Increasing Efficiencies through Performance Audit Techniques

An Application of the Lean Process Improvement Model

Common Government Myths Preventing Improvement

- We don't make widgets
- We don't have customers
- There is no incentive for us to improve

Performance Audit of the Streets Division's Pothole Repair Operations

- **Requested by Council member**
- He recommend the scope of the performance audit include:
  - Accuracy and effectiveness of the current tracking system
  - Pothole repair response times, analyzed by each council district and citywide
  - Best practices used by other governments to track and follow-up on pothole complaints
  - Effectiveness of the City's pothole repair operations (e.g., deployment of repair vehicles)
  - Recommendations to achieve greater efficiency and effectiveness

Pothole Headlines

- Pothole damage paving the road to ruin, The Daily Telegraph, London, June 2010
- Potholes cause misery for large number of drivers, The Guardian, UK, March 2013
- Putting potholes in their place, LA Times, August 13, 2012
- Fixing potholes small part of street budget, SJ Watch, April 2010
- Complained About a Pothole? Better Be Patient-Voice of San Diego, June 20, 2012
- I will not stop, mark my words, I will not stop until every road in the city of San Diego is a sexy street." Todd Gloria, Council President, San Diego

Initial Steps

- Ride-Alongs
- Top to Bottom Interviews
- Access to Production Database
- Reviewed related external reports and articles
- Contact other Municipalities
  - Dallas
  - Phoenix
  - LA

