
Leadership Lessons from Colin Powell
iSIXSIGMA
MAGAZINE
Changing Lives
Lonmin's deployment touches more than corporate culture
PAGE 22
Think Smart. Drive Results. Achieve Six Sigma.™
The Truth About Change
Exclusive research | 33
5 myths dispelled | 65
Project Replication
Stories from the trenches | 42
May/June 2007 • $14.95 •

THE FINAL TOLLGATE

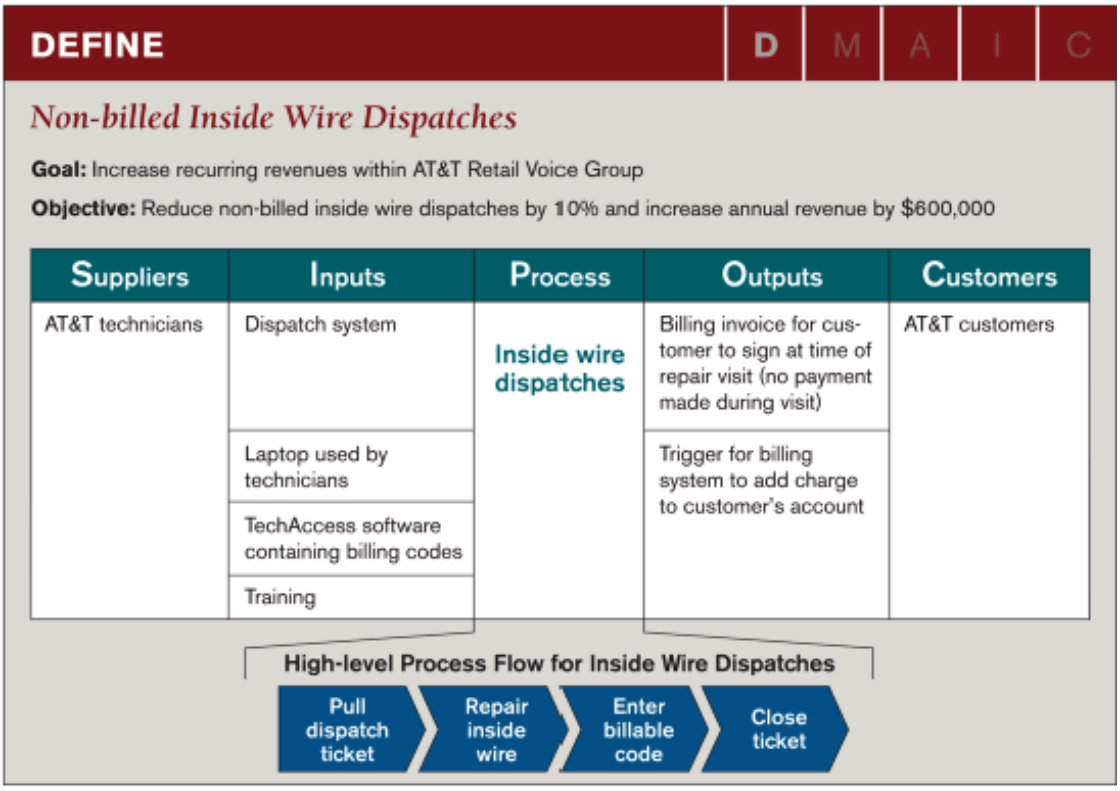
Non-billed Inside Wire Dispatches

BY PETER J. SHERMAN, CRAIG BROOMBERG, LES CROWELL AND D. WAYNE CROSBY

With revenues from inside wire dispatches down and non-billed inside wire dispatches at excessive levels, AT&T's Southeast region decided to find a sustainable, long-term solution that would offer a high return on investment. The goal was to reduce non-billed inside wire dispatches in four states by 10 percent – approximately 6,300 per year – corresponding to a $600,000 increase in annual revenue. A project team representing field operations, mechanized systems, the billing department and retail voice product development implemented a solution that far exceeded the original project objectives.

The Final Tollgate features a Six Sigma project as it would be presented to a panel of company executives at the final project review. The objectives of such a presentation are to communicate significant results of the project and share highlights of how results were achieved. The slides are the Black Belt's visual presentation and the accompanying text is the verbal presentation. It is assumed that the audience has a basic understanding of Six Sigma.

