July 23, 2009

DAVID E. WILLIAMS
ACTING VICE PRESIDENT, ENGINEERING

AREA VICE PRESIDENTS

SUBJECT: Audit Report – Overall Equipment Effectiveness: Delivery Bar Code Sorter (Report Number DA-AR-09-010)

This report presents the results of our nationwide audit of the Overall Equipment Effectiveness (OEE) of the Delivery Bar Code Sorter (DBCS) (Project Number 09YG017DA000). We conducted this self-initiated audit to determine reasons for low OEE on the DBCS nationwide and identify best practices for improving them. We identified low DBCS OEE from an automation risk model we developed to continuously monitor and evaluate machine efficiency.[1] See Appendix A for additional information about this audit.

Opportunities for Improving DBCS Effectiveness

Most U.S. Postal Service area OEE percentages were below DBCS performance targets. Maintenance managers stated that low OEE on the DBCS machines resulted from inadequately trained staff and lack of coordination between the maintenance and operations functions. Addressing these issues at mail processing sites could have lowered maintenance costs by an additional $5.5 million for the 2-year period ending September 30, 2008, and would lower mail processing costs by $5.1 million over the next 2 years. See Appendix B for our detailed analysis of this topic.

We recommend the Vice President, Engineering, in coordination with Area Vice Presidents:

1. Ensure Maintenance and Operations regularly coordinate to minimize maintenance issues and improve Delivery Bar Code Sorter Overall Equipment Effectiveness.

2. Require all machine operators and supervisors to have current Delivery Bar Code Sorter training.

[1] Performance Analyses and Risk Indicator Scans (PARIS) identify emerging risks at the district level and ranks them accordingly. The PARIS maintenance model identifies the highest risk districts from a standpoint of automation effectiveness, including, OEE and machine under-utilization.

Management's Comments

Management agreed with both recommendations, stating they will implement best practices and continue to emphasize cooperation and communication between Maintenance and Operations. They also have committed to providing the field with operator training information and agreed to validate DBCS operator training records. See Appendix D for management's comments, in their entirety.

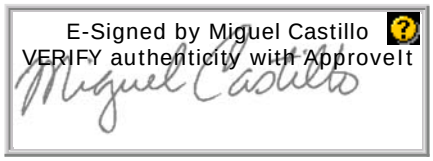
Evaluation of Management's Comments

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.

The OIG considers both recommendations significant, and therefore requires OIG concurrence before closure. Consequently, the OIG requests written confirmation when corrective actions are completed. These recommendations should not be closed in the Postal Service's follow-up tracking system until the OIG provides written confirmation that the recommendations can be closed.

We will report $5,481,804 in unrecoverable questioned costs and $5,076,183 in funds put to better use 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 Wayne Sharpe, Acting Director, Engineering, or me at (703) 248-2100.



Miguel A. Castillo
Acting Deputy Assistant Inspector General
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cc: William Galligan
Edward Gamache
Katherine S. Banks

APPENDIX A: ADDITIONAL INFORMATION

BACKGROUND

We extracted OEE percentages for the DBCS machines at mail processing plants. OEE scores are an indicator of how well the Postal Service maintains and operates mail processing equipment. OEE measures losses to machine availability, efficiency, and quality. OEE tells users the percentage of time that equipment, when running, is producing quality products at an acceptable rate. Tracking OEE during operation allows:

- Opportunities for continuous improvement.
- Consistent and frequent monitoring
- Everyone to be proactive.

Achieving an OEE score of 85 percent is the Lean Six Sigma and Postal Service standard for eliminating automation waste that does not add value.

The DBCS is a multilevel, high-speed bar code sorter (BCS). Usage of the Delivery Point Bar Code allows the DBCS to sort mail in carrier walk sequence, eliminating the need for additional sorting at the delivery unit. The carrier transports letter trays of sequenced mail directly to the vehicle for delivery to the customer. The DBCS can also sort letter mail to carriers in sector-segment sequence using a two pass operation. Sector-segment sorting places the mail in block face delivery sequence.