Pothole Repair Truck

Pothole Repair Crew

Pothole Repair Auditor

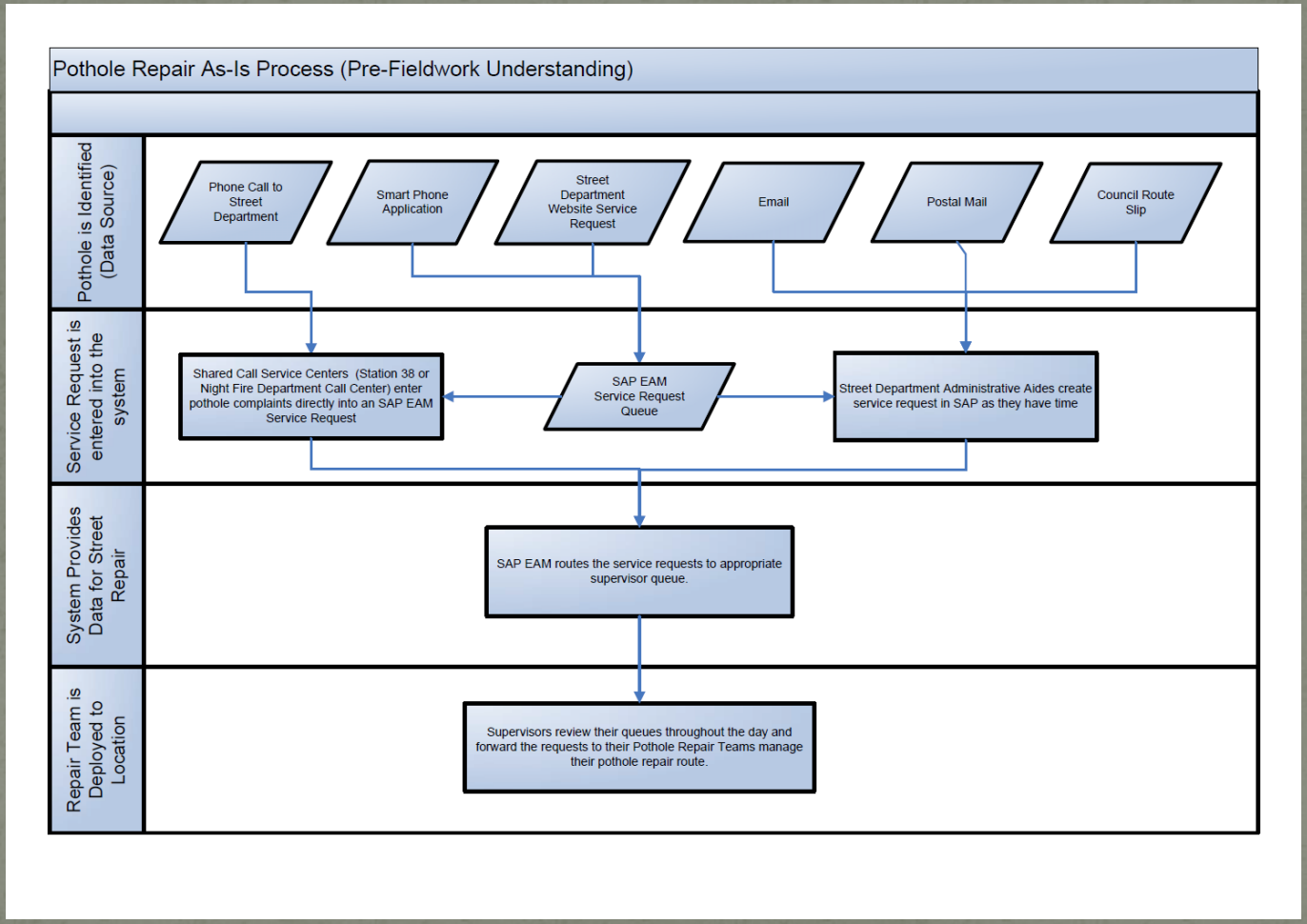
Initial Observations

- The pothole operations did not appear to be filling a significant number of potholes per day
- Crews passed several potholes en route to another repair locations
- Some data in the system was reliable, other data was not
- Response time varied among districts.
- Many governments pothole repair programs operated in a similar way to San Diego

Data Reliability

Number of Days with Data Entry Errors	Error Description	Error Impact
22 of 29 (76%)	57 of 419 repair requests had data entry errors (14%)	Number of potholes repaired did not match the daily work report.
25 of 29 (86%)	101 of 419 repair requests not entered on the correct day (24%)	Response time is not accurate and daily count of potholes repaired is not accurate.
21 of 29 (72%)	64 of 419 repair requests entered without source document to support date of repair (15%)	Response time is not accurate and daily count of potholes repaired is not accurate.

Pothole Repair Process in San Diego



Performance Measures

Transportation & Storm Water

Key Performance Indicators

Performance Measure	Actual FY2011	Estimated FY2012	Target FY2013
1. Time to repair a pothole (G1/O4)	33% within 3 days 49% within 6 days Average of 8 days	30% within 3 days 46% within 6 days Average of 9 days	33% within 3 days 49% within 6 days Average of 8 days