Do you have an exemplary Six Sigma project to share? Would you like to see it here? Submit it to us at isixsigma.com/submit



Define

"Inside wire dispatches" are a common type of service call for AT&T technicians. The dispatches typically involve the repair of inside wiring or wall jacks of a home. Customers not on a maintenance plan are charged $95 for this type of repair job, which represents a significant, steady revenue source for AT&T. However, technicians are inconsistent in charging for the service, and this non-billing has become a chronic problem. During 2006, non-billed revenue for inside wire dispatches in AT&T's Southeast region (USA) totaled $6 million.

Historically, when non-billing has reached excessive levels, supervisors and finance personnel have responded by reinforcing the charge policy with warnings, re-training and/or audits. All of these approaches are reactive, have a short-term effect and can often be gamed by technicians. The mission of our project team was to identify and implement a sustainable, long-term solution with an aggressive schedule and a high return on investment.

In 2005 inside wire dispatches for AT&T's Southeast region generated $38 million in revenue. Through September 2006, revenues were only $19.8 million and projected to reach $26.4 million by year-end.

An analysis of inside wire dispatch billing codes revealed that in four states of the Southeast region, nearly 57,000 billable inside wire dispatches (12 percent) were non-billed during 2005, with even more – 63,628 (18.65 percent) – in 2006 (projected from nine months of data).

The objective of this project was to reduce non-billed inside wire dispatches in these four states by 10 percent – approximately 6,300 per year – corresponding to a $600,000 increase in annual revenue.

The scope of the project encompassed the field technician billing code process for inside wire dispatches, from the [illegible]s a dispatch ticket, through completion of assigning the proper billing code to the job in their computer (via a software program called TechAccess). We developed a SIPOC diagram to identify the various process inputs and outputs, and also process flow maps to understand the end-to-end process.

Zoom Out Page 48

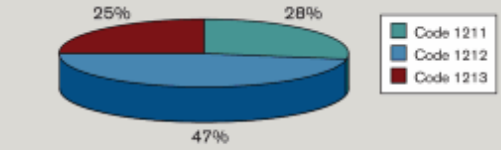
Measure

The data collection plan included querying the dispatch billing database for all inside wire dispatches in 2005 and through September 2006 on a monthly basis for Florida, Georgia, North Carolina and South Carolina. These states were selected due to consistent billing regulations and tariff restrictions. We filtered the data to include only those customers who did not have a maintenance plan and then identified which dispatches were billed

MEASURE D M A I C

Non-billed Inside Wire Dispatches

Distribution of Non-bill Disposition Codes for Inside Wire Dispatches

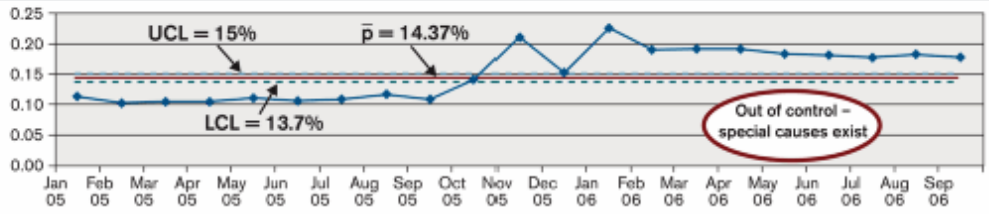


Data represents 2005 through Sept. 2006 inside wire dispatches for Fla., Ga., N.C. and S.C.

Pre-improvement Process Metrics

DPMO	186,500	Defect = non-billed inside wire dispatch
Sigma level	2.39	81.3% yield
C_{pk}	0.7967	$C_{pk} < 1 \rightarrow$ process is not capable
No. of non-billed dispatches	63,628	Projected from data through Sept. 2006
2006 unbilled revenue	$6,044,660	Based on $95 per dispatch

p Chart
Non-billed Inside Wire Dispatches for Customers Without Maintenance Plan



Data represents 2005 through Sept. 2006 inside wire dispatches for Fla., Ga., N.C. and S.C.

Current process is not in control and cannot meet requirements

(codes 1201, 1202 and 1203) and which were non-billed (codes 1211, 1212 and 1213).

Over the period of data collection, 14.4 percent of inside wire dispatches were coded non-bill for customers that should have been billed. During 2006 alone, the rate was even higher at 18.65 percent, as previously noted. A pie chart of the non-bill disposition codes used for inside wire dispatches during the data collection period showed us that the preponderance (47 percent) of the non-billed dispatches were coded 1212, meaning that the problem was isolated to the inside wiring or wall jack.

