Black Belt Project Reducing Bus Complaints

As of February 12, 2014

Team: ***Low Riders***

Carlos Maxwell (Team Leader)
Jackie Bailey
Kaushik Parekh
Sandra Washington
Lourdes Avalos
Felipe Hermida
Eric Zahn

Derrick Gordon (Sponsor)

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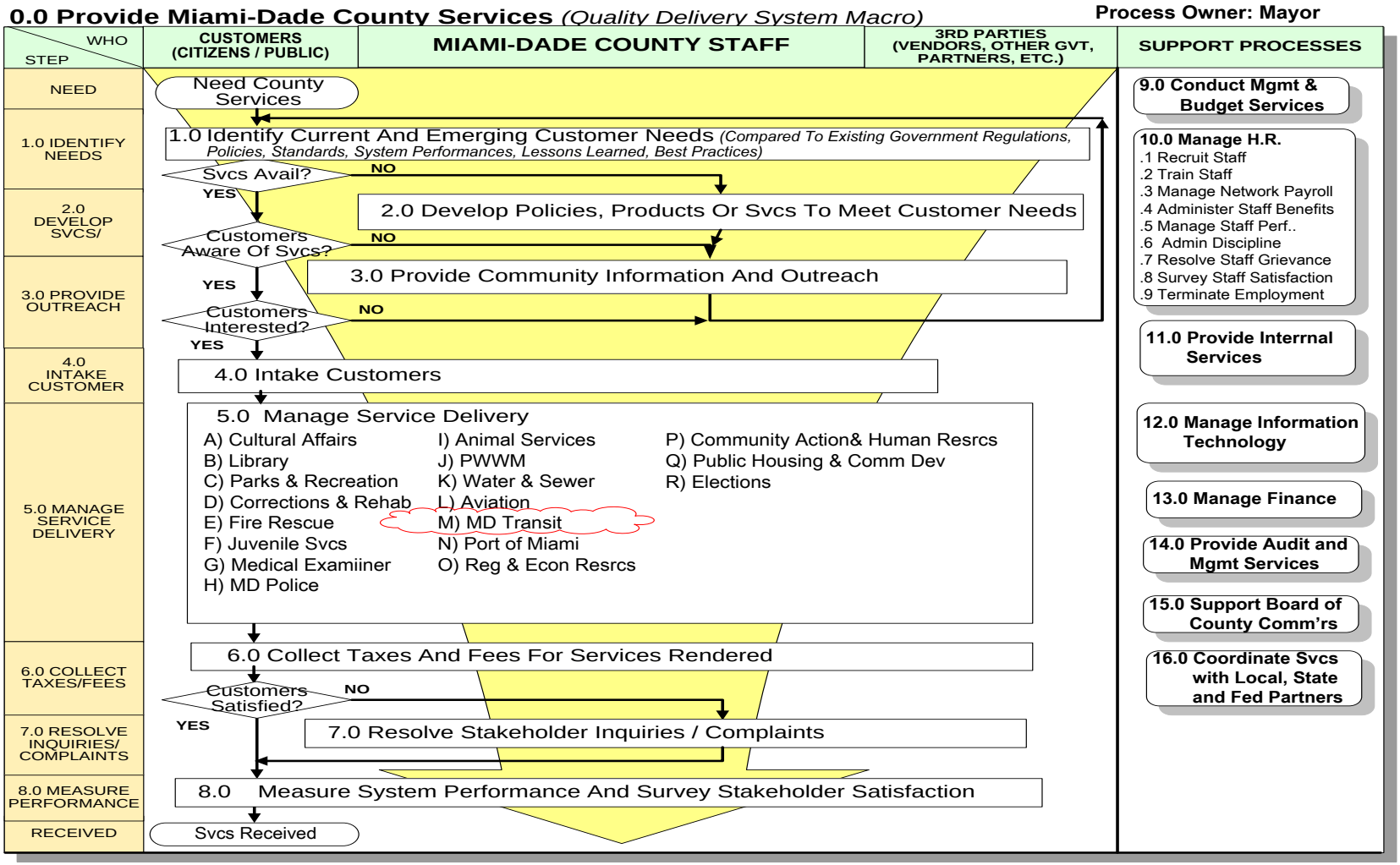
Review Quality Delivery System

The team reviewed the Miami-Dade Quality Delivery System.



The team will focus on a "core" delivery process in the Transit Department.

Hidden Costs of Bus Complaints

The team collected information on costs of bus complaints to demonstrate the financial impact of complaints on personnel resources

Annual Cost

Time spent at 311 intake..... $90,240

- 34 transit call specialists at 311 spend about 5% of time answering and processing complaint calls. Based on 311 call data for a six month period in 2013, this equates to 1.41 FTEs per year.
- Average 2013-14 salary and fringe per specialist is $63,567 ($64K x 1.41 = $90,240)

Time spent by MDT superintendents..... $227,250

- Nine superintendents spread across three garages review and answer complaints
- Estimated effort is 25% of superintendents' time ($909K x 0.25 = $227,250)

