

# Intermediate Timepoint Removal on Limited-Stop Routes at New York City Transit

S. Schwarcz and S. Wyss, MTA New York City Transit

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## Introduction

Like most transit systems, NYCT utilizes intermediate timepoints on bus routes as a control strategy. This strategy helps to keep buses on schedule but also tends to annoy customers who are already on the bus. NYCT began a pilot program in the spring of 2010 to remove most intermediate timepoints from the schedules of limited stop routes, with the goal of reducing travel times and improving customer satisfaction. Local service on the same corridor retained all timepoints. Limited-stop bus service at NYCT is a variant of local bus service, with greater distances between bus stops.

This pilot program was inspired by travel time savings achieved on Select Bus Service (SBS) which is NYCT's version of Bus Rapid Transit (BRT). The first route to run with very few intermediate timepoints was the SBS 12 in the Bronx, followed by the SBS 15 and SBS 34 crosstown in Manhattan. NYCT studies on these routes have shown a 20% decrease in travel time. Most of this travel time reduction was a result of the various features of BRT, including dedicated bus lanes, off-board fare collection, all door boarding and signal priority. However, it was thought that some of this reduction was a result of timepoint removal. One goal of this pilot program was to study the effects of timepoint removal in isolation from other travel time reducing features.

## Objectives

The goal of the pilot program was to test the impact of eliminating holding for schedule adjustments in order to reduce travel time and shorten customer trips, thereby improving customer satisfaction. However, since the purpose of intermediate timepoints is to keep trips on schedule, without these timepoints it was possible that reliability would decrease and thus negatively impact customer satisfaction. The pilot program includes an evaluation of travel time, reliability, and customer satisfaction.

## Methodology

The pilot routes were selected from existing limited-stop routes, a mix of route types (crosstown, feeder, all day, peak only), and routes that had sufficient data available to perform analysis. Non-relief and non-short turn intermediate timepoints were removed on pilot program routes and these routes were allowed to run for several months before the post timepoint removal data was collected.

Metric	Data Source
Travel Time	Before and after running times obtained from ride checks or point checks.
Reliability	Before and after wait assessment data, a measure of the variability of the headway (interval between buses).
Customer Satisfaction	Before and after customer satisfaction surveys. Overall customer satisfaction and with respect to holding for schedule adjustments. With respect to holding, customers were asked if they noticed that buses slow down when approaching green signals, or sit at bus stops for long periods of time for no apparent reason.

Figure 1. Measures of Effectiveness

The data available for analysis was primarily manually collected data (ride checks and point checks), some automatic fare collection (Metrocard) data, and before and after customer satisfaction survey results. Due to data limitations the analysis and conclusions are based on aggregate data, at the route level by direction, rather than a more detailed level by time period at the timepoint level.

## Results

The pilot program focused on four routes, the B6, B35, Q17, and Q43 (Figure 3). These routes were good case studies because they had existing limited-stop service which had been operating for several years, and the only change to these routes was the removal of intermediate timepoints. This allowed for the effects of timepoint removal to be studied in isolation from any other time saving features.

In general, pilot routes ran with very little intervention by Road Operations due to limited Road Operations resources and lack of AVL data to assist with real time control.

The tables to the right present a summary of the pilot route characteristics and the results of the data analysis. Results are shown for all four limited-stop routes. No changes were made to local bus service, but a concern had been raised prior to the pilot program that timepoint removal on limited-stop service might negatively impact parallel local service. Therefore, data was analyzed for the parallel local route for two of the case studies (B35, B6).



Figure 2. Map of NYCT bus routes in all five boroughs of New York City. All bus routes shown in light grey, with limited-stop routes in dark grey, and limited-stop routes without timepoints in red and identified by route.

Table 1. Case study statistics

Routes	B35	Q43	B6	Q17
Borough	Brooklyn	Queens	Brooklyn	Queens
Route Type	Crosstown	Feeder	Crosstown	North/South
Ridership (Avg. Weekday)	37,000	16,000	43,000	19,000
Local Svc Span	24/7	24/7	24/7	24/7
LTD Span	7 days	Peak hrs, Peak dir.	6 days	Peak hrs
Length (miles)	6.8	6.8	10.8	7.0
LTD Segment (miles)	4.1	6.8	4.8	7.0
Avg Run Time* (minutes)	64	43	85	45
Local Headway**	6	4	9	7
LTD Headway**	5	4	6	11
LTD Implementation	Summer 2005	Winter 1993	Fall 2000	Fall 2003
Timepoint Removal	Spring 2010	Spring 2010	Winter 2011	Winter 2011

\*One-Way, AM Peak  
\*\*AM Peak

Table 2. Case study results Summary

Route	B35	Q43	B6	Q17
Travel Time Savings* (minutes)	2	2.5	1	3
Reliability	Reduced from 86% to 84%	Increased from 88% to 91%	No change 83% before and after	Not available
Customer Perceptions	Improved overall on limited-stop service: faster ride and less holding	Improved with respect to trip speed, but no significant change in overall customer satisfaction	Improved overall on both local and LTD, and w.r.t holding and trip speed	Improved with respect to holding
Local Service Analysis	Reduced travel time, reduction in reliability (85% to 82%)	Not applicable	Reduced travel time, no change in reliability (84% before and after)	Not applicable

\*Average one-way

## Conclusions

Timepoint removal on limited-stop service appears to have resulted in:

- Slightly reduced travel time for all of the case study routes
- Slight, if any change in reliability
- Improvements in customer perceptions

### Impact on Local Service

While no changes were made to local service, a concern raised prior to the pilot program was that timepoint removal would result in reduced reliability on the limited-stop routes which might result in a passenger shift to the local service and increased travel time on the local route. For the local routes that were analyzed (B35, B6) there was a decrease in travel time which is contrary to this hypothesis. There was a reduction in reliability on the local B35, but due to the reduction in travel time and no observed shifting of customers this did not appear to be an effect of operational changes due to timepoint removal on the limited-stop service.

One possible explanation for local trips operating ahead of schedule is that typically bus operators who drive the local route also drive the limited-stop route and they may have become accustomed to operating faster on the limited-stop route and this is carrying over into how they operate on the local route. Further analysis would be needed to support this hypothesis.

Likewise, the reduction in reliability seen on the B35 local service may be related to the increased number of trips that were operating ahead of schedule and not adhering to timepoints while other trips did adhere to timepoints. Inconsistent operator behavior can result in erratic headways and reduced reliability. Further study would be necessary to determine the true cause.

### Union Resistance

Finally, despite these findings there was considerable pressure from bus operator unions to reinstate all timepoints. As a compromise timepoints will be reinstated on portions of the B6 route. This will likely eliminate most if not all of the savings achieved through complete intermediate timepoint removal.

## Future directions

Due to data limitations it was not possible to analyze running times and reliability at the timepoint level. This more detailed analysis would have provided more insight into the effects of timepoint removal. However, based on this experiment it appears that timepoint removal may be an effective strategy to reduce running time without negatively impacting reliability. An expansion of the pilot program to other NYCT routes and ideally more comprehensive data would be needed to confirm this initial result. Furthermore, similar experiments at other transit systems that have automated data collection systems and thus more robust data would further assist in determining the impact of timepoint removal on limited-stop service.

## For further information

For further information please contact [schwarcz@mnr.org](mailto:schwarcz@mnr.org) or [sarah.wyss@nycf.com](mailto:sarah.wyss@nycf.com). More information on this topic can also be found in the TRB compendium of papers. More information on New York City Transit and the MTA can be found at [www.mta.info](http://www.mta.info).