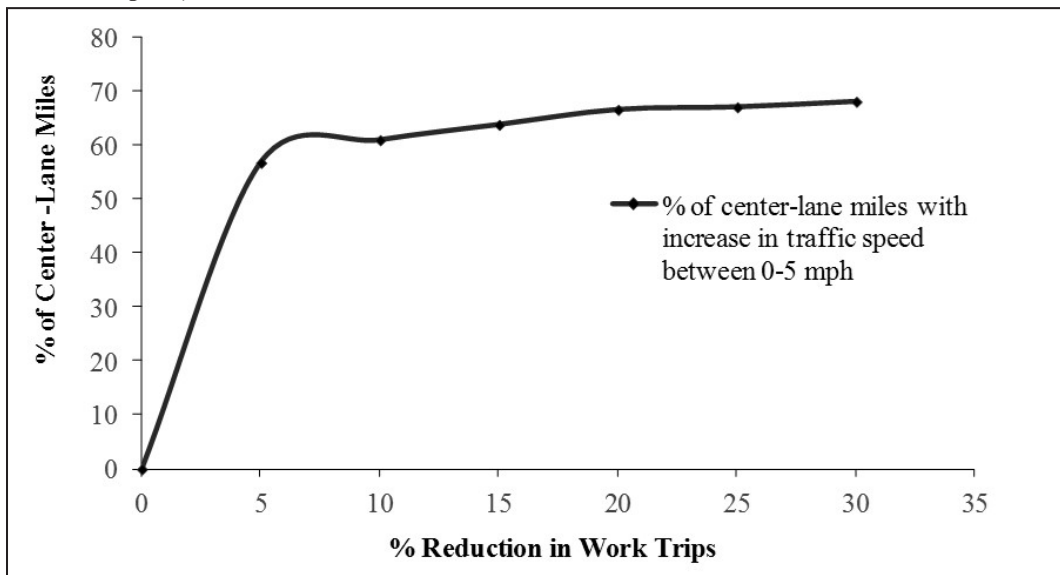
Figure 2: Center-Lane Miles by % Reduction in Work Trips (>5 mph Increase in Traffic Speed)
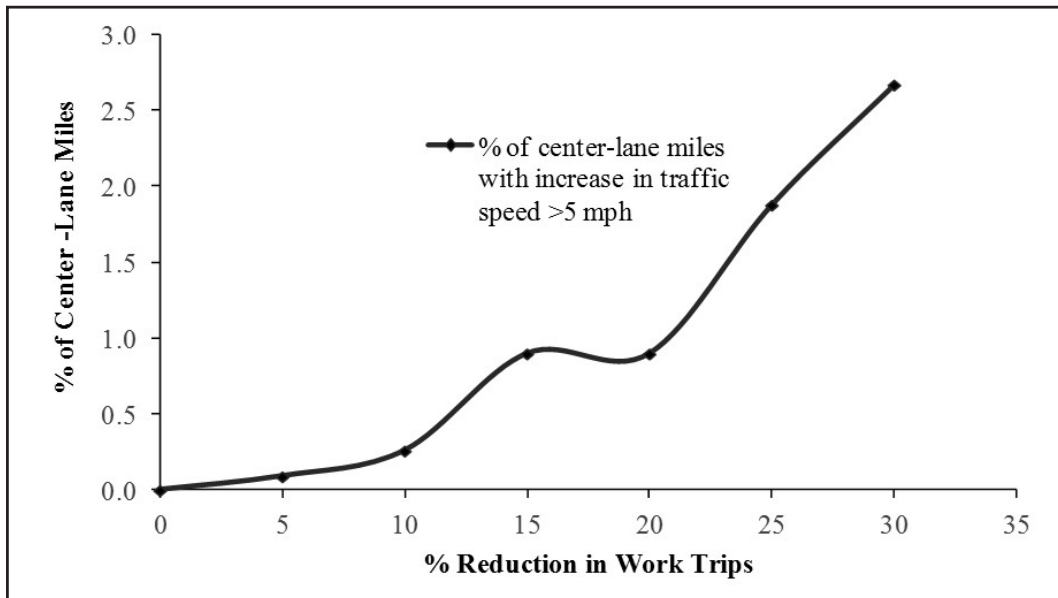
Changes in Travel Time

The change in total travel time is higher for away from downtown direction links than when compared with links toward the downtown direction of traffic flow, indicating a decrease in traffic toward the downtown area (Table 2). The total center-lane miles with a decrease in travel time is observed to increase with the percentage reduction in trips to the downtown area.