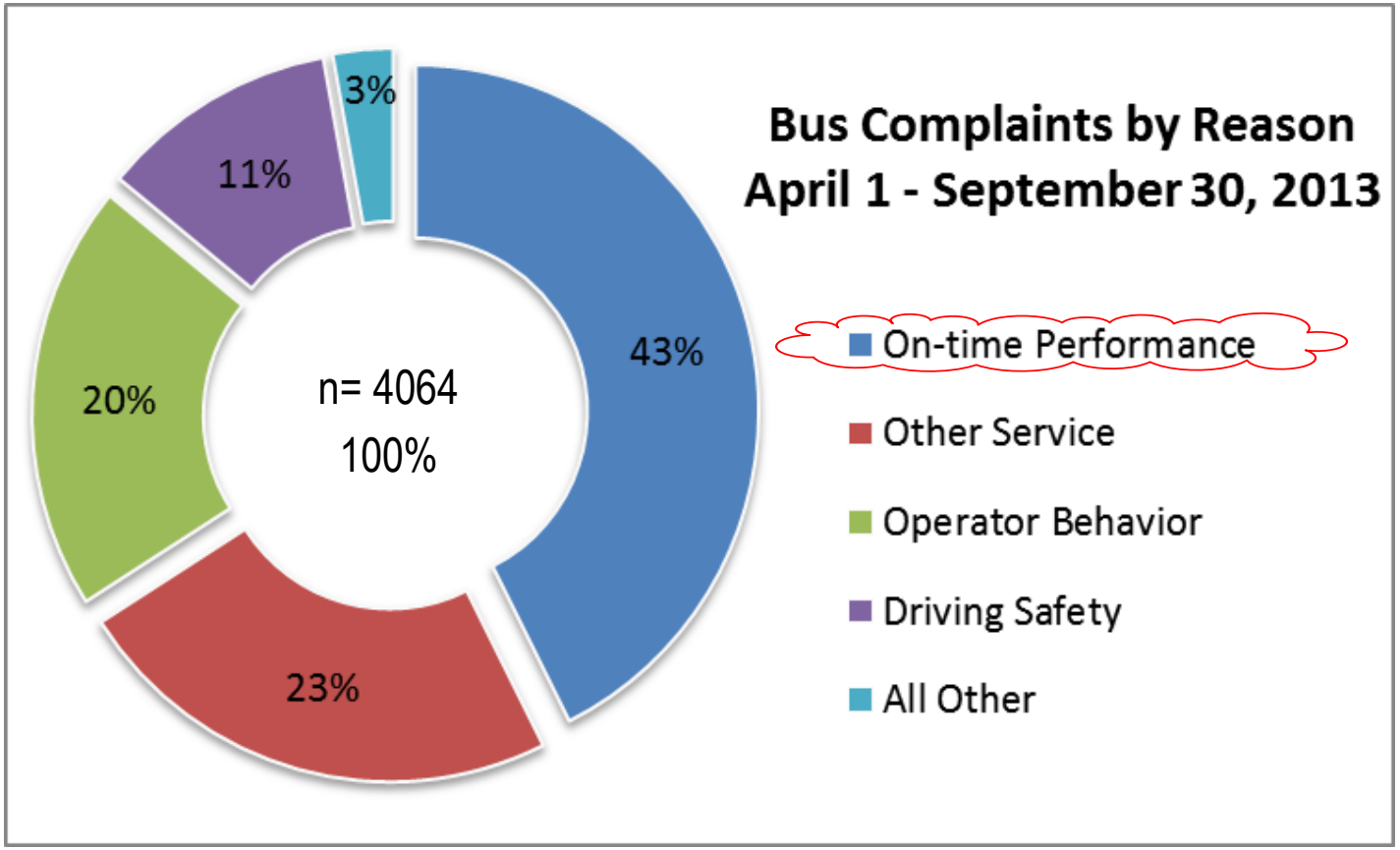
Other MDT complaint processing..... $553,017

- Bus Traffic Control/Field Supervisors monitor routes due to complaints
  - Estimated time working on complaints is 5% of staff time ($7.657M x 0.05 = $382,850)
- Quality Assurance Specialist run CAD/AVL Playbacks for specific complaints
  - One fulltime Quality Assurance Specialist and one Quality Assurance Specialist spends 50% of his time [(1.0 x $75,000) + (0.50 x $68,200) = $109,100].
- The Manager of Customer and Information Services investigates and develops responses to complaints as well as the monthly customer service report
  - Estimated effort is 40% of time. ($107K x 0.40 = $42,800)
- EZ-Card staff conduct the intake of in-person complaints
  - Estimated time is approximately 5% ($365,332 x 0.05 = $18,267)

Grand Total..... $870,507

Develop Project Focus

Complaints for bus service are due to a variety of issues. The vast majority come from buses not meeting their schedule.



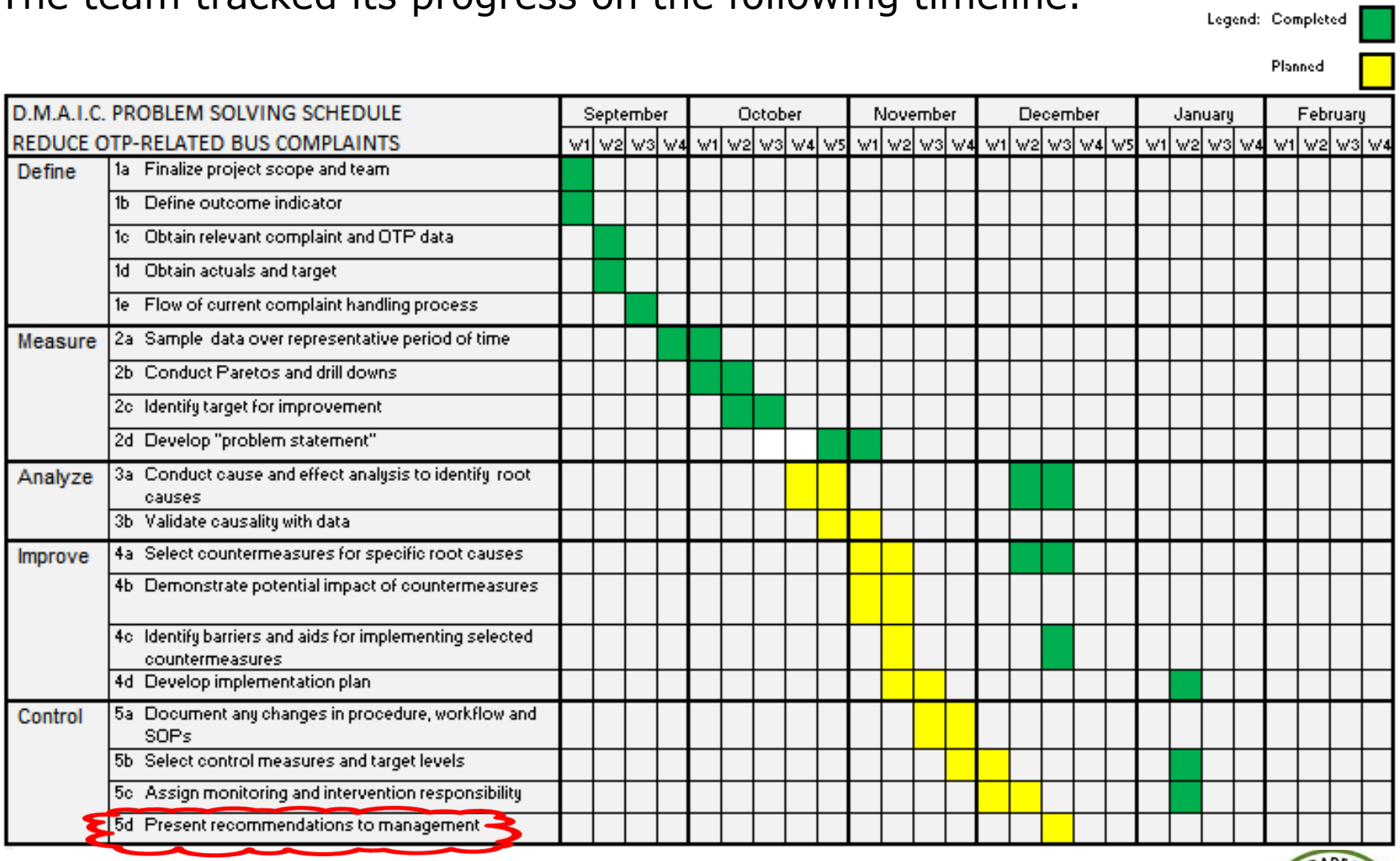
Given the primacy of on-time performance to MDT's ridership, management requested that the team's project charter focus on On-time Performance (OTP) related bus complaints.

