REEVALUATION OF GROUND ACCESS TO AIRPORTS

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This paper summarizes data obtained from states or other local sources on the central business district and airport highway connections in 1972. The main parameters considered are peak and off-peak travel time and travel speed. A comparison was made with similar data collected in 1968 and published in Highway Research Record 274. In addition, two earlier data sets collected by other sources in 1949 and 1965 are displayed and compared with the 1968 and 1972 data sets.

•AN earlier paper (1) summarized data obtained from the states or other local sources on the nature of the connection and existing level of service between the central business districts (CBDs) of major cities and major commercial airports. Data for that paper were collected in early 1968. This report is a similar compilation of data collected in mid-1972 on most of the same CBD-airport connections. The authors contend that the problem of airport accessibility demands continuing scrutiny if both the joint interests of efficient metropolitan transportation and the national air complex are to be fairly and objectively served.

The information presented here is not sufficient to provide a basis for such judgments. For one thing, it does not consider all travel to the airport or vicinity because the majority of airport travel is not directed to or from the CBD (2). In point of fact, no clue is even given as to the amount of or demand for airport travel service. Furthermore, the travel times shown here are averages and do not define the total ranges of travel time that individuals might experience in making their way to this largest of all intercity transportation terminals. Detailed determinations of what measures are required to better serve individual airports should be the subject of special studies, and such studies have been conducted more frequently in recent years.

On the other hand, the CBD is normally the largest single concentration of the "other ends" of trips directed to or from the airport. As such, it seems a logical hub of good public transportation services directed to the airport. Other concentrations of airport-oriented travel demand are seldom of comparable magnitude. The question of how to serve this widely dispersed, nonrepetitive travel pattern most effectively is the overriding question in dealing with airport accessibility problems.

SUMMARY AND ANALYSIS

Data collection for this analysis was conducted much like the previous study, with a few notable exceptions. First, the work was limited to airports serving large and medium hub cities as defined by the Federal Aviation Administration because access problems in smaller cities are of smaller magnitude and can be considered to be primarily matters of local interest. Second, previously submitted mapping was not resubmitted if no change was evident in primary and alternative access routes. Finally, information on travel to and from other CBDs served by some airports was not collected this time in favor of obtaining information on only the primary or major CBD served. These revisions, though addressing a much narrower field of vision than previously, drastically reduced the effort required by field forces from assisting agencies.

The reports received on all large and medium hub airports were summarized and have been included here.

Tables 1 and 2 give distance, travel time, overall travel speed, and percentage of freeway for 25 airports serving large hub cities and 31 airports serving medium hub cities.

Table 1. Connections between CBDs of 25 large hub cities and their primary commercial airport service.

City	Airport	1970 Population (in thousands)	Distance (miles)	Travel Time, Peak	Travel Time, Off-Peak	Speed, Peak (mph)	Speed, Off-Peak (mph)	Percent Freeway
Atlanta		1,173	8.9	22.2	14.1	24.1	37.9	89
Boston	Logan	2,653	5.0	28.5	15.3	10.5	19.6	13
Chicago	O'Hare	5,959	17.5	34.0	23.0	30.9	45.6	90
Cincinnati		1,111	12.8	17.7	17.9	43.4	42.9	70
Cleveland		1,960	14.5	24.7	22.9	35.2	38.0	81
Dallas	Love	1,339	6.1	22.0	16.0	16.6	22.9	75
Denver	Stapleton	1,047	6.2	14.4	14.6	25.6	25.5	0
Detroit	Metropolitan	3,971	22.5	32.0	29.9	42.2	45.2	89
Ft. Worth	Love	677	34.4	43.3	43.3	47.7	47.7	77
Houston	International	1,678	22.3	34.6	24.7	38.7	54.2	59
Kansas City	International	1,102	21.3	40.0	29.0	32.0	44.1	95
Los Angeles		8,351	17.7	40.0	25.0	26.6	42.5	80
Miami		1,219	7.1	11.0	10.0	38.7	42.6	77
Minneapolis-St. Paul		1,704	12.3	17.8	15.3	41.5	48.2	47
New Orleans		962	14.2	32.9	26.8	25.9	31.8	74
New York	Kennedy	16,207	14.3	50.0	30.0	17.2	28.6	49
New York	LaGuardia	16,207	7.8	32.0	19.0	14.6	24.6	87
New York	Newark	16,207	11.0	23.0	16.0	28.7	41.2	95
Philadelphia		4,021	8.9	21.5	16.6	24.8	32.2	40
Pittsburgh		1,846	15.3	28.0	16.0	32.8	57.4	77
San Francisco		2,988	14.3	28.2	19.9	30.4	43.1	91
Seattle	Seatac	1,238	14.3	17.4	16.8	49.3	51.1	98
St. Louis		1,883	14.8	26.0	21.0	34.2	42.3	90
Washington	Dulles	2,481	24.8	38.5	36.8	38.6	40.4	52
Washington	National	2,481	4.7	17.8	18.1	15.8	15.6	10