Figures 3 and 4 show the trend line between the percentage of center-lane miles by the percentage of reduction in work trips for 0-2 minutes and greater than a 2 minute decrease in travel time, respectively. The percentage of center-lane miles with a decrease in travel times up to two minutes increases with the percentage reduction in work trips (Figure 3). Similarly, a substantial increase in the percentage of center-lane miles with a decrease in travel time of more than two minutes was observed with the percentage reduction in work trips (Figure 4).

Overall, reducing 15% to 20% of work commute during the morning peak hours using the compressed work week strategy would decrease travel time by up to two minutes on at least 61% of center-lane miles. Even in this case, though a higher percentage of reduction in work trips may yield better performance, the reduction of work trips greater than 20% may be a difficult task for the employers or transportation system managers to target.

Changes in Volume-to-Capacity Ratio

Figure 5 shows the trends in volume-to-capacity ratio for the links with volume-to-capacity ratio greater than one. A substantial decrease in the percentage of center-lane miles with volume-to-capacity ratio greater than one is possible by reducing the number of work trips to the downtown area. The rate of decrease in volume-to-capacity ratio from 5% to 20% is greater than from 20% to 25% and 25% to 30%. Therefore, though a 25% or 30% reduction in the number of work trips yields better results (reduces volume-to-capacity ratio on the links toward the downtown area), the benefits seem to be relatively low or marginal. Based on this observation, a 15% to 20% reduction

in the number of trips can be considered to reduce the volume-to-capacity ratio on the links toward downtown area.
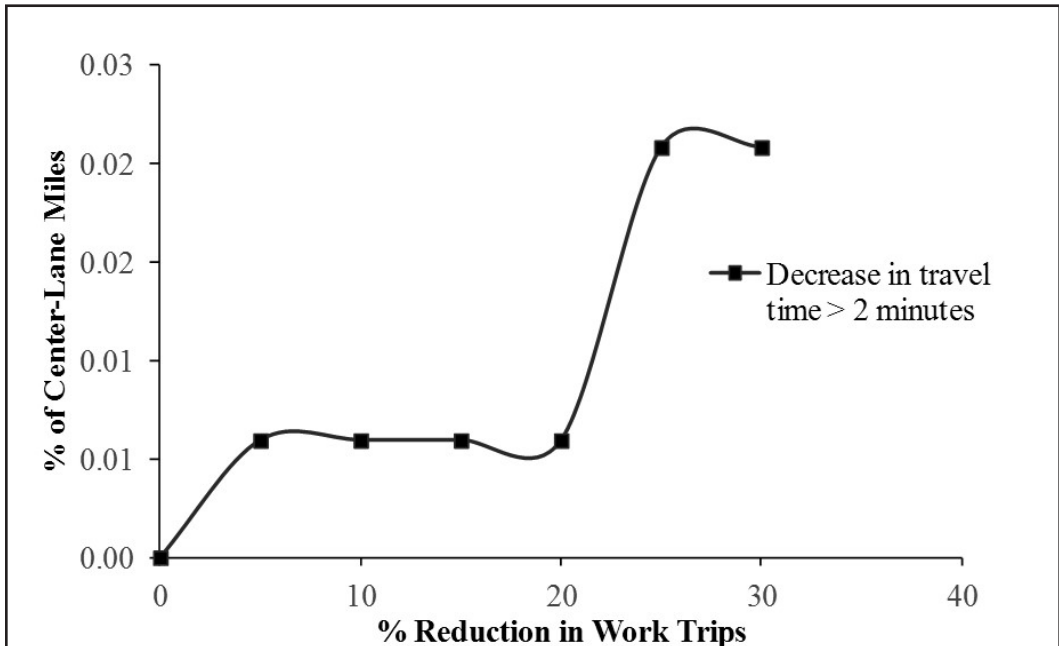
Table 2: Center-Lane Miles with a Decrease in Travel Time for Every 5% Reduction in Work Trips

% Reduction in Work Trips	Center-Lane Miles & Change in Travel Time						% of Center-Lane Miles	
	Away from Downtown (AB)			Towards Downtown (BA)				
	<= 0 min	>0 & <2 min	> 2 min	<= 0 min	>0 & <2 min	> 2 min	0-2 min	> 2 min
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
5	851.4	493.7	0.8	640.5	705.4	0.1	52.4	0.01
10	853.9	491.2	0.8	572.8	773.1	0.1	57.4	0.01
15	795.6	550.0	0.3	524.4	821.4	0.1	61.0	0.01
20	808.3	536.9	0.7	482.7	863.1	0.1	64.1	0.01
25	768.1	576.7	1.1	466.4	879.3	0.3	65.3	0.02
30	757.4	587.9	0.7	445.8	899.9	0.3	66.9	0.02