Additionally, a p chart indicated that the process was not in control. Most of the points were outside of the upper and lower control limits – especially during the last two months of 2005 and during all of 2006.

Based on the above information for 2006, we were able to benchmark the key metrics in the current process, including DPMO, sigma level, and C_{pk}. Based on these metrics (shown in the table on the Measure slide), we concluded that the existing process was not capable of meeting requirements.

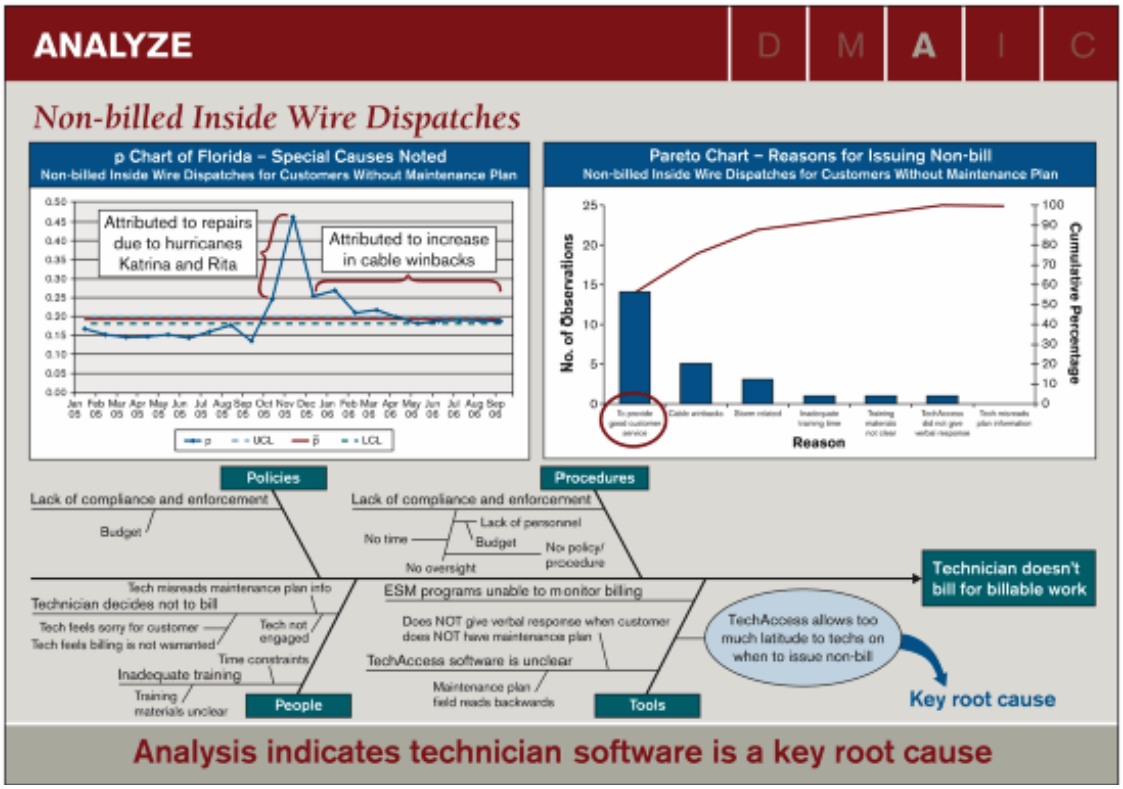
Analyze

Given the out-of-control process situation, the team's first priority was to identify special causes. P charts for all four states indicated that the special causes affected the entire region. The spikes for Florida in October and November 2005 were attributed to hurricanes Katrina and Rita.

However, the general increases for all four states from January through September 2006 were attributed primarily to "cable winbacks" – former AT&T customers returning to AT&T from cable service. In response to the threat of cable providers in late 2005, AT&T undertook an aggressive advertising and marketing campaign. These returning customers usually require inside wiring repair and are generally not charged for those repairs. An analysis between non-billed inside wire repairs and cable winbacks indicated a positive correlation.

The team then analyzed 25 random samples of non-billed inside wire dispatches for customers without a maintenance plan. Based on explanatory input from 25 technicians, we categorized the reasons why the dispatches were not billed. A Pareto chart of these reasons helped us identify the biggest contributors to the problem.