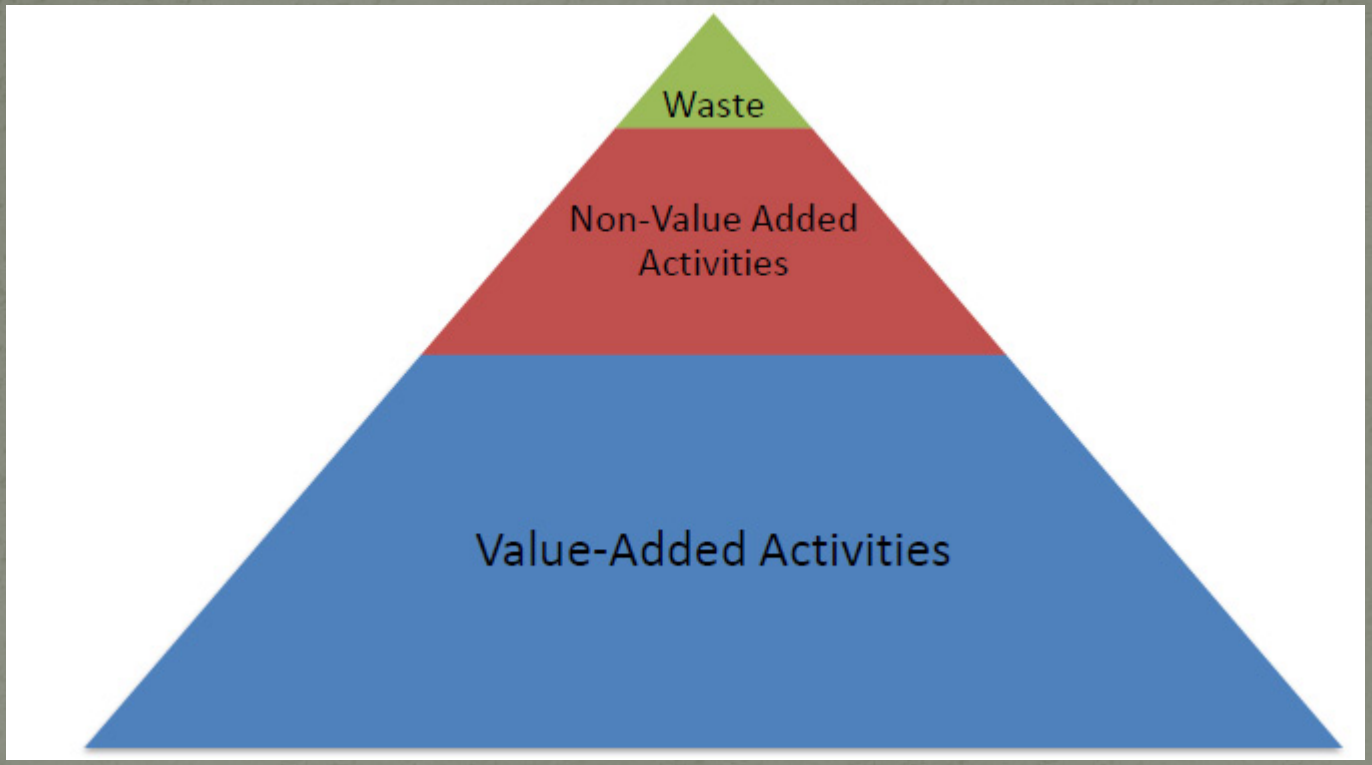
Introduction to The Lean Production Model

- Process Improvement Methodology
- Reduce Wasted time effort and material
- Reduce Cost
- Improve Quality
- Increase Output
- Efficiency Measurement Methodology

Basic Lean Concepts

- Value added vs. Non-Value Added vs. Waste
- Reduce unnecessary process complexity
- Better utilize available resources