Figure 3: Percent of Center-Lane Miles by % Reduction in Work Trips (0-2 Minutes Decrease in Travel Time)
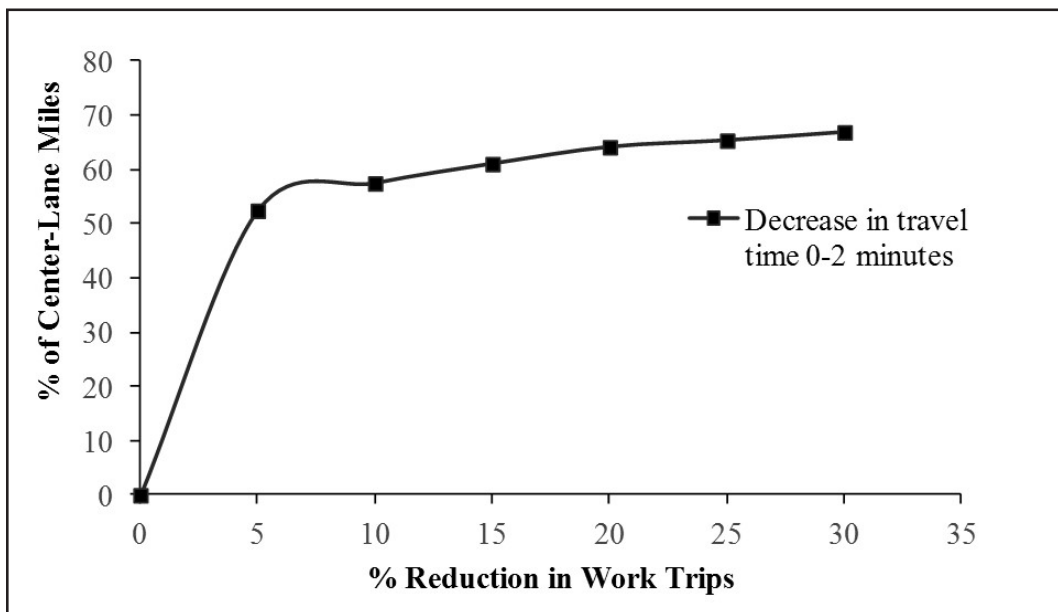
Figure 4: Percent of Center-Lane Miles by % Reduction in Work Trips (>2 Minutes Decrease in Travel Time)

Figure 5: Percent of Center-Lane Miles with Volume-to-Capacity Ratio Greater Than One
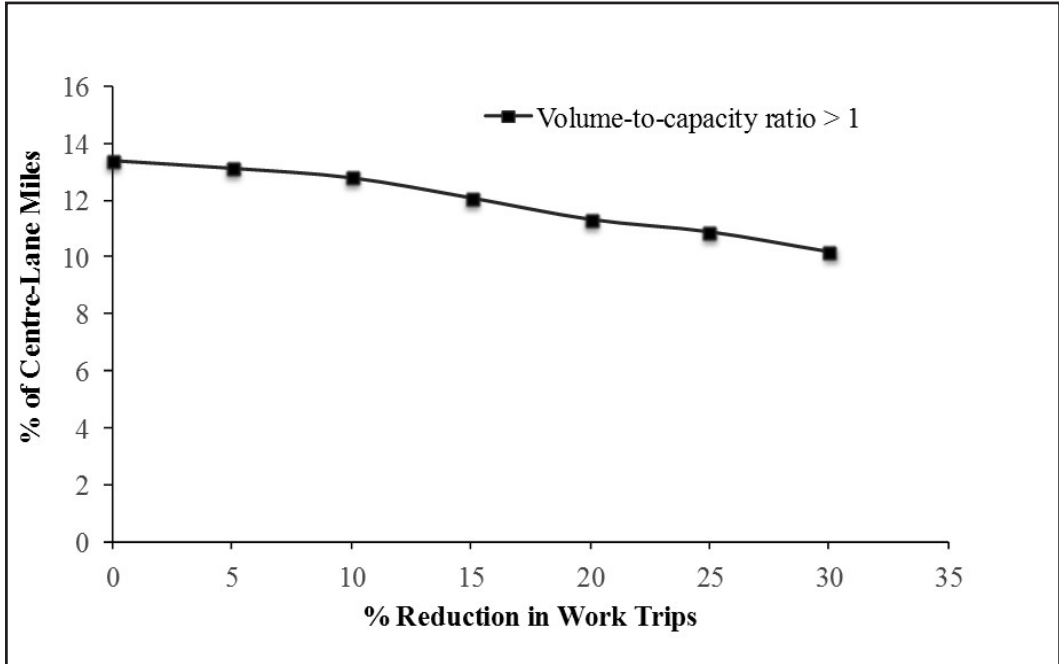
Figure 6 depicts the difference in traffic speed on the road links in the downtown area with a 15% decrease in the number of trips to the downtown area. The darker and thicker links in the figure indicate an increase in 3-5 mph and greater than 5 mph traffic speeds on the respective road links. There is an increase in traffic speeds on almost all the major links connecting the downtown area. An increase in traffic speed by 5 mph on some parts of Interstate-77 and US-74 Expressway (main freeways/expressways connected directly to the downtown area) was observed, which indicates a free movement of traffic toward downtown when compared with 0% reduction in trips to the downtown area (base case scenario). This increase in traffic speed along the major roads seems to extend well beyond the downtown area.