Develop Project Charter

Project Charter		
Reduce the Number of OTP-related Bus Complaints		
Business Case	Project Name:	Reduce the Number of OTP-related Bus Complaints
	Problem/Impact:	Complaints related to bus on-time performance make up a substantial portion of all bus-related customer complaints. A high number of complaints with bus on-time performance is consistent with low customer satisfaction with Miami-Dade Transit and Miami-Dade County services.
	Expected Benefits:	Reducing complaints related to bus schedule adherence should be correlated with improved rider satisfaction.
Objectives	Outcome Indicator(s)	Q2 - Monthly OTP-related Bus Complaints per 100K boardings
	Proposed Target(s)	No specific target for OTP related bus complaints exists. Team proposed a target of 3.832 OTP-complaints per 100,000 boardings based on the reducing the 12-month average ending September 2013 by 5%.
	Time Frame:	August 2013 through December 2013
	Strategic Alignment:	Bus On-time Performance is a Miami-Dade County Strategic Plan Key Performance Indicator (KPI). It is aligned with the County's goal of developing an efficient transportation network by providing reliable transit services, and is an expected driver of satisfaction with Miami-Dade County services.
Scope	In Scope:	Bus complaints due to schedule adherence. Data gathered from InfoCom with an incident date range of April 1 - September 30, 2013
	Out-of-Scope:	Complaints not specifically related or indirectly caused by on-time performance issues such as employee or passenger behavior, fares, safe driving, cleanliness, etc.
	Authorized by:	Derrick Gordon
Team	Sponsor:	Derrick Gordon
	Team Leaders:	Carlos Maxwell
	Team Members:	Jackie Bailey, Sandra Washington, Eric Zahn, Felipe Hermida, Kaushik Parekh, Lourdes Avalos
	Process Owner(s):	Joel Perez
	Mgmt Review Team:	Derrick Gordon, Joel Perez, Jerry Bryan
Schedule	Completion Date:	December 13, 2013
	Review Dates:	December 13, 2013
	Key Milestone Dates:	See Action Plan

Develop Project Timeline Plan

The team tracked its progress on the following timeline.

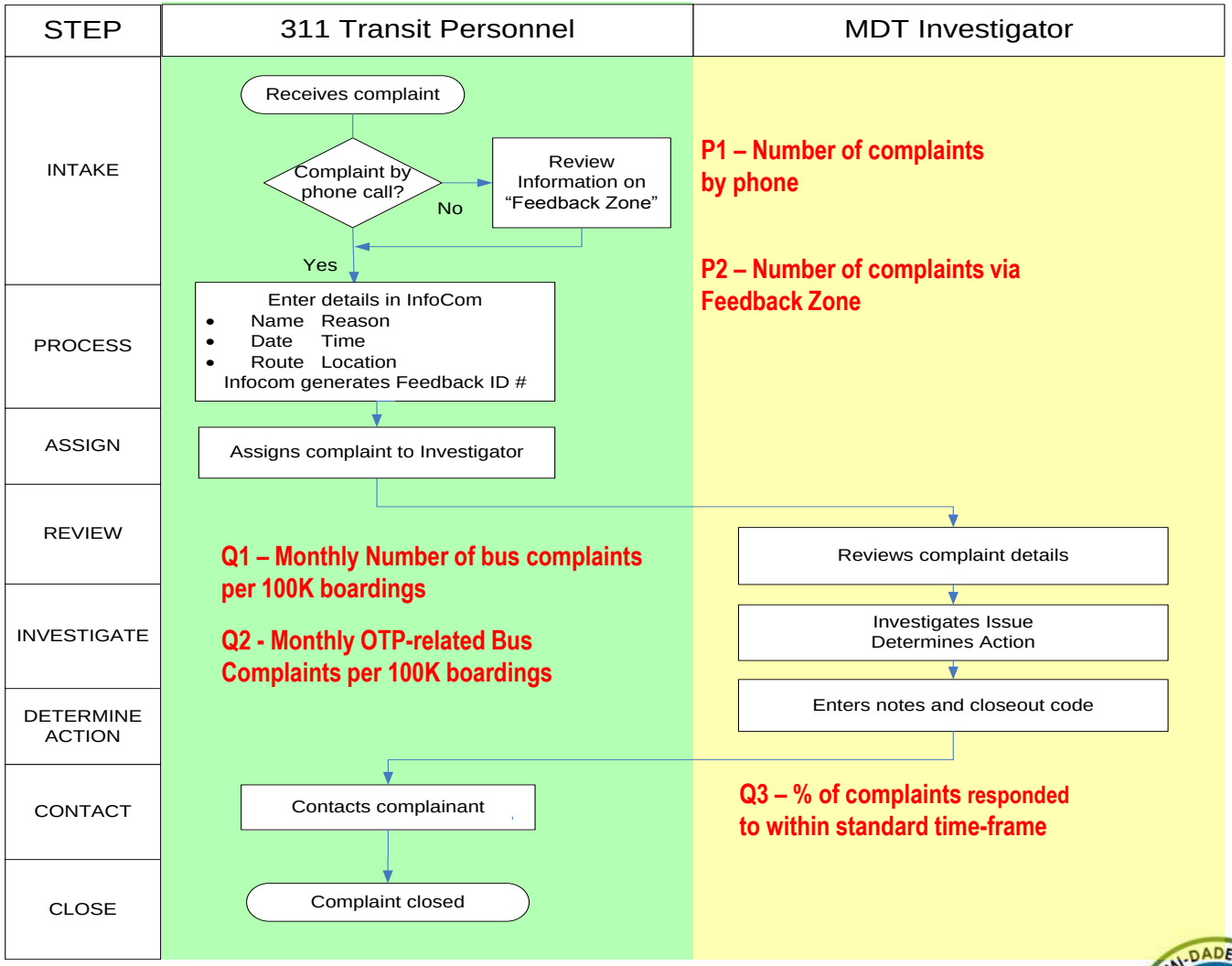


Review Process Flow Chart

The team constructed a process flow chart showing the major steps taken to address complaints.