Application to Pothole Repair Process



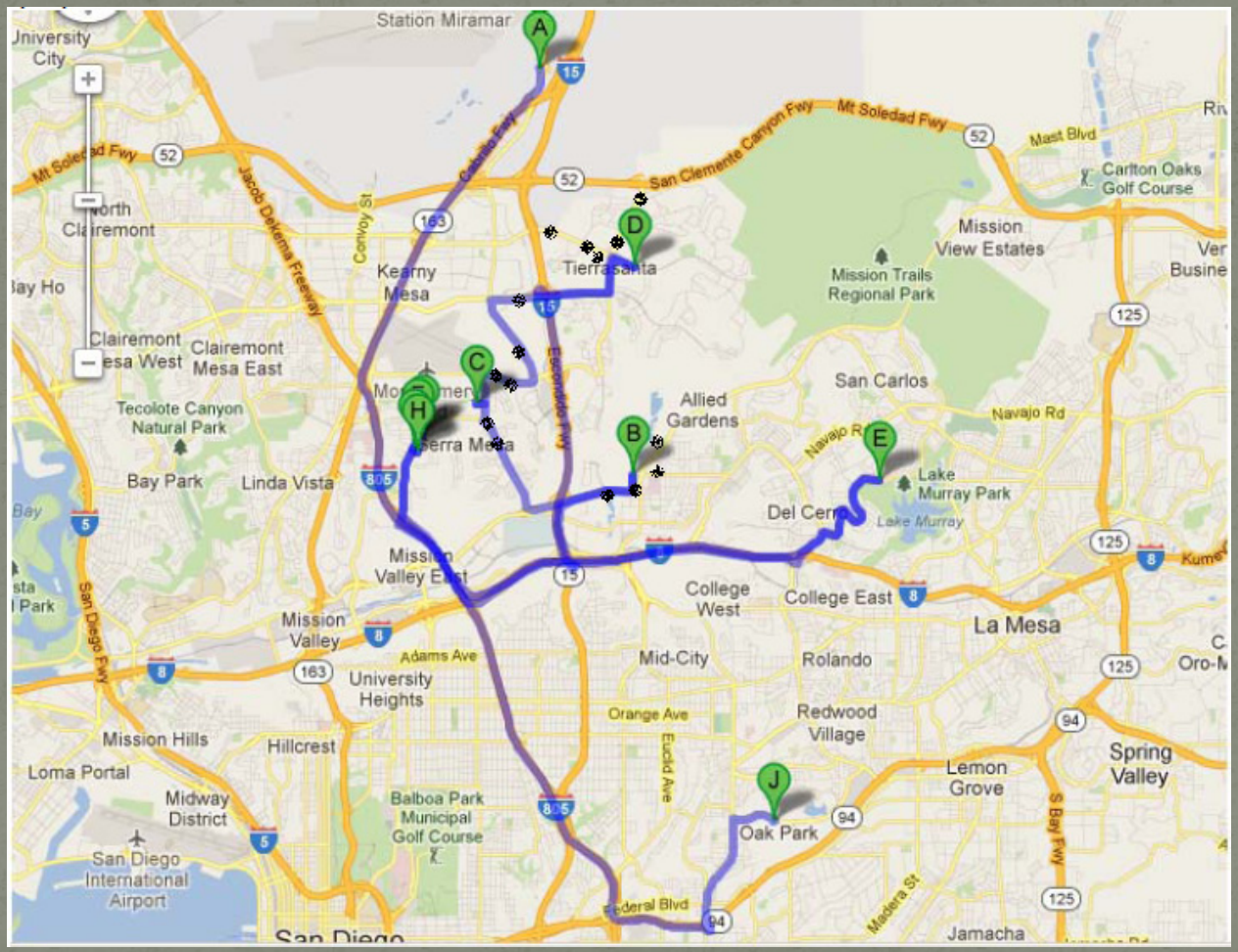
Utilizing the Lean Production Model

- Used actual workload
- Measured gains in efficiency

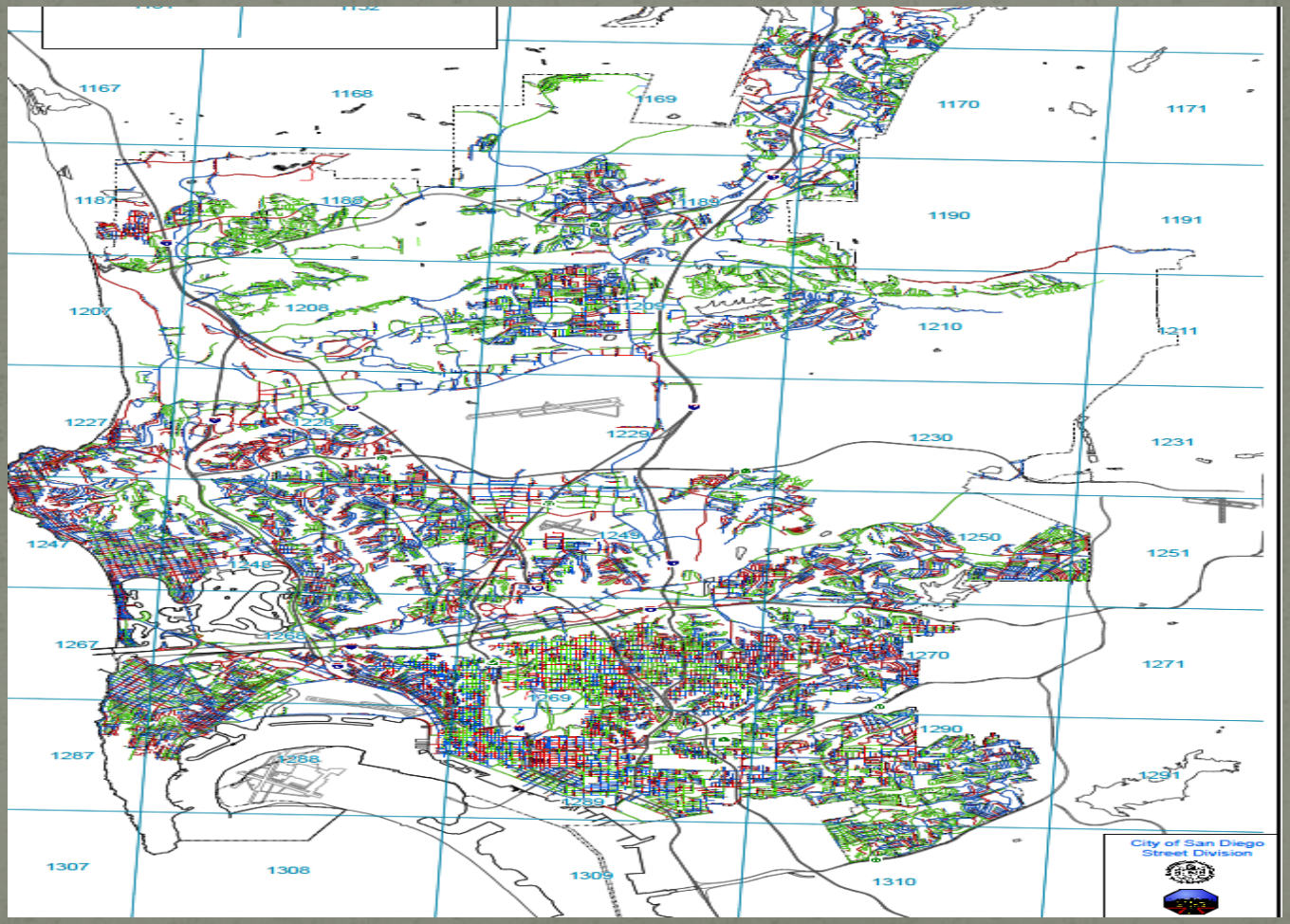
Current Trips and Mileage

Work Days	Repair Requests Completed	Total Daily Miles Driven
Day 1	1	9.6
Day 2	2→3	9.9
Day 3	4→5→6→7→8→9	50.4
Day 4	10	11.7
Day 5	11→12→13→14	28.2
Day 6	15	11.2
Day 7	16→17→18→19→20→21	38.4
Day 8	22→23→24→25→26→27→28→29	25.4
Day 9	30→31→32→33→34	23.5
Day 10	35→36	19.7
Day 11	37→38	23.2
Day 12	39→40→41→42	11.5
Day 13	43→44→45	18.7
Day 14	46→47→48→49	18.4
Day 15	50	11.2
Day 16	51	6.3
Total: 16 days	**51 repair requests**	**317.3 miles**

