



January 14, 2009

JAMES J. GALLAGHER
MANAGER, PHILADELPHIA METROPOLITAN DISTRICT

SUBJECT: Audit Report – Philadelphia Metropolitan District: Overall Equipment Effectiveness (Report Number DA-AR-09-003)

This report presents the results of our self-initiated audit of the effectiveness of equipment maintenance in the Philadelphia Metropolitan District (Project Number 08YG031DA000). Based on fiscal year 2008 risk analysis data, the Philadelphia Metropolitan District was among the districts most at risk for having low equipment effectiveness. Our objective was to determine the cause of low overall equipment effectiveness¹ (OEE) at the Philadelphia and Southeastern Processing and Distribution Centers (P&DC) in the Philadelphia Metropolitan District. See [Appendix A](#) for additional information about this audit.

Opportunities to Improve Overall Equipment Effectiveness

The Philadelphia Metropolitan District ranked 77th of the 80 Postal Service districts for OEE, as of June 30, 2008. During the 1-year period ending June 30, 2008, OEE averaged 52.4 percent compared to the national average of 65.5 percent and the Postal Service goal of 80 percent. This occurred because the Philadelphia Metropolitan District did not meet targets for daily and weekly preventive maintenance of mail processing equipment (MPE). In addition, excessive pieces at risk² and reject³ rates lowered the quality element of OEE and indicated opportunities for both maintenance and operational functions to increase equipment performance. Addressing these issues at mail processing sites could have lowered costs by an additional \$5 million for the year ending June 30, 2008, and would lower mail processing costs by \$10 million over the next 2 years. See [Appendix B](#) for our detailed analysis.

We recommend the Philadelphia Metropolitan District Manager:

1. Establish an action plan to increase equipment maintenance completion rates at the Philadelphia and Southeastern mail processing facilities.
2. Develop procedures to ensure compliance with letter mail operational standards for quality.
3. Ensure test decks are run while conducting preventive maintenance.

¹ OEE equals equipment availability multiplied by equipment performance efficiency multiplied by quality.

² Mail that was either rejected or missorted resulting in re-handling and increased costs.

³ Rejects are machinable mail that machinery did not accept for a variety of reasons including mechanical failure, out of sequence, and out of sort plan.

4. Establish a shared maintenance and operational action plan for minimizing Delivery Bar Code Sorter and Automated Flats Sorting Machine pieces at risk and reject rates at processing plants in the district.

Management's Comments

Management agreed with the finding and recommendations relating to improving OEE. Management has begun to correct maintenance deficiencies with the assistance of the Eastern Area by dedicating a maintenance employee to oversee the completion of maintenance requirements. This individual will use reports currently generated to identify the principal reason(s) for failure to achieve norms so management can address and remediate impediments. Management plans to complete their actions by February 9, 2009.

Management also clarified points that they believe impacted our monetary calculations. In particular, management stated that the method for recording manual volumes changed during the period of analysis and that the Automated Flats Sorting Machine 100 (AFSM 100) rejects are reworked through automation which would influence the reported impact. See [Appendix C](#) for management's comments in their entirety.

Evaluation of Management's Comments

The U.S. Postal Service Office of Inspector General (OIG) considers management's comments responsive to the recommendations and corrective actions should resolve the issues identified in the report.

We acknowledge the Postal Service changed the method for calculating and recording manual volume in the Web End of Run (WebEOR) system. However, this change does not impact the average cost per thousand pieces and, therefore, does not alter the monetary impact calculation. We extracted the cost per thousand pieces used in the audit report from the Activity Based Costing (ABC) system which identifies and accounts for all costs, not just workhours and volume.


We also acknowledge that management reprocesses flat rejects through automation using the Upgraded Flats Sorting Machine 1000. However, our subsequent analysis shows that flat mail flows⁴ to manual operations ranged from 4.5 to 15.3 percent of total pieces handled, on average, at the Philadelphia P&DC. Likewise, flat mail flows to manual operations ranged from 4.3 to 16.3 percent at the Southeastern P&DC. Therefore, we believe automation reprocessing may not be as effective as management indicates. As such, we believe the reported monetary impact is accurate and conservative.

The OIG considers all recommendations significant, and therefore requires OIG concurrence before closure. Consequently, the OIG requests written confirmation when

⁴ WebEOR First Handled Pieces in Manual Operations – Flat Mail.

corrective actions are completed. This recommendation should not be closed in the follow-up tracking system until the OIG provides written confirmation that the recommendations can be closed. We will report \$10,073,884 as funds put to better use and \$5,036,942 as unrecoverable questioned costs in our *Semiannual Report to Congress*.