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 Web End of Run system reproduces, archives, and summarizes information captured during a mail processing run. Web EOR 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. The MIRS also offers a number of standard reports, including reports for operations, maintenance, and machine summary data.

- The Activity Based Costing (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 audit objective was to determine reasons for low OEE on the DBCS and identify best practices for improving them. We focused on factors influencing the quality element of OEE, specifically, pieces at risk and machine reject rates. The efficiency and availability elements of OEE, while important, influence costs to a lesser degree and will be the subject of future OIG reviews.

We visited 10 mail processing facilities in two Postal Service areas and interviewed plant personnel. We also interviewed plant personnel by telephone in another area. To test DBCS effectiveness, we reviewed letter mail gross acceptance and reject rates as described in the Postal Service's *DBCS Standardization Work Instruction Guide* and analyzed pieces at risk reports. To determine monetary impact, we calculated additional maintenance and processing costs attributed to re-running excess rejected mailpieces at each plant. We limited the amount reportable in our *Semiannual Report to Congress* to maintenance costs as the OIG has previously reported opportunities associated with manual operations.

We conducted this performance audit from January through July 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 officials on May 28, 2009, and included their comments where appropriate.

We extracted data from the End of Run system to calculate excess DBCS rejected mailpieces. To calculate the monetary impact of excess rejects, we used data from the ABC system. We performed reasonableness tests and found the data sufficiently reliable to satisfy our audit objective.

PRIOR AUDIT COVERAGE

Report Title	Report Number	Final Report Date	Monetary Impact	Report Results
Fort Worth District Equipment Maintenance	DA-AR-08-009	August 7, 2008	Unrecoverable questioned costs of $4,738,201 and $9,476,402 as funds put to better use.	The district generally met targets for preventive maintenance of letter mail processing equipment; however, it could increase completion rates. Improved completion rates and better processing procedures can reduce excess mailpiece rejects. Management concurred with our finding and recommendations.
Philadelphia Metropolitan District: Overall Equipment Effectiveness	DA-AR-09-003	January 14, 2009	Unrecoverable questioned costs of $5,036,942 and $10,073,884 as funds put to better use.	The district did not meet targets for preventive maintenance of letter mail processing equipment, resulting in excess mailpiece rejects. Rejected mailpieces required more costly and less accurate manual processing. Management concurred with our finding and recommendations.
Assessment of Overall Plant Efficiency	NO-MA-09-002	May 8, 2009	Unrecoverable questioned costs of $969,495,708	Management has not fully adjusted workhours in response to changes in workload and has not used all automation opportunities. Operational efficiency could be improved by reducing workhours. Management concurred with our finding and recommendations.

APPENDIX B: DETAILED ANALYSIS

Opportunities for Improving DBCS Effectiveness

OEE is an indicator of how well the Postal Service maintains and operates mail processing equipment. As depicted in Chart 1, OEE data extracted from the Enterprise Data Warehouse for the 12-month period ending September 30, 2008, revealed that six of nine Postal Service areas did not meet FY 2008 DBCS OEE targets in the BCS mode.[2] Current Postal Service guidelines[3] require an average OEE score of 85 percent for machine certification.

Chart 1. FY 2008 DBCS OEE Percentages by Postal Service Area

Area	*OEE Percentage (Target is 85%)*	*OEE Range (Percentage)*		*Percentage Facilities Meeting Target*
		High	**Low**	
Capital Metro	79.0	88.2	45.3	7
Eastern	82.3	93.8	21.9	55
Northeast	83.2	96.3	73.6	56
Southwest	83.7	93.6	67.3	61
Southeast	83.8	96.1	74.6	60
New York Metro	84.1	94.3	80.2	58
Pacific	85.4	92.7	48.7	68
Western	85.6	96.5	72.6	66
Great Lakes	87.9	95.9	81.3	94

Minimizing Pieces at Risk Improves Overall Equipment Effectiveness, Minimizes Rejects, and Lowers Cost

Controlling pieces at risk not only improves the quality element of OEE but minimizes the level of mail rejects and more costly manual handlings and improves customer service scores. Pieces at risk are any mailpieces sorted to bins other than their assigned bins. It measures the risk of a mailpiece not reaching its destination in the allocated time. In March 2007, the Postal Service established "At Risk and Out-of-Sequence Goals" to minimize pieces at risk. The Postal Service recognized that achieving these goals is critical for performance and cost management success. As shown in Chart 2, few facilities met the established DBCS Pieces at Risk target of 2 percent.

