February 15, 2008

WALTER O'TORMEY
VICE PRESIDENT, ENGINEERING

SUBJECT: Audit Report – Equipment Maintenance Opportunities
(Report Number DA-AR-08-002)

This report presents the results of our self-initiated audit of equipment maintenance opportunities (Project Number 07YG068DA000). Our objective was to identify opportunities to reduce preventive maintenance workhours through the U.S. Postal Service's production-based maintenance (PBM) program. The Postal Service issued PBM guidelines in December 2006 for its Advanced Facer Canceler Systems (AFCS). Engineering establishes equipment maintenance policies and Postal Service Area Operations personnel are responsible for implementing them at their respective sites nationwide. See Appendix A for additional information on this audit.

Production-Based Maintenance Program Savings Not Realized

Postal Service facilities equipped with AFCS have not implemented PBM guidelines. The facilities did not implement PBM guidelines because the Electronic Maintenance Activity Reporting & Scheduling (eMARS) system is not capable of automatically generating production-based checklists that facilitate daily maintenance routines and field maintenance personnel were reluctant to deviate from former maintenance procedures. As a result, the Postal Service incurred excessive maintenance costs of $11.6 million for the year ending December 21, 2007. Successfully implementing the tested PBM guidelines would also avoid costs of $130.1 million over the next 10 years through attrition and reduced overtime. See Appendix B for our detailed analysis of this issue.

We recommend the Vice President, Engineering:

1. Develop an automated system support solution for production-based maintenance to facilitate daily maintenance routines.

2. Re-issue Maintenance Management Order-064-06 (MMO-064-06) clarifying the Electronic Maintenance Activity Reporting & Scheduling work-around process for collecting Advanced Facer Canceling System machine throughput.

3. Provide training to field maintenance supervisors on production-based maintenance capabilities, usage, and benefits.

4. In coordination with the Senior Vice President for Operations, require site maintenance managers to adhere to MMO-064-06 requirements to implement production-based maintenance.

Management's Comments

Management agreed with our finding and our four recommendations and is taking the following actions to implement corrective measures:

- Recommendation 1 - Management stated it is presently developing an automated subsystem to facilitate daily maintenance routines within eMARS called electronic conditional based maintenance. Management is field testing this subsystem on AFCS and will implement it nationwide by May 2008.

- Recommendation 2 - Management clarified MMO-046-06 to provide a simpler means for implementing the AFCS checklists.

- Recommendation 3 - Management proposed presenting an overview of condition-based maintenance at a National Maintenance Managers Conference scheduled for May 2008 and will work with Employee Development to incorporate condition-based maintenance in training course offerings.

- Recommendation 4 - Management will discuss the importance of compliance at an upcoming Area Operations meeting.

Management agreed with the annual impact of our findings on maintenance workhours and indicated the monetary impact calculated was reasonable. Though certain factors we used differed in their calculations, the results were similar. Management noted, in some cases, the introduction of the Flats Sequencing System would offset some proposed staff reductions. In these cases, the savings would be characterized as cost avoidance.

We have included management comments, in their entirety, in Appendix D.

Evaluation of Management's Comments

Management's comments are responsive to all the recommendations. Management's actions taken or planned should correct the issues identified in the finding.

The U.S. Postal Service Office of Inspector General (OIG) considers all the 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 follow-up tracking system until the OIG provides written confirmation the recommendations can be closed.

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

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

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

Attachments

cc: William Galligan
Edward Gamache
Katherine S. Banks

APPENDIX A: ADDITIONAL INFORMATION

BACKGROUND

Preventive maintenance is the scheduled, systematic servicing of equipment necessary to maintain optimal operating conditions. Historically, management has used machine run time to determine preventive maintenance needs. PBM was developed to measure throughput of mailpieces to align the timing and extent of preventive maintenance performed with wear and tear on the machine. Since throughput of mailpieces wears parts, PBM more accurately reflects when preventive maintenance is needed, based on machine usage. PBM achieves more efficient use of maintenance hours by making more hours available for proactive maintenance and supplementing the hours needed for other equipment.

In December 2006, the Maintenance Technical Service Center issued new daily preventive maintenance guidelines[1] for the AFCS. These guidelines were the first to use PBM. Maintenance managers are to use them when preparing daily route sheets for local maintenance personnel. To more accurately reflect when preventive maintenance should be performed on other mail processing equipment, the Postal Service has published guidelines to implement PBM for additional equipment.

OBJECTIVE, SCOPE, AND METHODOLOGY

Our objective was to identify opportunities to reduce preventive maintenance workhours through the Postal Service's PBM program.