We appreciate the cooperation and courtesies provided by your staff. If you have any questions or need additional information, please contact Miguel Castillo, Director, Engineering, or me at (703) 248-2100.

E-Signed by Darrell E. Benjamin, Jr. 
VERIFY authenticity with ApproveIt.

Darrell E. Benjamin, Jr.
Deputy Assistant Inspector General
for Support Operations

Attachments

cc: Edward Gamache
Katherine S. Banks

APPENDIX A: ADDITIONAL INFORMATION

BACKGROUND

We identified mail automation risks in the Philadelphia Metropolitan District as part of our initiative to conduct risk-based audits on a continuous basis. In particular we identified low OEE in the district. OEE is an indicator of how well the Postal Service maintains and operates MPE.

Key equipment used to process letter mail includes the Delivery Barcode Sorter (DBCS) and DBCS Input Output Subsystem (DIOSS) that sort mail in carrier walk sequence, eliminating the need for additional sorting at the delivery unit. For flat mail, the AFSM 100 is designed to streamline flats mail processing operations while significantly reducing manual processing. Mail is processed manually when it is rejected by or cannot be processed by machinery. Manual mail processing increases costs and may not be as accurate and timely as automation.

Postal Service policies set standards for maintaining and effectively operating equipment. Management maintenance orders outline the preventive maintenance procedures districts must perform. Operational standards and guides give instructions for increasing productivity, reducing missorted mail, and controlling costs.

The following three systems provide information to help management effectively and efficiently operate equipment and process the mail.

- The WebEOR system reproduces, archives, and summarizes information captured during a mail processing run. WebEOR offers standard reports on operations, maintenance, and machine configuration data.
- The Mail Image Reporting System (MIRS) summarizes pieces at risk captured during a mail processing run. MIRS also offers a number of standard reports, including reports for operations, maintenance, and machine summary data.
- The ABC system provides detailed cost information on mail processing. The ABC system converts operational data into cost information to identify trends, spikes, and other anomalies and to support improvement targets at the plant level.

OBJECTIVE, SCOPE, AND METHODOLOGY

Our objective was to determine the cause of low OEE at the Philadelphia and Southeastern P&DCs in the Philadelphia Metropolitan District. To assess causes for lower than expected OEE, we determined whether the Philadelphia Metropolitan District met targets for preventive maintenance and machine reject rates associated with letter and flat mail operations.

We visited the Philadelphia and Southeastern mail processing facilities and interviewed plant personnel. In addition, we analyzed the maintenance completion rates for each site within the Philadelphia Metropolitan District for DBCS and AFSM operations. To test the effectiveness of maintenance completion, we reviewed letter mail gross acceptance and reject rates as described in the Postal Service's *DBCS Standardization Work Instruction Guide* and flat mail gross acceptance and rejects as described in the *AFSM 100 - National Standardization Guide*. To identify the cause of the issues, we analyzed pieces at risk reports for each site in the Philadelphia Metropolitan District. To calculate the monetary impact, we compared the Philadelphia Metropolitan District's mail processing costs to average mail processing costs at the national level, reviewed the percentage of mailpieces processed manually at each site, and applied manual handling rates recorded in the ABC system to excessive machine rejects.

We conducted this performance audit from August 2008 through January 2009 in accordance with generally accepted government auditing standards and included such tests of internal controls as we considered necessary under the circumstances. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objective. We believe the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective. We discussed our observations and conclusions with management on December 9, 2008, and included their comments where appropriate.

PRIOR AUDIT COVERAGE

The OIG previously issued the following report relating to preventive maintenance and reject rates associated with letter mail operations.

Report Title	Report Number	Final Report Date	Monetary Impact	Report Results
<i>Fort Worth District Equipment Maintenance</i>	DA-AR-08-009	August 29, 2007	\$14,214,603	The audit determined the Fort Worth District generally met targets for preventive maintenance of letter MPE; however, opportunities existed to increase preventive maintenance completion rates to meet national standards at three of the district's five mail processing sites. In addition, excessive reject rates indicated opportunities for both maintenance and operational functions to increase equipment performance to meet operational targets. Management concurred with our finding and recommendations.

