

Planning and Development

UTILIZING AUTOMATIC PASSENGER COUNTERS FOR
NATIONAL TRANSIT DATABASE TRIP SAMPLING

1. Purpose: In accordance with Federal Transit Administration (FTA) regulations, this operating procedure describes the process the Authority will utilize when conducting random trip sampling in order to properly record accurate passenger miles data.
2. Authority: Chief Executive Officer and FTA Circular 2710.1A.
3. Background: In order to produce system wide passenger mile data for NTD reporting, the FTA allows transit systems to utilize sampling procedures to determine an “average trip length” figure. This figure is used to determine system wide passenger miles by multiplying it times the total passengers. The sampling procedures are delineated in FTA Circular 2710.1A. This Circular allows for transit systems to use alternative sampling techniques in order to utilize APC technology for trip sampling, provided the alternative trip sampling method is a statistically valid technique of accomplishing the FTA-required 95% confidence level within 10% precision of passenger miles data.
4. Scope: This operating procedure applies to all officers, employees and agents of the Authority.
5. Definitions: For purposes of this operating procedure, the following definitions apply:
 - a. Agency means the Central Florida Regional Transportation Authority d/b/a LYNX.
 - b. APC means Automatic Passenger Counters.
 - c. Authority means the Central Florida Regional Transportation Authority d/b/a LYNX.
 - d. Block means a collection of trips that constitute a bus operator’s daily work assignment.
 - e. FTA mean Federal Transit Administration
 - f. NTD means National Transit Database.
 - g. Trip means a one-way bus movement along a fixed route.

6. Procedure: Assurance of Randomly-Selected Blocks

In 2002 LYNX began using an alternative sampling procedure developed by George J. Knafl, Ph.D. that uses APCs. Based on his report "Sample Size Analysis for Future LYNX Passenger Miles Estimation for Fixed Routes" completed November 20, 2001, it was determined that a sample size of at least 250 randomly sampled fixed route blocks per year collected over 85 randomly sampled dates would achieve FTA requirements of 95% confidence within 10% precision. Dr. Knafl provided an Excel-based random trip sampling program for use by the Service Planning Division. The following procedures are followed to accomplish this precision level:

Effective with each LYNX service change, traditionally in April, August and December, the Service Planning Division will update the database of all blocks eligible for sampling.

On a monthly basis, the assigned Service Planner will generate a list of randomly selected blocks that are to have APC-equipped buses assigned to, utilizing the random trip sampling program provided by Dr. Knafl. A total of seven (7) blocks per day will be selected.

On a weekly basis, the assigned Service Planner will forward the upcoming weeks' randomly-selected blocks to the Transportation Department for the assignment of APC buses to the randomly-selected blocks. The Transportation Department will make every effort to assign APC buses to the randomly-selected blocks.

On a weekly basis, the Transportation Department will return the completed week's assigned APC bus list to the assigned Service Planner. The assigned Service Planner will then determine if a sufficient number of blocks were sampled by validating the presence of APC buses on the randomly-selected blocks.

On a weekly basis, the Manager of Service Planning or his designee will sign the completed week's assigned APC bus list.

7. Procedure: Periodic Calibration of APC Equipment

In order to utilize APCs for random sampling purposes, FT A requires transit systems to have a maintenance plan in place to accomplish periodic calibration of the APC equipment. This maintenance plan must consist of a sampling of at least 100 vehicle trips using ride checkers. The ride checker manually counts passengers boarding and alighting, and a comparison is made of these counts to the corresponding APC data. Any discrepancies between the APC data and the manual data are noted, and, if

required, the APC equipment is inspected and calibrated by the Maintenance Department.

In order to accomplish a minimum of 100 manual counts, at least two trips per week should be manually checked. However, this is simply a benchmark, as the manual trips do not have to be randomly sampled.

The assigned Service Planner maintains a list of all APC-equipped LYNX buses. Utilizing this list, the assigned Service Planner determines which APC-equipped buses need to have a manual count performed. This is done by determining which APC buses have not yet been checked. Currently LYNX has 67 APC-equipped buses (as of July 2010). It is the goal of LYNX to manually check every APC bus at least once per fiscal year and in order to achieve the required 100 manual checks, the majority of LYNX APC buses will receive a second manual check during the year.

The following procedures are followed to accomplish these tasks:

On an ongoing basis, the assigned Service Planner will maintain an accurate list of all APC-equipped LYNX buses.

On an as-required basis, the assigned Service Planner will identify an APC-equipped bus for manual ride check. The assigned Service Planner or his designee will ride a trip on the bus and record the boardings and alightings by stop.

Upon completion of each manual ride check, the assigned Service Planner will access the APC data for the corresponding manual ride check and will compare the data from the two sources. Any discrepancies are noted, and if it is determined that the APC data does not correspond to the manual data, the Maintenance Department will be notified of the malfunctioning APC. The APC will then be inspected and re-calibrated as necessary.

Upon completion of any maintenance work performed on the APC equipment, the Maintenance Department will provide signed documentation describing tasks performed.

The Manager of Service Planning or his designee will sign both the manual ride check and the corresponding APC data to validate that data was compared.

On a quarterly basis the average trip length will be calculated from the APC data to be used as a 'progress check' to ensure accuracy of the data. The sampling plan will then be updated if additional samples are needed for the remainder of the bid period to meet FTA statistical requirements.



8. Implementation:

The Chief Executive Officer shall utilize the above procedures and the FTA approved regulations to implement this policy, which shall be followed under all conditions that pertain to the activities listed. The Chief Executive Officer is authorized to amend the administrative guidelines from time to time as deemed necessary to implement this policy with the exclusion of required Federal and State statutes and regulations.

Approved By: 
Linda Watson, Chief Executive Officer

Date: 7/13/10