Table 2. Connections between CBDs of 31 medium hub cities and their primary commercial airport service.

City	Airport	1970 Population (in thousands)	Distance (miles)	Travel Time, Peak	Travel Time, Off-Peak	Speed, Peak (mph)	Speed, Off-Peak (mph)	Percent Freeway
Albany	Albany County	486	8.4	22.8	21.1	22.1	23.9	0
Albuquerque	International	297	4.3	10.4	9.4	24.8	27.4	33
Baltimore	Friendship	1,580	10.5	19.0	17.7	33.2	35.6	0
Birmingham		558	5.1	19.0	10.0	30.6	30.6	0
Buffalo	International	1,087	9.8	21.3	15.7	27.6	37.4	83
Charlotte	Douglas	279	7.4	18.3	18.0	24.3	24.7	0
Columbus	Port Columbus	790	8.5	27.4	20.3	18.4	25.0	16
Dayton	Cox	686	14.2	21.7	19.1	39.3	44.6	70
Des Moines		256	4.8	12.2	11.1	23.6	25.9	0
El Paso		337	8.3	18.4	17.3	27.1	28.8	72
Hartford	Bradley	465	14.5	30.0	20.0	29.0	43.5	100
Indianapolis		820	8.0	28.0	17.0	17.1	28.2	39
Knoxville	McGhee-Tyson	191	14.2	24.0	16.8	35.5	50.7	6
Louisville	Standiford	739	6.1	12.0	8.5	30.5	43.1	100
Memphis		664	12.3	18.2	16.2	40.5	45.6	68
Milwaukee	Mitchell	1,253	8.2	14.2	14.3	34.0	34.0	65
Nashville	Metropolitan	448	6.9	14.7	10.3	28.2	40.2	72
Norfolk		668	10.7	16.1	15.0	39.4	42.2	70
Oklahoma	Will Rogers	580	10.3	18.9	14.5	32.7	42.6	47
Omaha	Eppley	492	4.0	8.8	8.8	27.3	27.3	0
Phoenix	Sky Harbor	863	7.4	20.0	13.4	22.2	33.1	0
Portland, Ore.		825	10.5	21.7	17.8	29.0	35.4	50
Providence	Green	795	9.4	11.6	12.7	44.4	53.7	98
Raleigh		152	15.5	22.0	20.9	41.8	46.2	57
Rochester	Monroe County	601	4.2	13.0	15.5	19.4	16.2	0
Sacramento	Metropolitan	633	11.4	15.0	14.0	45.6	48.8	78
Salt Lake City		479	8.6	14.0	13.7	36.9	37.7	27
San Antonio		772	8.5	15.0	13.0	34.0	39.2	15
San Diego		1,198	3.1	10.2	9.1	18.2	20.4	0
Syracuse		376	8.3	13.5	11.2	36.9	44.5	90
Tulsa		372	8.7	15.6	12.6	33.5	41.5	88

Distance

The mean travel distance between the 25 large hub airports and their primary CBDs was 12.4 miles in 1968 and is 14.1 miles in 1972. Airports serving large hubs and located more than 15 miles from the CBD include Dulles International Airport (24.8 miles), Kansas City International (21.3 miles), Detroit Metropolitan (22.5 miles), Houston International (22.3 miles), Los Angeles (17.7 miles), and Pittsburgh (15.3 miles). The connection from Fort Worth to Love Field, Dallas, has also been included in the tabulation, but the 34.4-mile distance does not meet our criterion of service to its primary CBD. This connection will, of course, be drastically changed with the completion of the new airport that directly serves Dallas and Fort Worth.