APPENDIX B: DETAILED ANALYSIS

Philadelphia Metropolitan District Overall Equipment Effectiveness

OEE is an indicator of how well the Postal Service maintains and operates MPE. OEE data extracted from the Enterprise Data Warehouse for the 12-month period ending June 30, 2008, revealed the Philadelphia Metropolitan District ranked 77th out of the 80 Postal Service districts. The Philadelphia Metropolitan District's OEE was 52.4 percent compared to the national average of 65.5 percent and the Postal Service goal of 80 percent. Three critical elements of OEE are performance efficiency, availability, and quality. Completing preventive maintenance according to standards and controlling pieces at risk minimizes the level of mail rejects and improves the quality element of OEE.

Increasing Preventive Maintenance Completion Rates Improves Overall Equipment Effectiveness

Preventive maintenance is the scheduled, systematic inspection, examination, cleaning, lubricating, adjusting, servicing, and custodial caretaking performed to retain the functional capabilities of equipment. The objective is to improve and prolong equipment life, avoid unplanned maintenance activity, and lower overall maintenance costs by eliminating breakdown (reactive) maintenance and significantly reducing the number and frequency of corrective maintenance actions.

Postal Service maintenance policy requires that daily and senior⁵ preventive maintenance rates should be completed at or above 95 percent. As shown in Chart 1, the Philadelphia Metropolitan District's two processing plants completed daily preventive maintenance routines for DBCSs at the expected 95 percent rate. However, neither site met the expected 95 percent completion rate for their AFSMs.

**Chart 1. Daily Preventive Maintenance Completion Rates
(July 2007 - June 2008)**

Mail Processing Facility	# DBCS Machines	DBCS Percentage	# AFSM Machines	AFSM Percentage
Philadelphia P&DC	55	99.2	7	88.7
Southeastern P&DC	27	99.3	3	88.6
Nationwide Totals	4,785	98.0	535	94.0

⁵ Daily preventive maintenance is scheduled 2 to 7 days a week (some maintenance is required each day and other maintenance is only scheduled every other day or less frequently during a week) and can be completed by less experienced maintenance personnel. Senior preventive maintenance is scheduled less frequently and is completed by more experienced personnel.

In addition, as shown in Chart 2, the two processing plants did not complete DBCS and AFSM weekly senior preventive maintenance routines in accordance with Postal Service maintenance policies.

**Chart 2. Senior Preventive Maintenance Completion Rates
(July 2007 - June 2008)**

Mail Processing Facility	# DBCS Machines	DBCS Percentage	# AFSM Machines	AFSM Percentage
Philadelphia P&DC	55	89.9	7	84.1
Southeastern P&DC	27	90.5	3	88.6
Nationwide Totals	4,785	98.0	535	90.5

According to *MMO-013-05, Operational Maintenance Guidelines*, it is imperative that all personnel take an active role in maintaining MPE at optimum levels to ensure the Postal Service receives the highest return on investment for mail processing systems and improves service to its customers. Monitoring of the equipment during mail processing is essential to ensure missorted and miscoded mail is held to a minimum and OEE is maintained at the highest levels. This will reduce overall system downtime by correcting minor problems before they become failures.

Pieces at Risk and Mail Rejects

To assess the effectiveness of maintenance performed, we analyzed equipment pieces at risk and mail rejects⁶ at the Philadelphia Metropolitan District's two processing plants. Pieces at risk are any mailpieces sorted to bins other than the ones to which they were assigned. The pieces at risk indicator is a measure of mailpieces that are at risk of not reaching their destination in their allocated time. The primary component of mailpieces at risk is rejected mail that results in manual rehandling.

In March 2007, the Postal Service established "At Risk and Out-of-Sequence Goals." Achieving these goals is critical for Postal Service performance and cost management success. As shown in Chart 3, neither plant has met their target of 2 percent for mailpieces at risk.

⁶ Machinable mail rejected by the machinery due to a variety of reasons including mechanical failure, out of sequence, and out of sort plan.

Chart 3. Philadelphia Metropolitan District Mailpieces at Risk

Mail Processing Facility	Machine Type	Mailpieces Fed (000)	Mailpieces At Risk (000)	Mailpieces At Risk (Percentage)
Philadelphia P&DC	DBCS	2,814,657	107,282	3.81
	AFSM	373,831	30,137	8.06
Southeastern P&DC	DBCS	1,730,023	57,015	3.30
	AFSM	199,414	9,634	4.83

Source: MIRS 7/1/2007 – 6/30/2008

Postal Service operational standards⁷ also call for limiting DBCS rejects⁸ to approximately 1 percent and AFSM rejects to 5 percent of total mailpieces fed. As shown in Chart 4, both plants had excessive mailpiece rejects.