Current Deployment Model



San Diego Citywide Street Conditions



Reduced Trips and Mileage

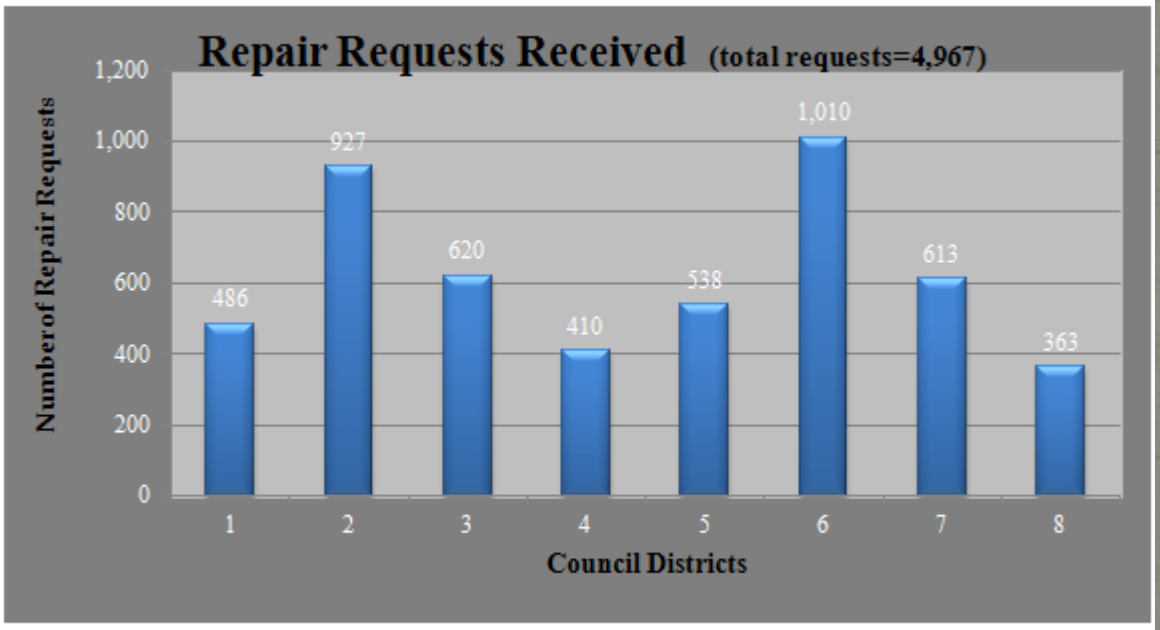
Work Days	Repair Requests Completed	Total Daily Miles Driven
Day 1	**36 → 37 → 18 → 19 → 4 → 5**	13.9
Day 2	**17→ 49→ 35→ 7→ 21→ 10**	16.4
Day 3	**51 → 1 → 20 → 22 → 44 → 38**	11.9
Day 4	**48 → 6 → 13→ 16 → 43 → 33**	9.1
Day 5	**26 → 28 → 27 → 29 → 42 → 25**	7.5
Day 6	**46 → 47 → 23 → 41 → 45**	8.5
Day 7	**9 → 3 → 12 → 15 → 50**	29.4
Day 8	**14 →24 → 2 → 8 → 11**	6.8
Day 9	**40 → 39 → 30 → 31 → 32 → 34**	5.3
Total: 9 days	**51 repair requests**	**108.8 miles**

Using Cost per Pothole to relate total cost to work accomplished

- Cost per pothole as the primary performance measure
- Number of potholes repaired
  - Cost of repair
  - Reduce Wasted time effort and material
  - Reduce Cost
  - Increase Output
- Budget Conversation

Different Service Request Levels by District

Pothole Repair Requests by Council District, January 1, 2012 through September 30, 2012



Source: Auditor generated using the division's pothole tracking data for period January 1, 2012 through September 30, 2012.

Recommendations

- **Recommendation #1:**
- In order to improve the quality of data, Street Division should standardize its data collection tool.

Specifically, the Street Division should:

- a) Specify the types of data that should be collected by repair crews (e.g. number of potholes filled and square footage),and revise the data collection form so that each required data type has its own field and standardized way of recording.
- b) Establish a process to insure supervisory review and approval prior to data entry with confirmation of review such as a signature.

Recommendations

- **Recommendation #2:**
- The Street Division should improve controls over data entry.