By far the most common reason inside wire dispatches were non-billed was the technicians' perception that they were "providing good customer service." This reason accounted for 56 percent of the occurrences and raised a red flag to the team. The billing policy specifically states, "A non-bill is warranted in the event a customer has an AT&T maintenance plan or at the technician's discretion



that the customer experienced poor service." Based on feedback from supervisors, we learned that at times technicians would issue a non-bill simply to avoid a customer confrontation. The team agreed there was a need to further understand the root causes aside from this behavioral issue.

To that end, the team developed a cause-and-effect, or fishbone, diagram to identify possible root causes and identify which are the most likely contributors to the non-billed inside wire dispatches problem. We particularly focused on the TechAccess software, which allowed technicians a great deal of latitude to bill or not bill a customer.

Based on a brainstorming session during which the team reviewed the process flows, Pareto chart, fishbone diagram and FMEA, we identified five possible solutions to reduce the number of non-billed inside wire dispatches:

1. *Modify the script in TechAccess.* Change the script to clearly identify customers who do not subscribe to a maintenance plan (e.g., pop-up screen).
2. *Develop an override screen in TechAccess.* Change TechAccess flow to invoke an override screen if both a 1211, 1212 or 1213 non-bill disposition code is used and the customer does not have a maintenance plan. If the technician chooses to override the code (e.g., a customer is threatening to cancel service), an email notification is sent real-time to the supervisor for approval.
3. *Provide training.* Provide mandatory training on current billing procedures to technicians and supervisors.
4. *Reinforce compliance policies.* Issue memorandums to all field technicians informing them that supervisors will perform routine audits of non-billed inside wire dispatches.
5. *Perform regular audits.* Accounting department will regularly audit inside wire dispatch billing codes.

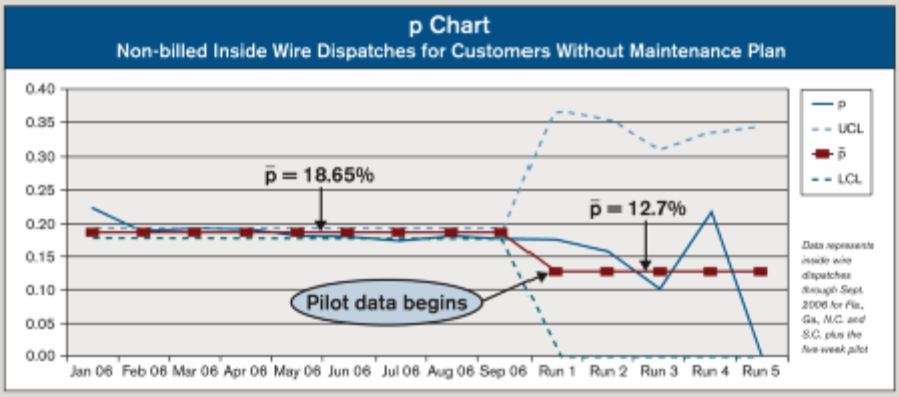
The team evaluated the solutions using three key criteria with different weightings:

- Ability to generate revenue (50 percent)
- Time to implement (30 percent)
- Cost (20 percent)

We assigned numerical scores from 1 (worst) to 10 (best) to each solution depending on how it corresponded to the three key criteria. These ratings yielded a weighted score for each solution. The highest-scoring solution turned out to be the development of an override screen in TechAccess. The team concluded that this factor would have the most sustainable impact on non-billed inside wire dispatches and could likely be implemented quickly and with minimal cost.

IMPROVE D M A I C

Non-billed Inside Wire Dispatches



Improved Process Metrics – Inside Wire Dispatches

Metric	Pre-pilot	Pilot	
DPMO	186,500	12,006	Defect = non-billed inside wire dispatch
Sigma level	2.39	3.76	98.78% yield
C_{pk}	0.7967	1.25	$C_{pk} > 1$ → process is capable
No. of non-billed dispatches	63,628	40,961	35.6% reduction (annualized from pilot data)
2006 unbilled revenue	$6,044,660	$3,891,295	Projected amount based on $95 per dispatch

Equates to a potential $2.15 million in additional annual revenue

Improve

To verify that this solution would have an impact, we conducted a pilot in which we collected data from a sample population of technicians in Georgia that we could compare to the original data for all technicians. The pilot consisted of 24 technicians (comprising a mix of experience and skill levels) whose historical average percentage of non-billed inside wire dispatches closely matched those in Georgia and the region. These technicians were given instructions on coding for billable and non-billable work. The new procedure simulated what they would experience with the TechAccess modification. The pilot was conducted in November 2006.