Chart 4. Philadelphia Metropolitan District Letter and Flat Mail Rejects

Mail Processing Facility	Machine Type	Mailpieces Fed (000)	Mailpieces Rejected (000)	Reject Percentage
Philadelphia P&DC	DBCS	2,871,499	47,737	1.7
	AFSM	373,831	34,343	9.2
Southeastern P&DC	DBCS	1,725,599	20,684	1.2
	AFSM	199,414	11,192	5.6

Source: EDW/EOR 7/01/07 – 6/30/2008

Limiting rejects to standard targets would reduce extra handling and the cost of mail processing and also improve the quality element of OEE.

Causes

The Philadelphia P&DC maintenance manager indicated that poor maintenance completion rates were primarily due to staff shortages or inexperienced personnel. This was less prevalent at the Southeastern P&DC as they closely monitored automation metrics for quality. At both plants, we observed that test deck runs⁹ were not always completed when performing daily preventive maintenance. This, in turn, caused inadequate equipment adjustments that resulted in excessive mailpieces at risk and mailpiece rejects. Furthermore, poor mail flow and inadequately trained staff resulted in mail being processed on non-designated machines and also contributed to excessive

⁷ DBCS Standardization: Work Instruction Guide Mail Processing & Maintenance, Version 0.9, May 2006.

⁸ Rejects percent used estimated at 1 percent (1 minus gross acceptance target rate of approximately 99 percent). Gross acceptance rate (GAR) DPS target is 99.1 percent. GAR non-DPS target is 98.8 percent.

⁹ Running test decks on MPE is an established practice that helps ensure the machine is functioning properly prior to being turned over to operations.

rejects. Finally, supervisors did not always perform the necessary preventive maintenance inspections to ensure maintenance quality.

Opportunity to Further Lower Mail Processing Costs

Excessive machine rejects contribute to higher processing costs since the rejected mailpieces are either re-handled or manually processed. As shown in Chart 5, the Philadelphia P&DC has the greatest opportunity to lower mail processing costs. For the 1-year period ending June 30, 2008, the cost to process 1,000 mailpieces manually was approximately \$116.37 for letter mailpieces and \$117.82 for flat mailpieces. For the same period, the letter automation rate was about \$8.68 per 1,000 mailpieces. Recognizing the tolerance for rejects, the cost of excessive rejects¹⁰ for the same annual period totaled about \$5 million for the two Philadelphia mail processing sites. Because the sites could have minimized rejects by following operational standards, we will report \$5,036,942 as unrecoverable questioned cost in our *Semiannual Report to Congress*. Since these costs are also avoidable in the next 2 years, we will report another \$10,073,884 as funds put to better use in the *Semiannual Report to Congress*.

Chart 5. Philadelphia Metropolitan District: Financial Impact of Machine Rejects

Mail Processing Facility	Number of Machines	Excess Machine Rejects (000)	Manual Processing Cost per 1,000 Mailpieces	Annual Cost of Excess DBCS/AFSM Rejects
Philadelphia P&DC	DBCS 55	19,022	\$137.33	\$2,612,287
	AFSM 7	15,651	\$125.42	1,962,939
Southeastern P&DC	DBCS 27	3,428	\$95.41	327,065
	AFSM 3	1,222	\$110.21	134,650
District Average			\$117.09	
National Average			\$112.66	
Total Unrecoverable Questioned Costs ¹¹				\$5,036,942
Funds Put to Better Use (2 Years) ¹²				\$10,073,884

Source: ABC System

¹⁰ DBSC excess rejects are greater than 1 percent and AFSM excess rejects are greater than 5 percent of mailpieces fed for the period July 1, 2007, through June 30, 2008.

¹¹ Unrecoverable costs that are unnecessary, unreasonable, or an alleged violation of law or regulation.

¹² Funds that could be used more efficiently by implementing recommended actions.

APPENDIX C. MANAGEMENT'S COMMENTS

Philadelphia Processing and Distribution Center



Date: December 31, 2008

TO: JAMES J. GALLAGHER, DISTRICT MANAGER, PHILADELPHIA METRO DISTRICT
LUCINE M. WILLIS, DIRECTOR, AUDIT OPERATION, O.I.G.
KATHERINE S. BANKS, MANAGER, CORPORATE AUDIT AND RESPONSE
MANAGEMENT, USPS

SUBJECT: MANAGEMENT DRAFT RESPONSE: Philadelphia District OEE Audit (Report DA-AR-09-DRAFT)

Objective

The Philadelphia Metropolitan District underwent an on-site visit by the OIG, followed by the draft report noted above. The stated purpose at the entrance meeting was a review of OEE or Operational Equipment Effectiveness for the Philadelphia P&DC. The period measured one year's performance from, July 1, 2007 to June 30, 2008.