Specifically, Street Division should:

- a) Modify the date field to a blank, yet required field to help insure the date field is entered correctly into the system.
- b) Evaluate potential data entry controls available in SAP for data recorded in the system to strengthen edit checks and controls.

Recommendations

- **Recommendation #3:**
- Street Division's pothole repair group should implement a regional deployment strategy in order to reduce redundant trips to the same areas and systematically address pothole repair.

- **Recommendation #4:**
- Street Division should change its primary performance metrics to include a measure of production efficiency. Specifically, the Department should utilize the cost-per-pothole as their primary performance measure to capture the efficiency of its operations.

Management Response

Management Response #1: Agree with Recommendation

- The Division is revising the data collection form to include the number of potholes and square footage of potholes.
- Additionally, the data form will be revised so each data type has its own dedicated data entry field.

Management Response

- The Street Division is in the process of modifying the data field to be blank and be a required data entry field to insure the date is entered correctly. This change will be effective beginning Fiscal Year 2014.
- The Division is evaluating potential data entry controls available in SAP to strengthen edits checks and system controls

Management Response

- Street Division agrees with this recommendation as it should result in work being completed in a more efficient manner, allowing more potholes to be filled and reducing redundant trips to the same area.
- Using a regional deployment strategy, customer generated notification may account for less of the work performed in a work day while self generated service notifications will increase as crews travel from one customer generated service notification location to the next.

Management Response

- Beginning in Fiscal Year 2014, Street Division will utilize the cost-per-pothole method as the primary performance measure to capture the efficiency of its operations.

Press Response

WATCHDOG

Auditor finds holes in pavement response

By Jeff McDonald 3:14 P.M. APRIL 12, 2013

PRINT SAVE COMMENTS -

A pothole on northbound Sandrock Road south of Aero Drive. [U-T file] — *John Gibbins*

The city of San Diego spent more than $1.3 million repairing 30,000 potholes but still has no way to determine the average response time or to track which neighborhoods have the most frequent need, an audit released Friday concludes.

From what auditors could tell from the error-riddled data, the average repair time nearly doubled over the past year, from eight days in 2011 to 15 days in 2012, the review states.

Document

City auditor pothole report

DOWNLOAD .PDF

City Moves to Fix the Holes in Its Pothole Data

BY: LIAM DILLON CONNECT | APRIL 12, 2013 | COMMENTS (7)

File Photo by Sam Hodgson

City worker Omar Santos fills a pothole on Bankers Hill in November 2009.

The city of San Diego will make numerous changes to how it tracks and reports pothole repairs, after an audit released Friday found widespread errors and inefficiencies.

The city plans to improve how its street crews collect data and will now measure its effectiveness by the cost to fix potholes rather than the time it takes to respond to complaints.

Audit reveals holes in San Diego's pothole repair system

Report's recommendations approved by committee

Large Photo

Posted: 05/13/2013
Last Updated: 101 days ago

SAN DIEGO - A report that recommends the city of San Diego change its strategy for repairing potholes was unanimously approved Monday by the City Council's Audit Committee.

The study from the city auditor's office found that the time it took to fill a pothole after it was reported climbed from eight days to 15 days in the past two years, and that numerous data entry errors hampered the ability of the Streets Division to report on performance metrics.

It was also found that the number of potholes repaired dropped from 50,000 to more than 30,000 between fiscal years 2011 and 2012. The first year, however, included an unusually stormy winter.

Utilizing the Lean Production Model Next Steps

- More efficiency gains
- Cost per pothole changes

Questions?

- Contact Information
  - Chris Kime: Audit Manager
    - pkime@sandiego.gov (619-533-3030)
  - Steve Gomez
    - gomezs@sandiego.gov (619-533-3032)

- Staff Not In Attendance
  - Sunny McLernon: Senior Performance Auditor
  - Sara Collier: Performance Auditor/Industrial Engineer