The mean travel distance from CBD to the airport for medium hub cities was 9.1 miles in 1968 and is 8.8 miles in 1972. Raleigh Durham (a regional airport) is the only listed medium hub airport more than 15 miles from the CBD.

Figure 1 shows a frequency distribution of the number of airports located at various distances from CBDs from the 1972 study data.

Travel Time

Because we have defined a single route and a single movement of people within the metropolitan area, travel time over that route is an important indicator of the effectiveness of airport service. Table 3 gives a list of large hub airports having peak-hour and off-peak travel times exceeding an arbitrary service criterion of 30 min.

The only medium hub airport exceeding this criterion is Bradley Field serving Hartford, Connecticut, and Springfield, Massachusetts. This is a regional airport. Table 4 gives all medium hub linkages having travel times greater than 20 min.

Figure 2 shows a frequency distribution of the number of airports having various peak-hour travel times from the CBD to the airport. Figure 3 shows comparable information for the off-peak condition.

For comparative purposes, Figures 4 and 5 show the changes in peak-hour and off-peak travel time from 1968 to 1972 for large and medium hub airports. Most cities' travel times have not changed by more than 5 min, but there have been a number of exceptions.

Overall Travel Speed

Another measure of access service is the overall travel speed. Figure 6 shows a distribution of peak-hour travel speeds from the CBD to large and medium hub airports. Figure 7 shows a similar distribution of off-peak speeds.

A good visual summary of travel impedance can be obtained by relating travel time, speed, and distance on the same chart. Figure 8 shows such a comparison for large hubs only for peak-hour travel. Figure 9 shows a similar off-peak chart. These charts can be readily compared with the charts previously prepared (1).

Accessibility Over Time

In addition to the two data sets for 1968 and 1972 that were collected for this paper and the previous paper (1), we have located two earlier data sets (3, 4). The first (3) lists travel time required based on peak travel condition between airport and downtown business centers in 1949. The second (4) includes data on both peak and off-peak travel time between downtown and the airports. It is realized that these four data sets are not strictly comparable. For example, the starting points in the downtown may be different in the 1949 and 1965 data from the point used in 1968 and 1972 data.

Figure 10 shows the peak-hour travel time for the major hub airports where the data were available. The peak-hour travel time is plotted against the appropriate year.

Figure 11 shows the relative number of increases and decreases in travel time from airport to CBD between 1949 and 1972, based on the new data and data obtained from the 1949 study (3), for those airports on which common data were available. More decreases than increases are shown, but conditions have apparently degenerated in a number of instances.

Figure 1. Distance from CBD to major airports.

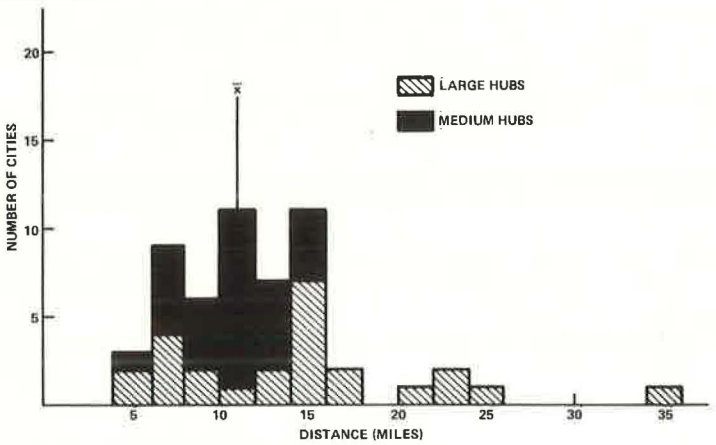


Table 3. CBD linkages having travel times of more than 30 min, large hub airport.