Figure 6: Difference in Traffic Speed Due to a 15% Reduction in Work Trips
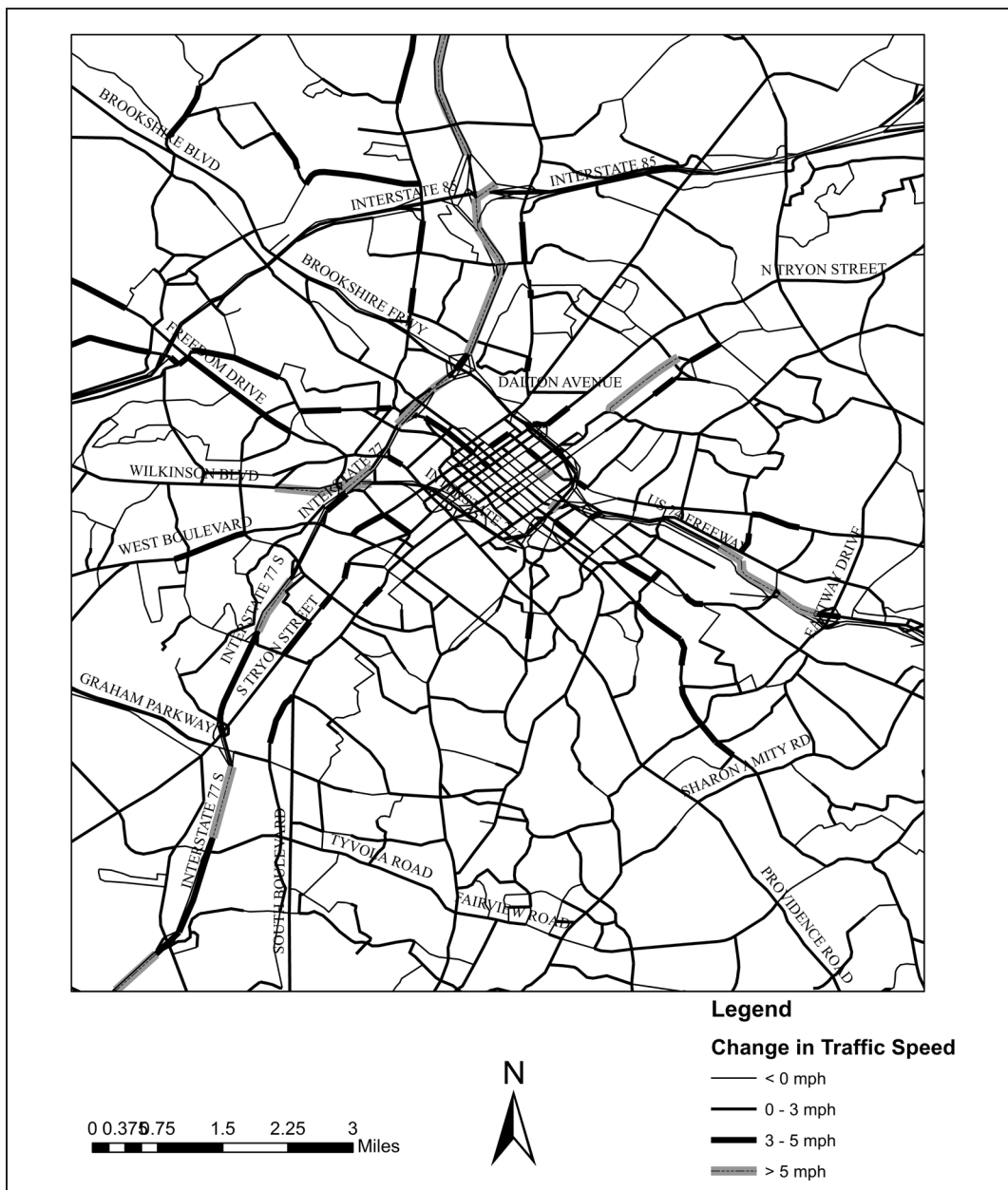
Table 3 shows the percentage of center-lane miles with an increase in traffic speed on road links for each category of speed limit. There is an increase in traffic speed on road links in AB direction (away from downtown) with lower speed limits. However, there is no change in traffic speed on the road links with high speed limits (freeways and expressways). This could be attributed to the fact that the links away from the downtown are less likely to be congested during the morning peak. The traffic speed on a majority of the freeway links in the BA direction (toward downtown) increased along with a substantial increase in the percentage of road links with lower speed limits when compared with the AB direction. Overall, there is an increase in traffic speeds on (44.41% + 0.51% + 0.27%) = 45.19% of the links in AB direction with a 15% decrease in the number of work trips to downtown area compared with (62.23% + 1.67% + 0.90%) = 64.80% of the links in the BA direction.