The data from the five-week pilot showed that 12.7 percent of the inside wire dispatches were non-billed. It is also important to note that during the same five-week time period, the percentage of non-billed inside wire dispatches for all Georgia technicians not in the pilot remained largely the same as the original data set.

From the gathered data, we conducted a hypothesis test (a z-test) to determine if the new process would improve the problem. The null hypothesis stated that there was no difference between the percentage of non-billed inside wire dispatches in the pilot population and the percentage for the original group. The alternate hypothesis stated that there was a difference between the two data sets.

With a 95 percent confidence level, we calculated the test statistic, a z-value. Comparing this z-value to the Z table (a table of the standard normal distribution) led us to reject the null hypothesis and conclude that there was a statistically significant difference between the original data set and the pilot data. On an annualized basis, there was a 35.6 percent reduction in non-billed dispatches.

Assuming the same percentage reduction across all four states in our project scope, the improvement translates to 22,667 more billed inside wire dispatches each year. At $95 per dispatch, this yields a projected $2.15 million in incremental annual revenue.

Based on this pilot, our final recommendation was to change the TechAccess flow to invoke a series of override screens if either non-bill disposition code 1211 (problem was isolated to the customer's phone equipment) or 1212 (problem was isolated to the inside wiring or wall jack) is selected and the customer does not have a maintenance plan. For the time being, we will exclude the 1213 billing code in this solution because of inconsistencies in state tariffs and increased programming costs. Further, disposition codes 1211 and 1212 constitute the majority (75 percent) of the non-billed inside wire dispatches.

CONTROL D M A I C

Non-billed Inside Wire Dispatches

Control Plan

No.	Activity	Owner(s)	Frequency
1	Develop control charts (p charts) with UCL and LCL of non-billed inside wire dispatches	Industrial Engineering	Weekly/monthly by district, state and region
2	Produce key metrics reports (DPMO, sigma level, C_{pk})	Industrial Engineering	Weekly/monthly by district, state and region
3	Develop financial reporting (billed revenue associated with inside wire maintenance dispatches)	Finance with support from Industrial Engineering	Monthly by state and region
4	Review technical issues with software (i.e., bugs)	Field Ops	Coordinate with vendor on fixes
5	Conduct interviews/focus groups with technicians to address concerns, questions and process improvements	Industrial Engineering/ Field Ops	Monthly with small groups of technicians

Next step: Scale improvements across AT&T nationwide

If a technician chooses an override code – because AT&T is legitimately at fault or a customer threatens to cancel service – an email notification is sent real-time to the supervisor for immediate approval. The email mechanism serves as a key compliance enforcement tool as well as a tracking system.

The estimated cost for software changes is $53,000. Based on the projected $2.15 million in incremental annual revenues, the payback period is approximately one week! Estimated time to begin deployment is May 2007.

Control

At the core of the control program will be a task force comprised of members of the Six Sigma project team who will meet weekly during the initial rollout to monitor results of the implementation, develop reports and conduct continuous process improvement. The specific activities the task force will be performing are described in the table on the Control slide.

By all measures, the project was a success. We greatly exceeded the original project objectives of reducing non-billed dispatches in the Southeast region by 10 percent and increasing annual revenue by $600,000. Results from the pilot reflect a 35.6 percent reduction in non-billed dispatches, which corresponds to $2.15 million in projected incremental annual revenue. The process sigma level improved from 2.39 to 3.76. The nominal investment of $53,000 and one-week payback period were met with approval from AT&T's senior management. Perhaps most importantly, the TechAccess modification represents a sustainable, scalable solution with built-in compliance enforcement and a tracking system to change technician behavior.

Our next step is to explore the feasibility of scaling the new process in all AT&T regional divisions across the United States. ◆

Peter J. Sherman is a certified Black Belt with AT&T's Southeast Product Development Division. He is a member of the International Society of Six Sigma Professionals (isssp.com) and the American Society for Quality.

Craig Broomberg is a certified Yellow Belt with the industrial engineering organization of AT&T's Southeast Atlantic Operations.

Les Crowell is a certified Yellow Belt with the industrial engineering organization of AT&T's Southeast Atlantic Operations.

D. Wayne Crosby is a certified Yellow Belt with the industrial engineering organization of AT&T's Southeast Atlantic Operations.