	Peak Hour		Off-Peak	
Rank	Airport	Travel Time (min)	Airport	Travel Time (min)
1	New York Kennedy	50.0	Fort Worth Love	43.3
2	Forth Worth Love	43.2	Washington Dulles	36.8
3	Kansas City International	40.0	New York Kennedy	30.0
4	Los Angeles	40.0		
5	Washington Dulles	38.5		
6	Houston	34.6		
7	Chicago O'Hare	34.0		
8	New Orleans	32.9		
9	Detroit Metropolitan	32.0		
10	New York LaGuardia	32.0		

Table 4. CBD linkages having travel times of more than 20 min, medium hub airport.

	Peak Hour		Off-Peak	
Rank	Airport	Travel Time (min)	Airport	Travel Time (min)
1	Hartford, Connecticut	30.0	Albany, New York	21.1
2	Indianapolis, Indiana	28.0	Columbus, Ohio	20.4
3	Columbus, Ohio	27.7	Hartford, Connecticut	20.0
4	Knoxville, Tennessee	24.0	Raleigh, North Carolina	20.0
5	Albany, New York	22.8		
6	Raleigh, North Carolina	22.1		
7	Dayton, Ohio	21.7		
8	Portland, Oregon	21.7		
9	Buffalo, New York	21.3		
10	Phoenix, Arizona	20.0		

Figure 2. Peak-hour travel time, CBD to major airports.

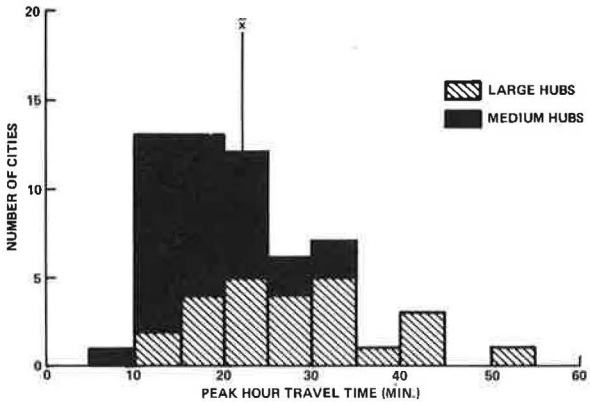


Figure 3. Off-peak travel time, CBD to major airports.

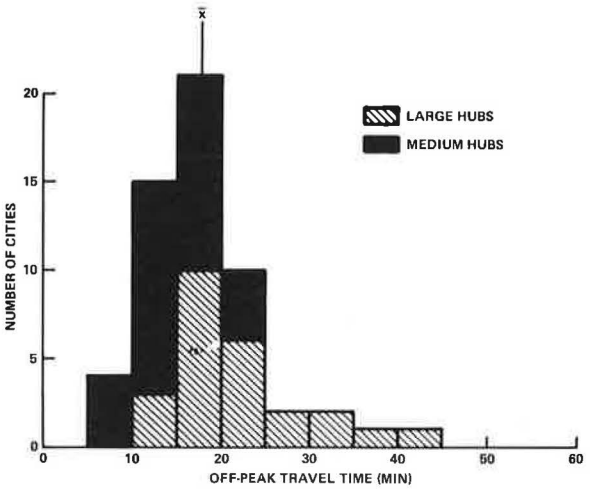


Figure 4. Change in peak-hour travel time, CBD to airport, 1968 to 1972.

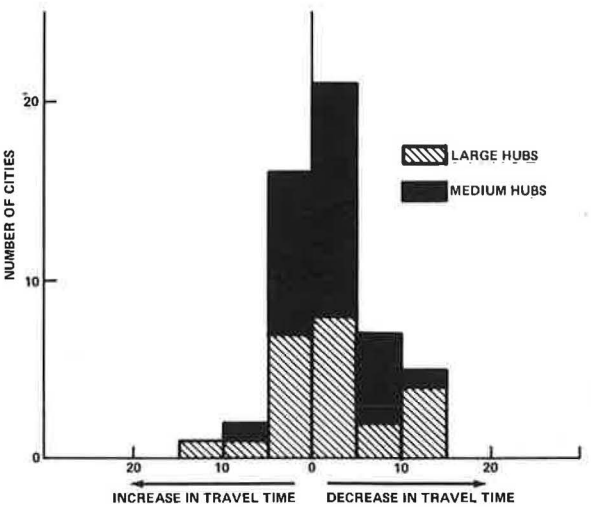


Figure 5. Change in off-peak travel time, CBD to airport, 1968 to 1972.

