An Analysis of SEPTA Regional Rail On-Time Performance

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Executive overview

I collected publicly available On-Time Performance (OTP) data continuously from SEPTA and analyzed it over the past nine years. Specific trains with consistently poor On-Time Performance are notable for their tardiness as well as their regularity. Timetable updates will address the majority of SEPTA's OTP issues and help achieve the stated 90% OTP goal. Specific recommendations to fix the problem are included in this report.

Introduction

Rail performance is a function of rail equipment, operating capabilities, ridership, acts of God and expectations set forth in the timetable. This report reviews SEPTA's Regional Rail timetables and presents specific recommendations to improve performance through schedule management.

SEPTA's rail scheduling process uses multivariate modeling of demographics, climate, speed limits, equipment capabilities, and much more. This is great for designing new service and predicting the impact of large changes like equipment replacement. The analysis in this report is strictly incremental and is based solely on SEPTA's historical performance.

Definitions

On-Time Performance (OTP) is a railroad industry standard definition: the percentage of trains on a line which are 5:59 minutes late or less in reaching their destination. For SEPTA, *destination* means Suburban Station or a system extremity.

Lateness is the time a train departs a given stop versus the scheduled departure time for that stop.

Percentile is a statistic. By way of example, consider a weekday schedule running for 4 weeks (20 service days). We say the *90-percentile lateness* is 3 minutes if 18 or more trains are late by 3 or more minutes.

Analysis

I created a data collection and reporting tool in 2008 and run it continuously to monitor all SEPTA Regional Rail trains. Although SEPTA updates its schedules regularly, many trains have run continuous service for a decade or more. This provides a strong basis for understanding trends. Specific recommendations on this report are based on the current service period starting January 29, 2017.

This analysis strives to improve official OTP performance as well as reduce lateness at non-destination stops. **Only outbound service (departing from Suburban Station) is in scope for this report.**

It is trivial to achieve 100% OTP – leave a *huge* gap before the last stop. Likewise it is trivial to minimize train travel times – ignore schedules, and depart each stop as soon as is safe. Surely, managing schedule changes and OTP requires discretion. This report puts forth reasonable suggestions and only considers changes when they will have a meaningful impact.

Even still, there are plenty of easy improvements to make. **For example, Media/Elwyn train #9331 has only started its route (University City) on time ONCE and every time this lateness cascades until at least Morton-Rutledge.**

Following are recommendations to fix big, easy problems like #9331, a methodology to fix smaller problems and a proposed set of new timetables for all rail lines.

Recommendations

Update the timetable effective April 23, 2017 for these problem stops:

Train	Issue	Proposal
#453 Airport	Train has NEVER been on time, and contributes significantly to OTP.	Study contention with Amtrak rail between University City and Eastwick. See also #5253 Newark.
#768 Chestnut Hill East	Train has NEVER been on time because it is deprioritized at Wayne Junction, a majority of OTP failure cascades from this one stop.	Reschedule Wayne and later stops 4 minutes later.
#4815 Chestnut Hill West	75% of trips are 6+ minutes late leaving Suburban Station. Root cause is Warminster Line inbound service.	Reschedule stops before Queen Lane 4 minutes later.
#1071 Cynwyd	90% of trains are late at destination.	Reschedule final stop 1 minute later. (Delaying the final stop is normally "cheating", but it is justified in this severe case.)
Fox Chase	Trains #814, #830, #840, #852 are 3+ minutes late at Lawndale over 80% of the time.	Reevaluate modeled transit time between Wayne and Olney. Add 2 minutes scheduling delay before Olney.
#514 Lansdale	Median service lateness is 6+ minutes for Ft. Washington, Ambler, Penllyn, 9th Street and Fortuna stops. This schedule is cheating by schedules 14 minutes between Link Belt and Chalfont.	Schedule 4 extra minutes of transit somewhere between Glenside branch and Fort Washington. Or, if significant changes to Jenkintown/Glenside are planned then only add 2 minutes. Remove same amount of time from Link Belt – Chalfont segment.
#6212 Manayunk	This train has NEVER been on time for any stop after Miquon.	Reschedule Spring Mill +1 minute, Conshohocken +1 minute, Norristown + 1 minute, Main Street +2 minutes, Elm Street +2 minutes.
#515, #8517 Paoli	These trains significantly impact OTP	Study passenger load variability and

	but their performance is highly variable.	review if equipment or operator issues are contributing to lateness.
#4213 Wilmington	Train NEVER reaches Chester on schedule.	Reschedule Chester, Marcus Hook and Claymont stops 2 minutes later.
#6358 West Trenton	Train NEVER reaches destination on time.	Reschedule final stop one minute later.
#384 West Trenton	Train NEVER departs Forest Hills, Somerton or Trevose on time.	Reschedule Forest Hills, Somerton, Trevose and Neshaminy one minute later.

Conclusion

Many of these recommendations are modest. The recommended approach is to move a little in the right direction, and then review performance at each schedule update.

Enclosed are reports there were used as the starting point for this analysis. They show the 90th percentile departure time for every train and assist in identifying problems. These detailed reports are also available online and include drill down functionality. This report has been featured on NBC News, The Transit Wire and Technical.ly Philly.

ONLINE VERSION: http://phor.net/apps/septa/

Although SEPTA has improved on-time performance considerably in the past 10 years, there is room for continuous improvement to match its competitors in other cities.