Table 3: Percent of Center-Lane Miles with an Increase in Traffic Speed for Each Category of Speed Limit

Category / Center-Lane Miles	Center-Lane Miles & Change in Traffic Speed				% of Center-Lane Miles			
	<= 0 mph	> 0 & <= 3 mph	> 3 & <= 5 mph	> 5 mph	<= 0 mph	> 0 & <= 3 mph	> 3 & <= 5 mph	> 5 mph
Away from Downtown (AB Direction)								
<= 35 mph	172.80	192.15	2.08	0.24	47.05	52.32	0.57	0.07
40 or 45 mph	357.53	357.18	4.59	2.95	49.50	49.45	0.64	0.41
50 mph	24.31	4.59	0.00	0.00	84.12	15.88	0.00	0.00
55 mph	141.37	43.82	0.17	0.51	76.06	23.58	0.09	0.27
65 mph	41.63	0.00	0.00	0.00	100.00	0.00	0.00	0.00
All	737.64	597.74	6.84	3.70	54.81	44.41	0.51	0.27
Towards Downtown (BA Direction)								
<= 35 mph	123.61	236.10	5.87	1.69	33.66	64.29	1.60	0.46
40 or 45 mph	191.69	517.44	7.97	5.15	26.54	71.64	1.10	0.71
50 mph	15.88	9.99	0.40	2.63	54.95	34.57	1.38	9.10
55 mph	122.07	52.91	8.27	2.62	65.67	28.47	4.45	1.41
65 mph	20.55	21.08	0.00	0.00	49.36	50.64	0.00	0.00
All	473.80	837.52	22.51	12.09	35.20	62.23	1.67	0.90

CONCLUSION

The compressed work week strategy helps relieve congestion during peak hours by increasing traffic speed and decreasing volume-to-capacity ratio, thereby decreasing travel time on links connected to the downtown area. Decreasing the number of work trips by 15% to 20% can be the ideal target percentage of reduction in work trips to have a substantial improvement in transportation network performance during peak hours. Though targeting more than 20% of employees through a compressed work week strategy continues to improve volume-to-capacity ratio, it is not suggested to have more than 20% of employees telecommuting as it might have a negative effect on economic productivity. Also, influencing work trips generated by more than 20% of employees may yield only marginal benefits (and not outweigh associated costs). Upon the reduction of trips by 15% to 20%, traffic speed on at least 64% of the center-lane miles can be increased by up to 5 mph and travel time on at least 61% of the center-lane miles can be reduced by up to two minutes.

Only offices in and around the downtown area were considered for evaluating the compressed work week strategy in this paper. Considering residential population in the downtown area or the entire core urban area may yield much larger benefits and merit an investigation.

The strategy and method discussed in this paper could be implemented to examine the effect of compressed work strategy on decentralized local areas or high office activity areas. It is highly likely that the results depend on network topology, existing travel demand, flow patterns, and congestion level. Evaluating the effectiveness of the compressed work week strategy using data for centralized and decentralized networks, different network topologies, types of networks (radial and grid patterns), detailed network characteristics, and levels of congestion would provide better insights and possibly lead to large-scale implementation of the strategy.

Implementing a compressed work week strategy might result in increased non-work trips, reducing its benefit. The development and assessment of a non-work-based model or activity-based model to examine its effect also warrants an investigation.

Acknowledgement

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