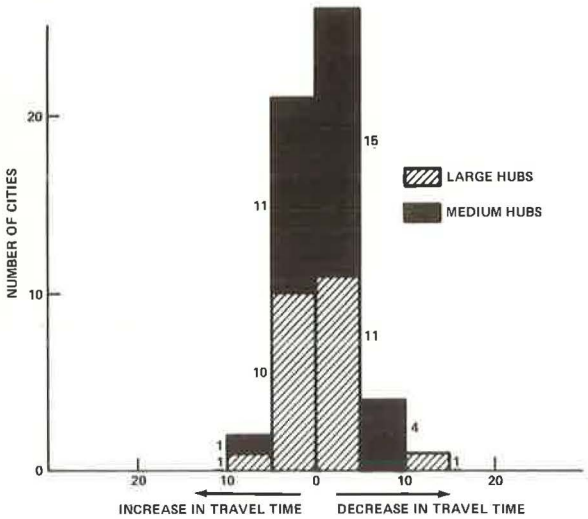


Figure 6. Peak-hour travel speed, CBD to major airports.

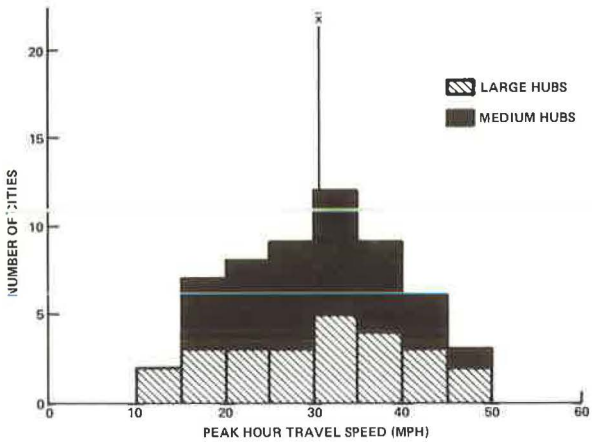


Figure 7. Off-peak travel speed, CBD to major airports.

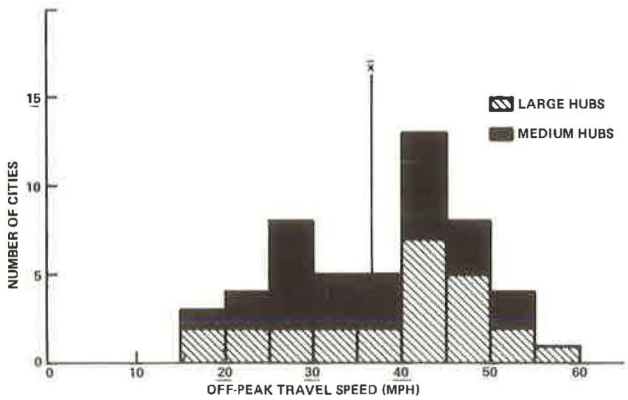


Figure 8. Peak-hour travel time versus distance for major cities.