The scope of our audit was limited to the PBM program for the AFCS. To accomplish our objective, we collected daily preventive maintenance workhours for all 1,052 AFCS machines located at 254 Postal Service facilities for the period December 23, 2006, through December 21, 2007. We calculated the potential savings by comparing the daily preventive maintenance workhours with the calculated PBM workhours, which are based on machine throughput.[2] We collected the preventive hours used in our analysis from the eMARS system and collected the number of mailpieces fed from the Enterprise Data Warehouse/End-of-Run Report system. After performing initial calculations of potential savings, we contacted the Maintenance Technical Support Center to verify our methodology. The field support specialist responsible for developing the PBM program agreed with our methodology.

We also surveyed 25 maintenance managers either through site interviews or electronic surveys. The purpose of the surveys was to determine if field maintenance managers had implemented PBM and, if not, to identify the reason(s).

[1] MMO-064-06, *Operational and Preventive Maintenance Guidelines for Advanced Facer Canceller System (AFCS), Production-Based Maintenance Program*, dated December 11, 2006, requires PBM for the AFCS.
[2] MMO-064-06 defines the number of minutes required to perform daily preventive maintenance based on pieces fed.

We conducted this performance audit from September 2007 through February 2008 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 reviewed policies and procedures for internal controls and discussed our observations and conclusions with management officials on December 6, 2007, and included their comments where appropriate.

We extracted data from the Management Operating Data System (MODS) End-of-Run reports that use MODS data, and eMARS. We determined MODS data was reliable based on a prior OIG report[3] showing that MODS internal controls were generally effective and MODS data was valid and reliable at the plant level. We performed reasonableness tests of eMARS data and found data was sufficiently reliable to satisfy our audit objective.

PRIOR AUDIT COVERAGE

We did not identify any prior audits or reviews related to the objective of this audit.

[3] *Management Operating Data System* (Report Number MS-AR-07-003, dated August 21, 2007).

APPENDIX B: DETAILED ANALYSIS

Production-Based Maintenance Program Benefits Not Realized

Postal Service facilities equipped with AFCS are not using PBM to reduce maintenance costs. Nationwide data analysis of preventive maintenance workhour usage revealed excessive maintenance workhours at all 254 AFCS sites when compared to the calculated PBM workhours. Excessive workhours totaled 516,424 for the 1-year period following issuance of the PBM maintenance management order. The chart below categorizes these workhours by Postal Service area.

Chart 1 – Excessive AFCS Maintenance Workhours by Postal Service Area

Postal Service Area	Actual Preventive Maintenance Workhours	Production-Based Maintenance Workhours	Excess Preventive Maintenance Workhours	Percent Excess Preventive Maintenance Workhours
New York Metro	74,443	29,476	44,967	9%
Northeast	75,905	32,945	42,960	8%
Eastern	109,094	47,140	61,954	12%
Western	137,147	58,054	79,093	15%
Pacific	101,026	46,324	54,702	11%
Southwest	108,140	40,484	67,655	13%
Southeast	116,027	53,167	62,860	12%
Great Lakes	107,257	50,794	56,463	11%
Capital Metro	80,219	34,449	45,770	9%
Grand Total	**909,258**	**392,833**	**516,424**	**100%**

Reasons Production-Based Maintenance Was Not Implemented

We surveyed and interviewed Postal Service maintenance managers at 25 facilities to determine the reasons PBM was not implemented. Twenty-four site maintenance managers indicated they had not used PBM at all during the entire period measured. The other site manager indicated he had recently implemented PBM but had not used it for the entire period measured. The reasons for not implementing PBM were:

- eMARS does not have the capability to automatically generate production-based checklists that facilitate daily maintenance routines.
- Maintenance managers questioned the ability of PBM to maintain machines at acceptable performance levels.

While eMARS does not support PBM, the new PBM checklists can be issued without eMARS. As indicated by MMO-064-06, AFCS throughput data used to generate the production-based checklists can be obtained from readily available End-of-Run reports, which report the same data as eMARS.

Regarding the second reason, PBM procedures were thoroughly tested and validated at the maintenance technical service center in Norman, Oklahoma. PBM test results showed these procedures would enable the machines to perform at acceptable performance levels.

Impact of Not Implementing Production-Based Maintenance

The Postal Service exceeded maximum hours allowed for AFCS preventive maintenance by 516,424 for the period December 23, 2006, through December 21, 2007. We estimate the Postal Service could have saved 311,508 hours by reducing overtime used in conducting this maintenance, for a savings of $11.6 million.

In addition, implementing PBM could allow the Postal Service to eliminate 171 maintenance positions over the next 6 years through attrition. Chart 2 illustrates this potential reduction. Additionally, management could reduce overtime workhours, less an acceptable allowance of 9 percent.[4] We estimate the Postal Service could reduce 260,799 overtime hours in 2008 and 177,866 in 2009.