[2] Since approximately 89 percent of all mail processed on the DBCS is run in the BCS mode, we analyzed machine performance in this mode.
[3] *DBCS Standardization: Work Instruction Guide, Mail Processing & Maintenance* Version. 0.9, May 2006.

Chart 2. FY 2008 DBCS Pieces At Risk Percentages

Area	At Risk Percentage (Target is 2%)	At Risk Range (Percentage)		Percentage Facilities Meeting Target
		High	Low	
Eastern	4.0	13.1	2.2	0.0
New York Metro	3.9	11.3	2.0	4.0
Northeast	3.8	18.1	2.0	4.8
Great Lakes	3.7	8.0	2.1	1.9
Western	3.7	14.4	1.8	5.5
Capital Metro	3.5	11.7	1.8	3.6
Pacific	3.3	7.9	1.9	15.2
Southwest	3.3	9.3	1.5	4.0
Southeast	3.0	4.4	1.7	19.7

Mail rejects are mailpieces the machinery could not sort due to a variety of reasons including mechanical failure, out of sequence, and out of sort plan. Limiting rejects to standard targets would reduce extra handling and mail processing costs and improve the quality element of OEE. Postal Service operational standards[4] call for limiting DBCS rejects to approximately 1 percent. As shown in Chart 3, none of the Postal Service areas met the DBCS mailpiece reject target.

Chart 3. FY 2008 DBCS Mail Reject Percentages

Area	Reject Percentage (Target is 1%)	Reject Range (Percentage		Percentage Facilities Meeting Target
		High	Low	
Pacific	2.3	24.4	0.6	19.4
Capital Metro	1.8	9.5	0.7	10.3
New York Metro	1.7	5.9	0.7	45.8
Eastern	1.6	8.0	0.5	26.6
Great Lakes	1.6	2.5	0.6	14.6
Western	1.5	2.6	0.6	18.9
Southwest	1.5	2.3	0.6	26.1
Northeast	1.4	2.7	0.6	39.0
Southeast	1.4	2.5	0.6	31.7

[4] *DBCS Standardization: Work Instruction Guide Mail Processing & Maintenance,* Version 0.9, May 2006.

Causes and Impact

In general, maintenance managers did not focus attention on OEE targets for the DBCS. However, they provided the following explanations for not achieving the target OEE percentages:

- Inadequately trained machine operators feed non-machineable mail to the DBCS resulting in excessive pieces at risk and machine rejects.

- Lack of coordination between the maintenance and operations functions.

Re-running excess rejects results in extra machine maintenance and processing. As shown in Appendix C, re-running excess rejected mailpieces increased Postal Service maintenance cost by approximately $5.5 million for the 2-year period ending September 30, 2008. If uncorrected, the cost for the next 2 years will be approximately $5.1 million, for a total monetary impact of $10.6 million.

Excess mailpieces rejects also increased FY 2008 machine operator costs by approximately $25 million and manual processor costs by approximately $207 million. However, we are limiting the amount reported in our *Semiannual Report to Congress* to maintenance costs because we previously reported overall operator costs in our report titled *Assessment of Overall Plant Efficiency* (Report Number NO-MA-09-002, dated May 8, 2009).

Best Practices at High Scoring Plants

The Postal Service can further improve OEE scores by implementing several best practices utilized by sites with high OEE scores. Specifically:

- Communicate performance challenges between Maintenance and Operations
  Maintenance should provide at-risk metrics and OEE data to Operations to identify problems and improve machine performance. Likewise, Operations should promptly report machine troubles to Maintenance so they can resolve problems quickly.