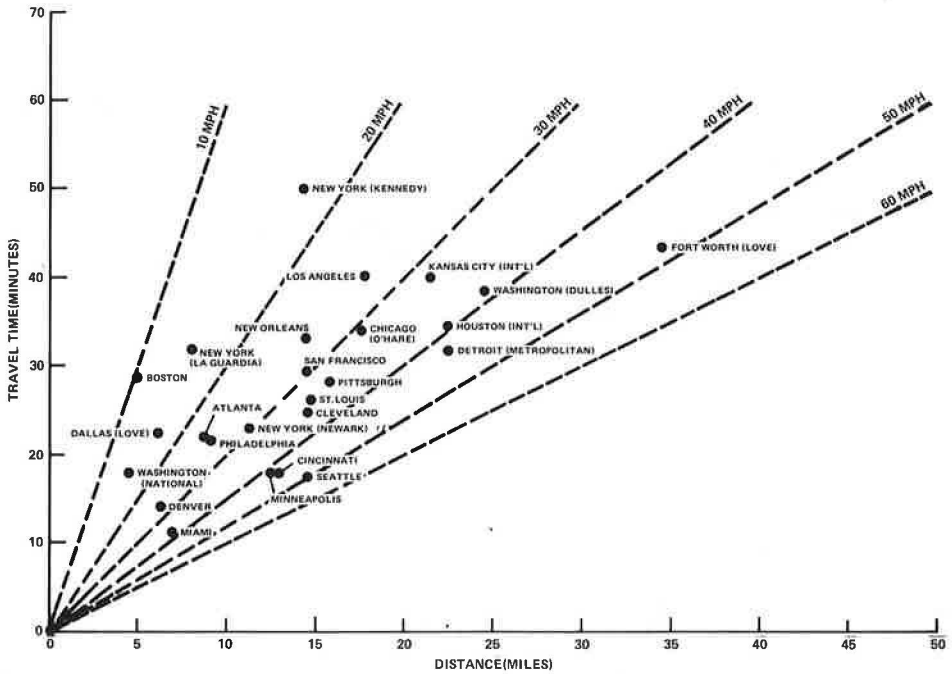


Figure 9. Off-peak travel time versus distance for major cities.

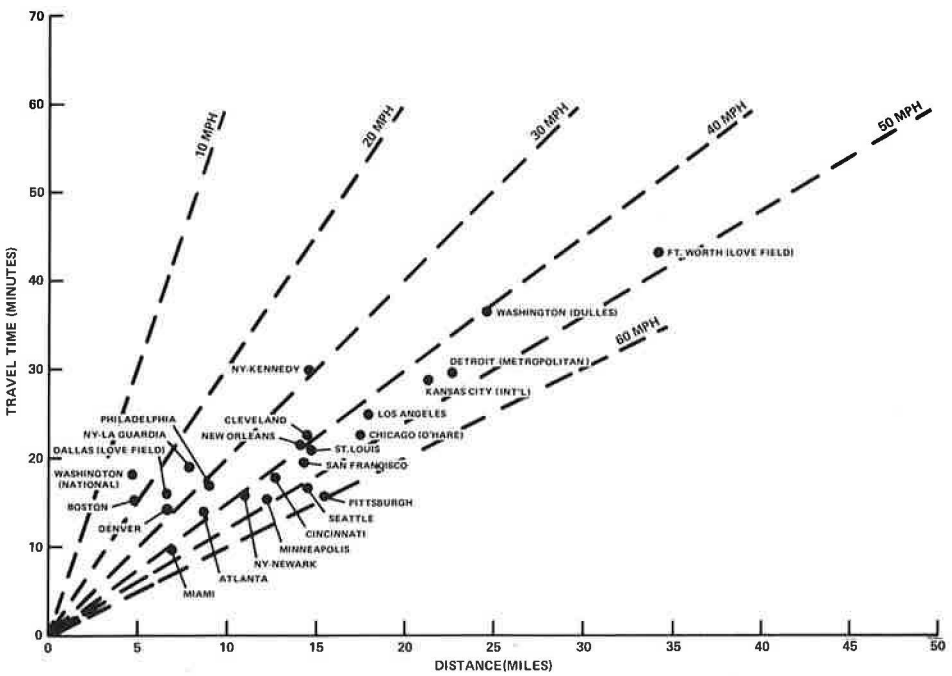


Figure 10. Peak-hour travel time versus year.