The team next looked at data needed to display the P and Q Indicators.

MDT 311 Complaint Handling Process



Identify Data Collection Needs

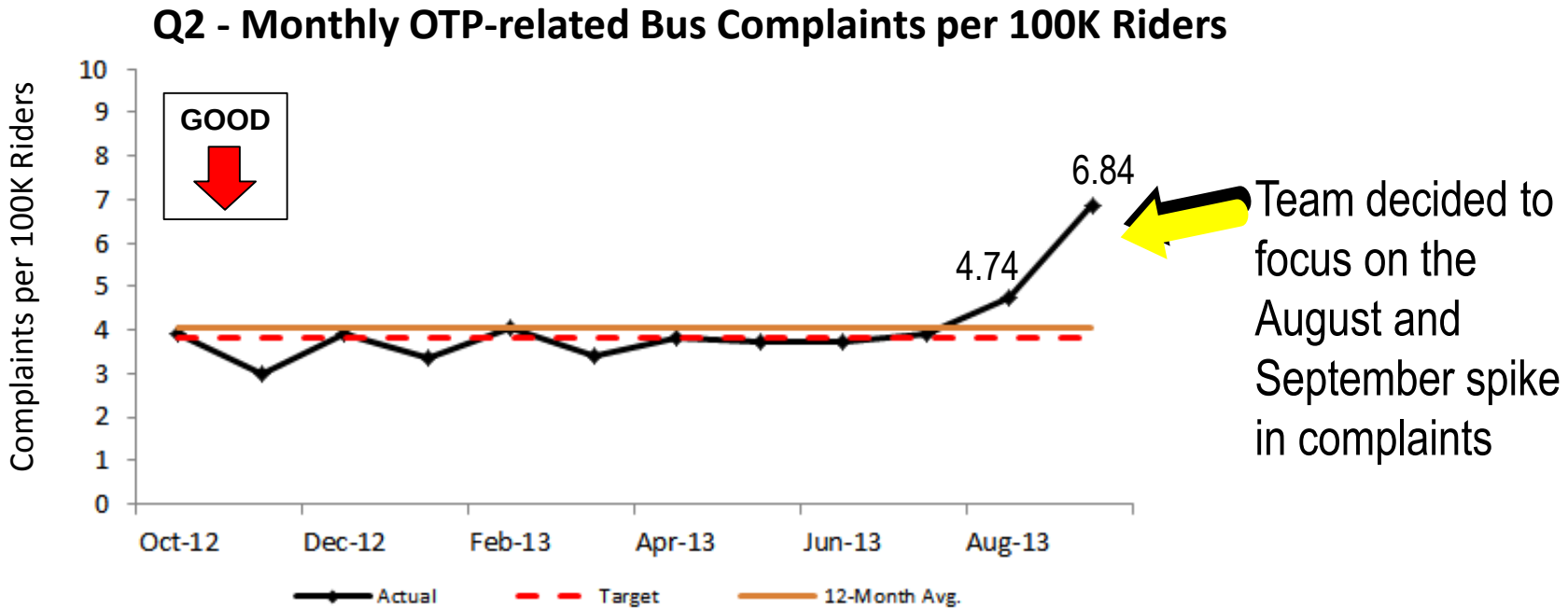
The team collected key demographic information from the "InfoCom" system which is used to track all transit service feedbacks. Fields included:

- Name and contact information of customer
- Feedback type and subtype
- Method of contact
- Date and time of incident
- Route, direction, geographic location
- Vehicle number
- Operator badge number
- Division and investigator
- Closeout codes and notes

Review Selected Indicator

The team reviewed data from InfoCom to develop an outcome indicator line graph. The data showed OTP-related complaints for bus service spiked in August and September 2013.

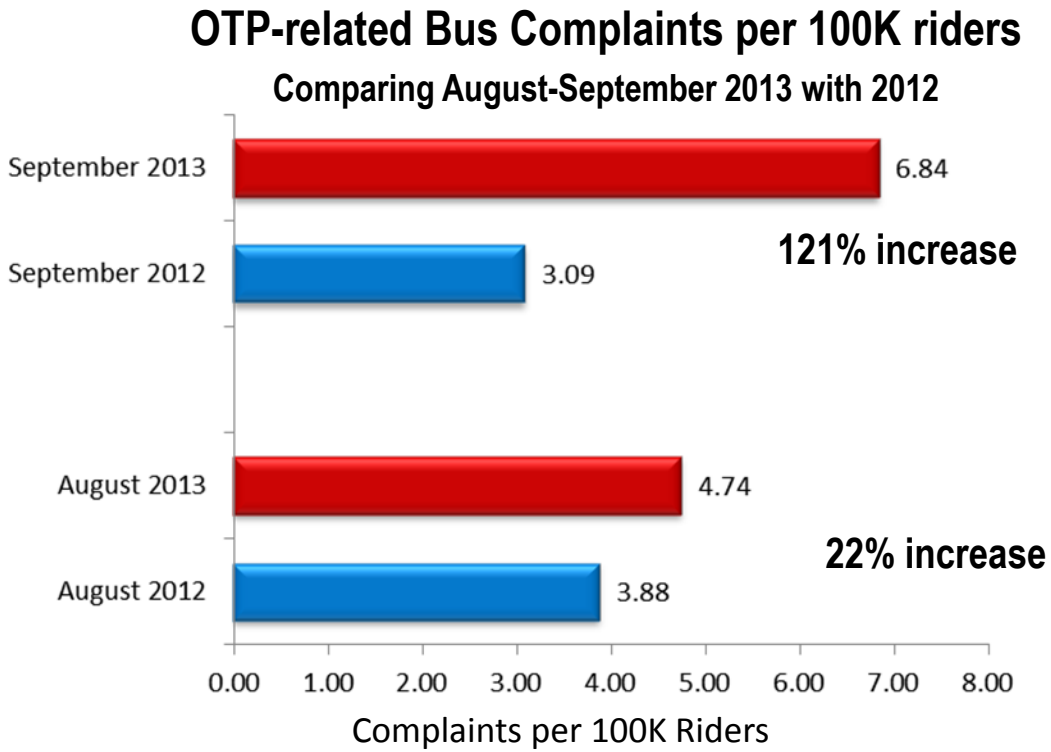
The team identified a target based on reducing OTP-related complaints by 5% over the 12-month average ending in September 2013.