Findings

The following are the findings noted by the OIG:

1. Establish an action plan to increase equipment maintenance completion rates at the Philadelphia and Southeastern mail processing facilities.
2. Develop procedures to ensure site compliance with letter mail operational standards for quality.
3. Ensure test decks are run while conducting preventive maintenance.
4. Establish a shared maintenance and operational action plan for minimizing Delivery Bar Code Sorter and Automated Flats Sorting Machine pieces at risk and rejects rates at processing plants in the Philadelphia District.

The District management agrees that the findings improve quality and add value to the organization as they mirror USPS policy for maintenance and mail processing operations.

The management notes that Action Plans, Performance Improvement Plans, Daily and Weekly telecons, Eastern Area on-site reviews, inventory audits and training were either in progress at the beginning of FY 2008 (October 1, 2008) or conducted throughout the FY. These efforts are ongoing and continue at this time.

The OIG noted the demonstrated improvement during the Exit meeting.

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Appendix A

-The period noted covers two Fiscal Years (FY 2007 and FY 2008). Several data recording systems changed during this period, most notably WebEOR cited in this report. The Postal Service changed the method for calculating and recording manual volumes, i.e. - cessation of weighing manual mail, both letters and flats. This change in data recording likely had an impact on calculating the average cost per thousand pieces and a further impact on monetary calculations. As an example, it is unlikely that the Southeastern P&DC would process manual letters at a rate that is 41 dollars a thousand less than the Philadelphia P&DC.

-The documentation of Preventive Maintenance is dependent upon manual input.

Appendix B

-“At risk” pieces were used to assess effectiveness versus other Districts and facilities. It should be noted that the Philadelphia P&DC is the local site used to “mass” outgoing standard mail letter and flat volumes for plants in the eastern portion of the Eastern Area. Standard mail volumes in automation generally reject at a higher rate and cause more mail pieces to need further re-handling in automation or manual mail processing. Rejects will be higher than plants that do not process this mail.

-The plants identified in the audit are both CIOSS sites and have PARS operations, which generate more manual volumes than non-PARS/CIOSS operational sites.

-The Philadelphia P&DC consolidated seven CSBCS sites and relocated six Phase 1 Delivery Bar Code Sorters (+10 years old) during the review period. Relocation of letter sorting machinery of this relative age created maintenance and operational issues not normally experienced in other facilities. This led to quality of sort issues needing addressed and repaired.

-In the Philadelphia P&DC, some flats rejecting from the AFSM100 operation are reworked on the UFSM1000. These rejects are processed at a lower machine rate but at a much higher rate than manual processing.

-In “Causes” it is noted that the Maintenance Manager, during an interview, explained poor PM rates due to staffing shortages and inexperienced personnel. The Eastern Area over-staffed the P&DC during the facility activation and the local maintenance staff still exceeds USPS norms. With very few exceptions staffing is not the cause of poor PM completion.

-Effective management of the local maintenance EAS and craft personnel had been identified by both the Eastern Area and local facility management as an issue to be addressed.



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FY 08 Eastern Area and Plant Maintenance activities

Daily

- Maintenance telecons reviewing "at risk" indicators between EA and local Maintenance
- Test Deck reports
- PM completion rates by plant
- Review of open "logs"

Weekly

- Local plant staff service telecons with the EA VP and Maintenance Manager
- Trend reporting PM completion, with written feedback from VP

Other

- Written audits/ reviews of operations
- Completion of Maintenance Staffing package
- Performance Improvement Plans
- Consolidation of CSBCS and DBCS sites
- LSS project to reduce jams on letter sorting equipment

Files for each are available, noting dates covered and/or completed.

Action Plan

-In order to address the significant finding, the P&DC management, with the assistance of the Eastern Area will dedicate a maintenance EAS employee to oversee the completion of daily and weekly routes to within USPS norms. This individual will make use of reports currently generated to identify the principal reason(s) for failure to achieve norms so that impediments may be addressed and remediated. Target date for completion is February 9, 2009.

-Once appointed, it will be one of the new Maintenance Manager's primary tasks to carry out the action plan to increase equipment maintenance completion rates at the Philadelphia P&DC.

Please contact me at 215-749-4307 if you have any questions.



Daniel P. Muldoon
Senior Plant Manager
Philadelphia P&DC