- Assign responsibility for a specific DBCS machine to an Electronic Technician (ET)[5]
  Assigning a machine(s) to an individual ET increases the quality of maintenance because ETs are accountable for their respective machine's performance. Also, an ET who is familiar with a specific machine can more easily troubleshoot problems.

[5] ETs perform a full range of diagnostic, preventative maintenance, alignment and calibration, and overhaul tasks on mail processing equipment and systems.

- Ensure DBCS clerks understand machine operating procedures
  A poll of maintenance managers revealed that operator training is the key to increased OEE scores. This includes instruction on what type of mailpiece the DBCS cannot process.

APPENDIX C: CALCULATION OF UNRECOVERABLE QUESTIONED COSTS AND FUNDS PUT TO BETTER USE

Excess DBCS Maintenance Costs		
Unrecoverable Questioned Cost[6]		
Excess Maintenance cost FY 2008	$2,729,996	
Excess Maintenance cost FY 2007	$2,751,808	
Total Questioned Cost		$5,481,804
Funds Put to Better Use[7] ***(Avoidable Costs)***		
Excess Maintenance cost FY 2008	$2,729,996	
Number of Years Funds Put to Better Use Claimed (10/1/2008 – 9/30/2010)	2	
Cost of Money	5%	
Total Funds Put to Better Use		$5,076,183
Total Monetary Impact		**$10,557,987**

Notes

- We used fully loaded ET labor rates as published by the Postal Service for FY 2008.
- Funds Put to Better Use is the present value of excessive preventive maintenance cost over the next 2 years. We obtained the cost of money rate from the Postal Service's *Decision Analysis Factors* published on May 27, 2009.

[6] Unrecoverable costs that are unnecessary, unreasonable or an alleged violation of law or regulation.
[7] Funds the Postal Service could use more efficiently by implementing recommended actions.

APPENDIX D: MANAGEMENT COMMENTS

ENGINEERING

UNITED STATES POSTAL SERVICE

July 15, 2009

LUCINE M. WILLIS
DIRECTOR, AUDIT OPERATIONS
1735 NORTH LYNN STREET
ARLINGTON, VA 22209-2020

SUBJECT: Draft Audit Report – Overall Equipment Effectiveness: Delivery Bar Code Sorter (Report Number DA-AR-09-DRAFT)

We appreciate the opportunity to review and comment on the subject draft audit report. Generally, we are in concurrence with the report's recommendations and specific responses to each recommendation are below.

We agree that there are monetary findings and accept the amount noted.

Recommendation 1:

Ensure Maintenance and Operations regularly coordinate to minimize maintenance issues and improve Delivery Bar Code Sorter Overall Equipment Effectiveness.

Response:

Management agrees with this recommendation. A policy letter developed and coordinated with Network Operations, will be sent to each Vice President, Area Operations requesting each Area ensure the implementation of best practices and the continued emphasis on cross functional cooperation and communication. This will be completed by the end of August 2009.

Recommendation 2:

Require all machine operators and supervisors to have current Delivery Bar Code Sorter training.

Response:

Management agrees with this recommendation. Processing Operations provided the field with updated basic foundational DBCS training in FY 2006 and FY 2007. Field efforts are currently under way to validate DBCS operator training records. Processing Operations has committed to provide the field with the necessary information for operator training to all DBCS operators who require it. Validation of DBCS operator training is expected to be completed by December 2009.

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We do not believe this report contains any proprietary or business information that should not be publicly disclosed and do not believe there are any required exemptions under the Freedom of Information Act (FOIA). If you have questions, Michael Rogers of Maintenance Policies and Programs will monitor implementation of report recommendations and can be reached at 703-280-7078.

David E. Williams
Acting Vice President

cc: Mr. Galligan
Mr. Small
Mr. Gamache
Mr. Neri
Ms. Banks
Area Vice Presidents