The team then wanted to compare the number of complaints per 100K riders to the same months in 2012 to confirm that the spike in 2013 was significant and not just seasonal.

Stratifying the data

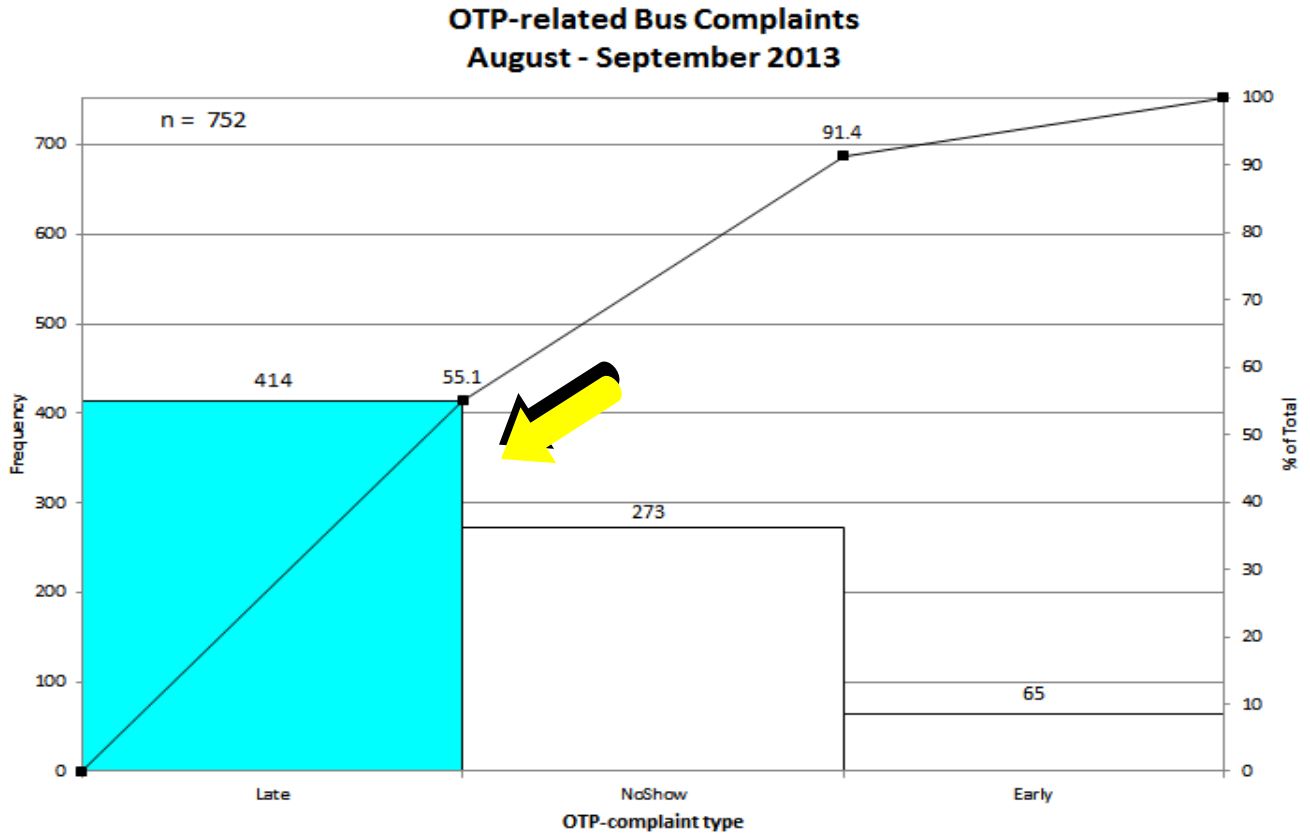
The team confirmed that the spikes in August and September 2013 were not seasonal fluctuations by comparing the data to August and September OTP-related complaints in 2012.



The team decided to drill down further on the OTP-related complaints in August and September 2013. Please note that there were 752 of these complaints in this time period.

Stratifying the data

The team drilled down on the data and found that more than 50% of 752 OTP-related complaints in August and September 2013 stem from a rider saying that his or her bus is late.

