

Methodology:
Determining Average Weekday Evening Rush-Hour Speeds
for 60 Most-Used Local Bus Routes in New York City
November 2003

I. Overview

In 2002, the NYPIRG Straphangers Campaign and Transportation Alternatives issued their first-ever Pokey Awards to the 25 slowest bus routes in New York City. The awards used bus profiles issued periodically by MTA New York City Transit, which include an arithmetic calculation of average bus speeds for each of its 202 local bus routes at noontime.

This year, we adjusted our focus from noontime speeds for the entire route to late afternoon speeds along the most crowded portion of each route. This methodology allows us to make more up-to-date, fair comparisons of rush-hour bus speeds on the most-used routes in New York City.

Basically, we determined the speed of buses during the beginning of the evening rush-hour at a crowded segment of the route. We believe this is a fair and uniform benchmark for comparing speeds among bus routes, using the most-recent available data from New York City Transit. Our intention is to replicate this approach in future years, which we could not do with the relatively static “average noon time speed” in the New York City Transit profiles.

II. Step by Step

First, we selected the ten most-used local bus routes in the Bronx, Brooklyn, Queens and Staten Island and the twenty most-used routes in Manhattan for inclusion in the report. The source of data for this selection was New York City Transit’s average daily ridership by local bus route for weekdays for September 2002. In our judgment, it was appropriate to limit our analysis in this way, as these 60 routes account for more than 1.4 million of the 2.5 million local bus trips taken by bus riders on the average weekday.

Second, we then determined the section of the bus route where the greatest number of passengers boarded. We did this by reviewing New York City Transit’s year 2000 bus route profiles, which is the most-recent data available. We located all the maximum load points and maximum load areas, which are those areas with the greatest loading of passengers. Often, this data would differ for each route depending on the direction of travel, such as northbound versus

southbound or eastbound versus westbound. To ultimately determine the slower direction of travel on any route, we essentially treated each route as two separate ones, one for each direction. We then plotted this data by hand on the most-recent available borough bus route maps.¹

Third, we reviewed the most-recent available bus schedules maintained by MTA New York City Transit on its web site.² Using the scheduling data, we plotted the scheduled timepoints on the bus route by hand on the same maps where we had noted the maximum loading points for each of two directions of travel for the sixty routes selected.

Fourth, we then defined a “maximum load corridor” as the smallest subset of each route and direction which:

- a. begins at a published timepoint;
- b. ends at a published timepoint; and
- c. includes all maximum load points and areas listed in the route profile.³

In the majority of routes and directions, the maximum load corridor represented a significant proportion (> 30%) of the total length of the entire route.

The length of these 120 corridors was measured (in miles) using Geographic Information System (GIS) mapping software, ArcView 8.3 and ArcExplorer 4.0.

Fifth, the scheduled number of minutes of travel time between the timepoints around each maximum load corridor were then calculated for the first local revenue trip scheduled to depart its terminus at or after 4:00 on weekdays. We felt that measuring bus speeds at the beginning of the afternoon rush hour most adequately captured a plurality of riders’ commuting experience. Note was taken of those instances when no local but only limited service was available at that time of day.

Sixth and finally, scheduled minutes were then converted into scheduled hours, and miles per hour were calculated by dividing the length of the corridor by the scheduled number of

¹ Sources: MTA Bronx Bus Map December 2002, commodity number 22-30-1347; MTA Brooklyn Bus Map April 2003, commodity number 22-30-1351; MTA Manhattan Bus Map April 2003, commodity number 22-30-1352; MTA Queens Bus Map December 2002, commodity number 22-30-1345; and MTA Staten Island Bus Map December 2002, commodity number 22-30-1348.

² Source: www.mta.nyc.ny.us/nyct/service/bus/bussch/.htm, July-August 2003.

³ A list of maximum load corridors by route and direction is available on request. Contact Campaign coordinator Neysa Pranger at (212) 349-6460.

hours between its beginning and end. For each route, the slower of the two directions was reported.

III. An Example: the M23

Here's an example of our how our methodology was applied, using the M23 route:

The M23 provides local bus service between West 22nd Street and 12th Avenue in Chelsea and East 20th Street and Avenue C in Peter Cooper Village.

Eastbound, its maximum load points are West 23rd Street and 6th Avenue and East 23rd Street and 3rd Avenue. Westbound, its maximum load points are East 23rd Street and Lexington Avenue and West 23rd Street and 6th Avenue. In both directions, the published timepoints are:

- West 22nd Street and 12th Avenue
- West 23rd Street and 9th Avenue
- West 23rd Street and 6th Avenue
- East 23rd Street and Park Avenue South
- East 23rd Street and 2nd Avenue
- East 20th Street and Avenue C

Thus in the eastbound direction, the maximum load corridor runs on 23rd Street, between 9th and 2nd Avenues. In the westbound direction, the corridor is the same, although in the opposite direction.

In the eastbound direction, the first scheduled weekday trip at or after 4 p.m. departs West 22nd Street and 12th Avenue at 4:01 p.m. It is scheduled to stop at 9th Avenue at 4:09 p.m. and at 2nd Avenue 4:28 p.m., thus traveling its maximum load corridor in 19 minutes. We converted the minutes to hours, which is 0.317 hours.

In the westbound direction, there is a weekday trip scheduled to depart East 20th Street and Avenue C at 4:00 p.m. It is scheduled to stop at 2nd Avenue at 4:11 p.m. and at 9th Avenue at 4:32 p.m., thus traveling its maximum load corridor in 21 minutes. We converted the minutes to hours, which is 0.350 hours.

Using GIS mapping software, the length of the maximum load corridor was measured at 1.2 miles.

We then divided the length of the maximum load corridor (1.2 miles) by the time required to traverse it in the eastbound direction (0.317 hours) and the westbound direction (0.350 hours).

That calculation results in a weekday evening rush-hour bus speed of 3.8 miles per hour in the eastbound direction and 3.4 miles per hour in the westbound direction. The slower of these two speeds is cited in our report.

V. Credits

Methodology for the second annual “Pokey” awards was designed by Matt Glomski and Gene Russianoff of the Straphangers Campaign. Thanks to Bruce Schaller of Schaller Consulting for his expert advice. Data analysis was done by Matt Glomski, Campaign organizer Michael Hernandez and Campaign interns Richard Thomas and Rebecca Sklaren. Expert graphics and web production was provided by NYPIRG’s Li Howard.

Steven Romalewski, Marty DeBenedictis and Meg McCarron of NYPIRG's Community Mapping Assistance Project (CMAP) provided Geographical Information System (GIS) technical support. Campaign coordinator Neysa Pranger edited the report and supervised production.

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