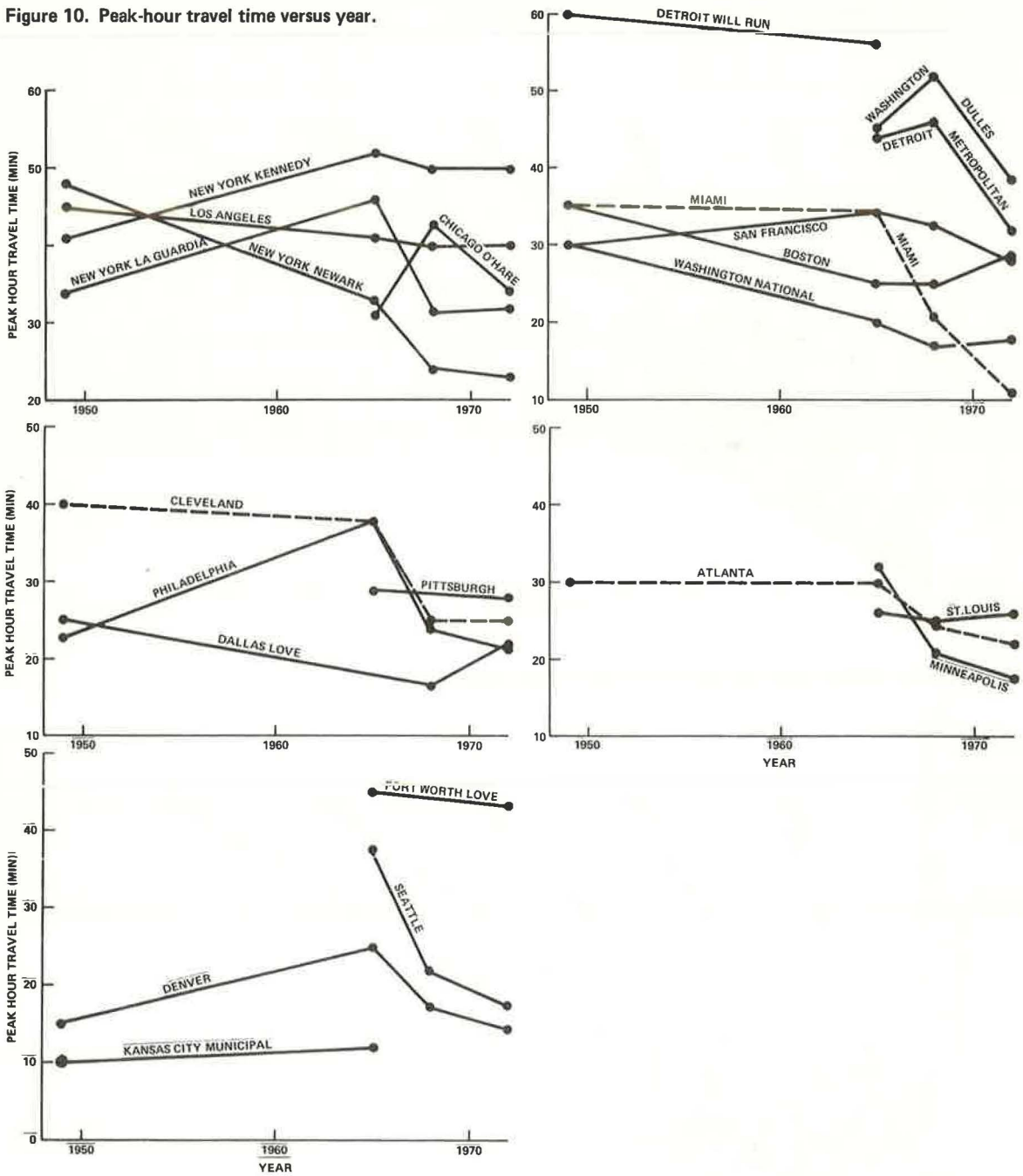
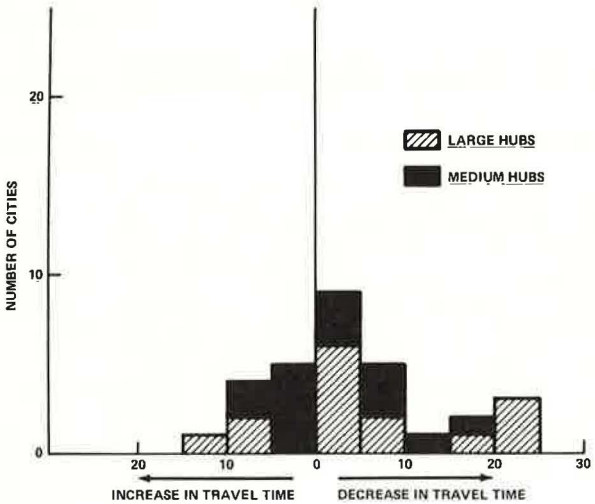


Figure 11. Increase or decrease in travel time, airport to CBD, 1949 to 1972.



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