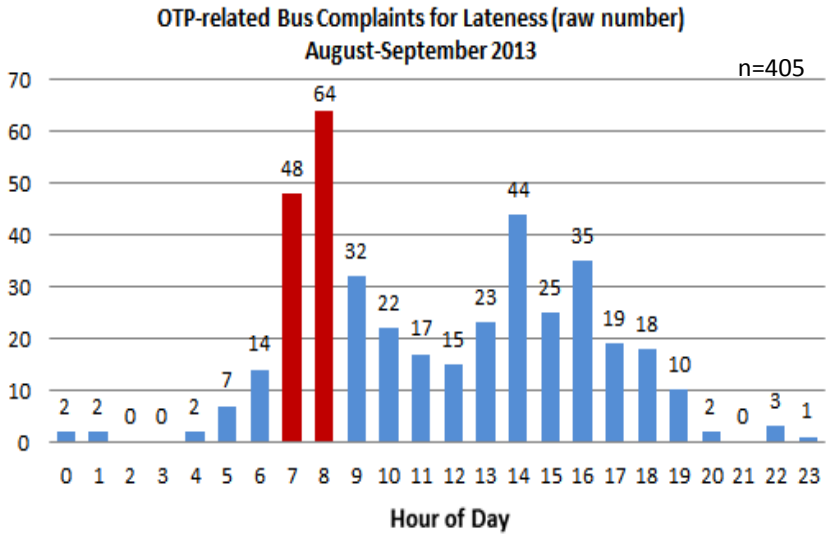


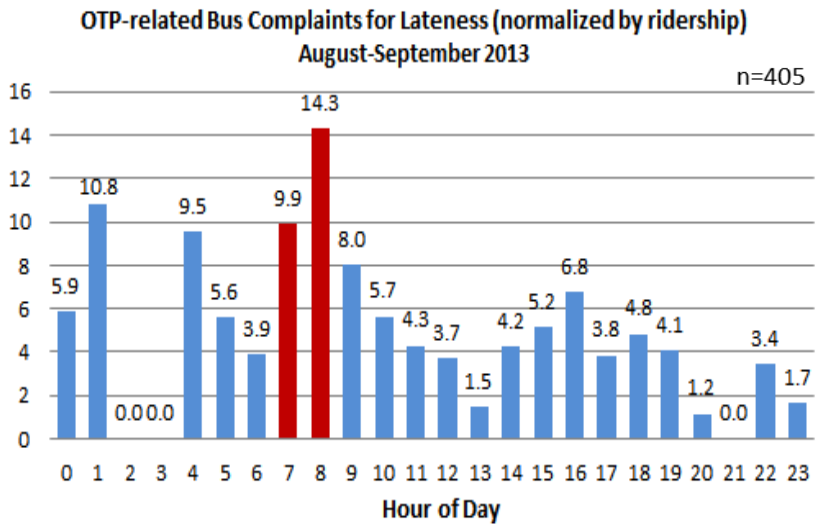
The team then wanted to find out if there was a specific time of day the 414 complaints for lateness occurred.

Stratifying the data

The team then looked at the hour of day of 405 (of the 414) OTP-related complaints for lateness and found that most complaints occurred during the 7:00AM and the 8:00AM hours. This finding is consistent also when complaints were normalized by ridership.

Please note: Nine complaints had no time associated, and the increase in normalized complaints in the early morning hours is due to extremely low ridership between 1:00AM and 4:00AM.



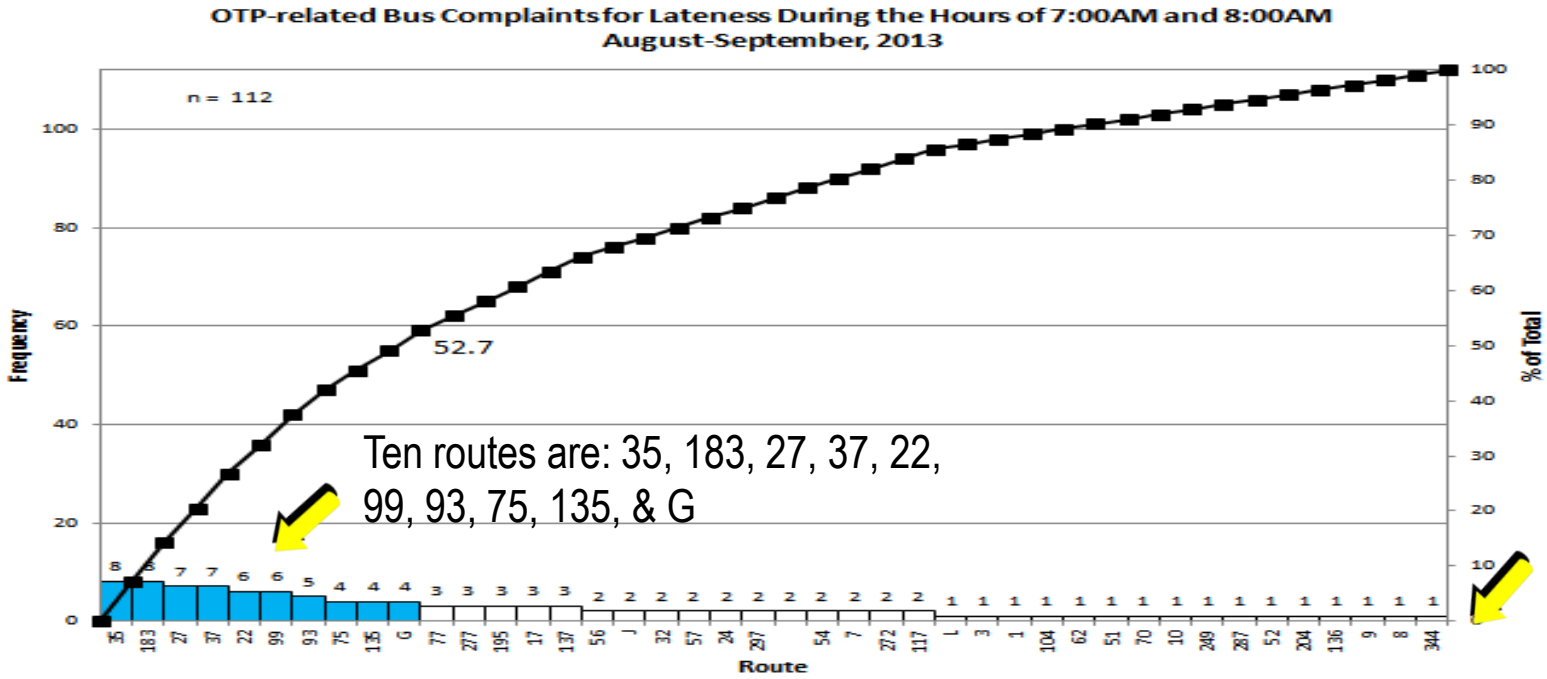


The team then wanted to stratify OTP-related complaints due to lateness occurring between the hours of 7AM and 8AM (totaling 112 complaints) by route and found…..

Stratifying the data

Fifty-nine of the 112 (52%) OTP-related complaints for lateness occurring during the 7:00AM and the 8:00 AM hour originated in just 10 out of the 42 routes having OTP-related lateness complaints.

Since 96 routes are in operation on weekday mornings, more than half of the complaints for lateness during the time period were related to just 10.4% of the routes in operation.



Please note this diagram does **not** include the 54 routes that had 0 complaints in the time period

The team agreed on the following problem statement: 53% of complaints due to lateness occurring in August and September 2013 during the hours 7:00AM and the 8:00AM hours were related just to ten routes.

Identify Potential Root Causes

The team conducted a single case bore analysis and found that most of the complaints that were sampled had CAD/AVL data showing that buses were late at the time of complaint.

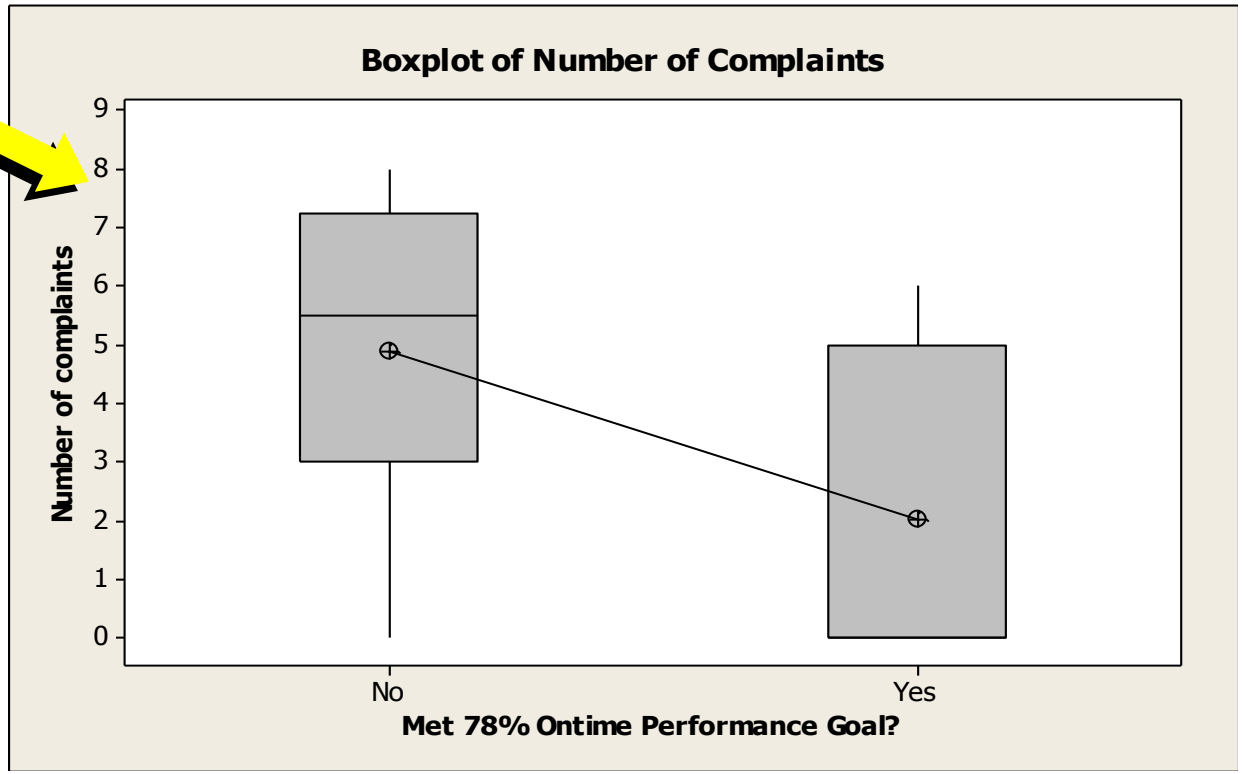
Problem Statement: 53% of complaints due to lateness occurring in August and September 2013 during the hours 7:00AM and the 8:00AM hours were related just to ten routes

Reasons or Factors (That possibly contributed to late verification of Payroll and Insurance)	Sampled 19 of the 59 complaints																		Total	Percentage
	104219	104224	104485	104488	104829	104830	105437	105446	105637	105639	105720	105731	106017	106315	106364	106578	106579	106870	106892	
A 1) Complainant says and AVL data shows bus was late, but no cause given	x		x	x				x	x			x	x	x	x	x	x	x	12	57%
2) Complainant says bus was late, but no AVL signal available			x			x	x			x									4	19%
3) Complaint occurred at a major transfer point					x	x						x							3	14%
4) Not late accordning to AVL data but complained regardless		x									x								2	10%
5) Did not stop at station					x														1	5%
6) Bus bunching occurred						x													1	5%
7) Bus breakdown							x												1	5%
8) Operator behavior may have contributed										x	x								2	10%

Identify Potential Root Causes

To further confirm that complaints for lateness are due to **actual** lateness of buses, the team reviewed schedule adherence information for the routes generating the most complaints for lateness in our selected time period with routes that had no complaints for lateness and found…..

Routes that have difficulty meeting specs for schedule adherence are more likely to generate complaints for lateness.



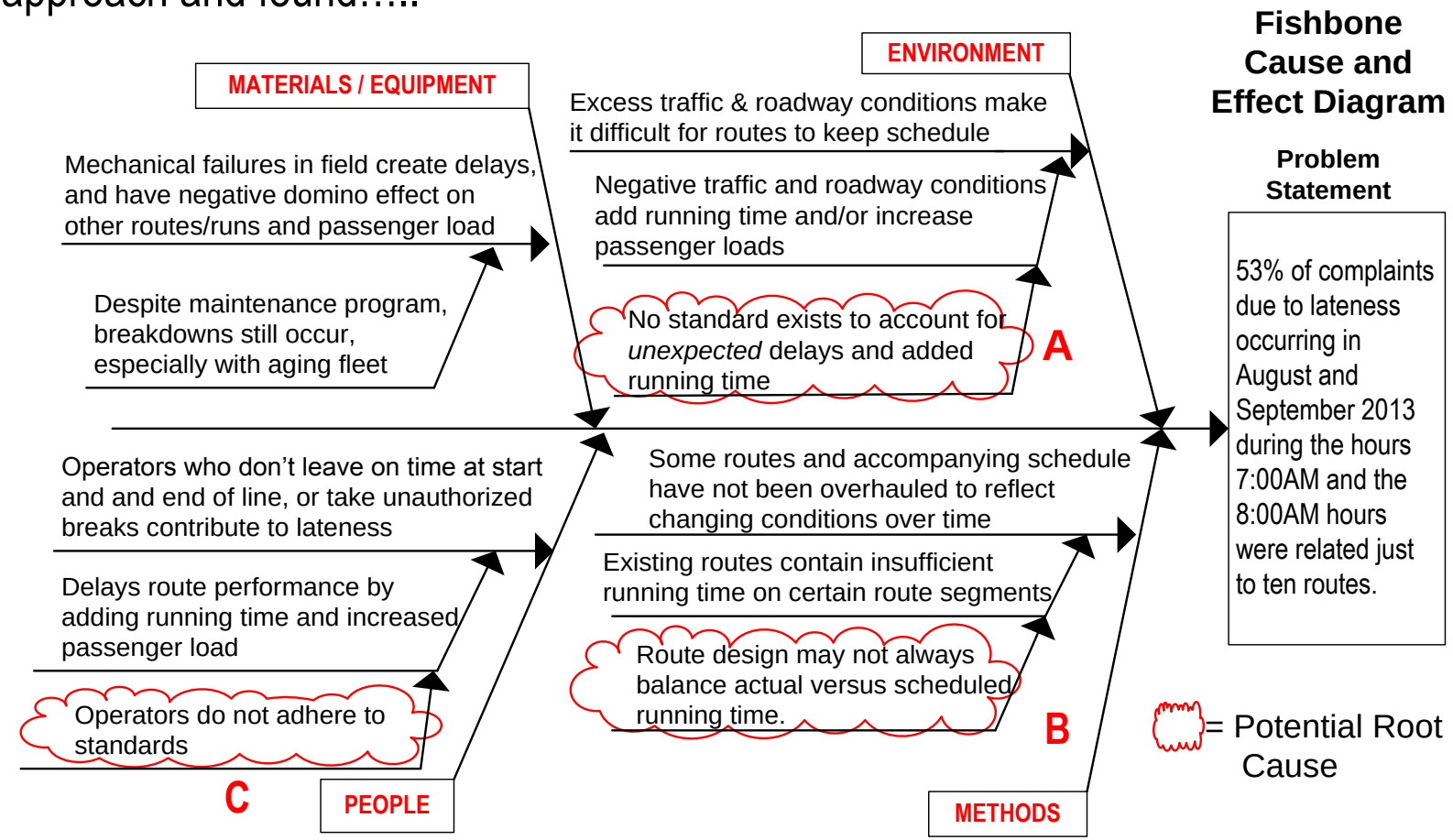
MIAMI-DADE COUNTY

Define | Measure | Analyze | Improve | Control

MIAMI-DADE TRANSIT LEAN SIX SIGMA PROGRAM

Identify Potential Root Causes - Fishbone

To drill down on more specific potential root causes, the team completed a Cause and Effect Analysis using the Methods, Environment, People, and Equipment/Materials approach and found…..



… several potential root causes for lateness of buses and resulting complaints.

Verify Root Causes

The team reviewed information to verify the root causes and found ….

Root Cause Verification Matrix

Potential Root Cause	How Verified?	Root Cause or Symptom
A No standard exists to account for *unexpected* delays and added running time	• No process exists to address unexpected, temporary delays that cause disruption	Root Cause
B Route design may not always balance actual versus scheduled running time	• Reviewed time segment plots for targeted routes in August and September 2013. Found positive and negative variations between planned running time and actual running times.	Root Cause
C Operators do not always adhere to standards	• Supervisory documentation and corroborating complaints verify schedule violations	Root Cause

Identify and Select Countermeasures

The team brainstormed many countermeasures and narrowed them down to ….

Problem Statement	Root Cause	Countermeasures	1-lowest 5-highest Rankings: Effectiveness	Feasibility	Overall	Take Action
53% of complaints due to lateness occurring in August and September 2013 during the hours 7:00AM and the 8:00AM hours were related just to ten routes.	A - No standard exists to account for *unexpected* delays and added running time	A1 - Increase recovery time at the end of routes	4	2	8	N
		A2 - Adjust schedule for long-term planned construction and known detours	5	1	5	N
		A3 - Improve communications with patrons; includes providing at certain key transfer points real-time information on next bus arrival time	3	4	12	Y
		A4 - Develop enhanced response to delays including stand-by fleet and staff	5	1	5	N
	B - Route design may not always balance actual versus scheduled running time	B1 - Reallocate inefficient deviations on routes back into more productive portion of routes	4	4	16	Y
		B2 - Better use of data (APC, SIR, AVL) to predict performance of routes	4	5	20	Y
		B3 - Adjust routes with insufficient running time with the time from routes with excessive resources; including elimination of unproductive routes	4	2	8	N
	C - Operators do not adhere to standards	C1 - Reevaluate employee incentive programs (i.e. rewards for accident prevention)	3	3	9	Y
		C2 - Increase operator morale through improved working conditions (added recovery times and better equipment)	5	2	10	N
		C3 - Use available monitoring and administrative tools where appropriate	4	3	12	Y

Develop and Implement Action Plan

The team proposed an Action Plan for the its selected Countermeasures.

HOW		LIAISON	WHEN (2014)
A3.a	Work with Marketing to further develop outreach opportunities and implementation strategies	Jackie	Feb–Apr: 3/31/14
A3.b	Review plan to implement "Next Bus". Identify routes and key locations for electronic signage	Jackie	Mar–May: 4/30/14
B1.a	Review identified and implement selected recommendations from the Transit Service Evaluation Study (Grid Plan)	Eric	Feb–Sept: Ongoing for 2 years
B2.a	Develop strategy for systemic use of data including APC, SIR, and AVL information for route scheduling and planning	Eric and IT	Mar–June: 5/31/14
C3.a	Evaluate operator incentive program; pilot recommendations	Sandra	Mar–June: 5/31/14
C3.b	Increase number of Bus Traffic Controllers and field supervisors, and supervisor vehicles to monitor on-time performance	Felipe	June–Sept: On-going

Identify Barriers and Aids

The team performed Barriers and Aids analysis on the selected countermeasures.

Countermeasure(s): Implement Countermeasures to Reduce OTP-related Bus Complaints

Barriers		Aids
Impact (H, M, L)	**Forces against Implementation**	**Forces For Implementation**
H	1) Workplace rules and collective bargaining agreements make mid-lineup change difficult to implement	A) Data collection tools are more readily available. This helps provide predictive analysis for route performance, and enhanced real time information for patrons
H	2) Current fiscal restraints make it difficult to add new buses and operators to alleviate route schedule challenges	B) Success of growing inter-connectedness of regional transportation system depends on greater service reliability.

The team next sought to incorporate this analysis into the team's action plan.

Lessons Learned

- Learned more about the DMAIC process and how it can be used in MDT. The team brainstormed some project ideas including:
  - Timeliness of disciplinary process
  - Impact of fleet reliability
  - Review time needed and method for developing route plans and schedules
- No simple solutions especially for complaints, which can be caused by forces outside our control.
- Team's analysis assumed resource neutrality, but department is facing several fiscal challenges that contribute to service problems.
- Lean Six Sigma is not by itself a "killer-app". Project success depends on data available for analysis.
  - InfoCom investigator responses are not sufficiently detailed to allow identification of more precise causes of OTP-related complaints.