Chart 2 – Reduction of Maintenance Positions[5]

Fiscal Year	Excess AFCS Preventive Maintenance Workhours	Number of Maintenance Positions
2008	184,800	105
2009	79,200	45
2010	19,360	11
2011	8,800	5
2012	5,280	3
2013	3,520	2
Total	**300,960**	**171**

We estimated the Postal Service would realize a reduction of overtime hours by implementing PBM over the next 2 years and a reduction of maintenance positions through attrition over the next 10 years. As such, we are reporting $11.6 million as unrecoverable questioned costs and $130.1 million as funds put to better use in our *Semiannual Report to Congress.* (See Appendix C.)

[4] We based the 9 percent overtime allowance on the planned workhour mix (straight time, regular overtime, penalty overtime, sick leave) reported in the *Fiscal Year 2008 Final Area Expense Targets* package provided to Vice Presidents, Area Operations, on June 29, 2007.

[5] We analyzed excess workhours on a site-by-site basis to determine potential attrition. According to historical Postal Service attrition rates, on average approximately two electronic technicians (ET) full-time equivalents (FTE) per site were vacated between fiscal years (FY) 2000 through 2007. Although average historical attrition for ETs is two per year, we limited reductions to one FTE per year. One position equates to 1,760 preventive maintenance hours, hence 300,960 excess AFCS workhours/1,760 = 171 positions.

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

UNRECOVERABLE QUESTIONED COSTS (Overtime)		
Time Period	**Workhour Reduction**	**Total Cost**
Overtime AP4 FY 2007-AP3 FY 2008	311,508	**$11,612,797**

Notes

- We calculated cost avoidance using the overtime workhour reduction multiplied by the overtime rate.
- We based overtime labor rates on the Postal Service's FY 2008 published rates for an ET-08. They are 150 percent of the hourly rate.

FUNDS PUT TO BETTER USE (Full-Time Equivalents and Overtime)			
Time Period	**Workhour Reduction**	**Undiscounted Savings**	**Discounted Savings (Net Present Value)**
Overtime:			**$130,063,240**
AP4 FY2008 – AP3 FY2009	260,799	$10,004,076	
AP4 FY2009 – AP3 FY2010	177,866	$6,972,906	
Full-Time Equivalents:			
10 years (AP4 FY 2008 - AP3 FY 2018)	300,960	$141,362,365	

Notes

- We calculated cost avoidance using the workhour reduction multiplied by the fully loaded labor rate.
- We escalated labor costs at 2.2 percent.
- We calculated Net Present Value using the discount rate of 4.5 percent.
- We based fully loaded labor rates on the Postal Service's FY 2008 published rates.
- We based labor cost escalation and the discount rate on the Postal Service's Decision Analysis Factors published on December 6, 2007.

APPENDIX D: MANAGEMENT COMMENTS

WALTER O'TORMEY
VICE PRESIDENT
ENGINEERING

UNITED STATES POSTAL SERVICE.

February 1, 2008

DARRELL E. BENJAMIN, JR, DEPUTY ASSISTANT INSPECTOR GENERAL
FOR SUPPORT OPERATIONS

SUBJECT: Equipment Maintenance Opportunities (Report Number DA-AR-08-DRAFT)

This report has been reviewed and management agrees with the overall substance and conclusions of the report. There are some items that require clarification.

The report states that "historically, management has used run time to determine preventive maintenance needs". Prior to 2001, most USPS preventive maintenance (PM) was determined by calendar-based frequencies (i.e. daily, weekly, monthly, etc.) without regard to run time. At that time, preventive maintenance procedures were changed on a number of systems to be based on "A, B, C" levels of run-time. With MMO-064-06, procedures for the AFCS were further rationalized to be based on pieces processed, or Production Based Maintenance (PBM). This, in turn, is a step in the evolution to Condition Based Maintenance (CBM) where PM is based on condition of the equipment as determined by various indicators such as hours operated, pieces processed, vibration levels, sound levels, heat conditions, etc. Also, where previous preventive maintenance procedures have been task list oriented, CBM is individual task oriented. That is, each task (or small group of tasks) is triggered by a condition, whereas previously entire lists were used. Tests to convert the AFCS PM procedures to CBM are currently in process in ten pilot sites. As we implement CBM the term PBM will be obsolete.

We have reviewed the estimates of excessive maintenance work hours used for AFCS PM contained in the report and compared conclusions reached as a result of the audit with estimates made by postal managers during development of PBM. While different methodologies were used by the two groups expected results were very similar. Therefore we agree that full implementation of PBM for AFCS will provide field maintenance the opportunity to reduce approximately 500,000 AFCS work hours annually.

With regard to the cost savings cited, the notes on page seven and other places throughout the report refer to Electronic Technicians. The MMO defines the "minimum skill level" for most tasks to be Mail Processing Equipment Mechanics (MPEs) or Maintenance Mechanics. Further, the references to reduction of maintenance personnel by attrition must be tempered by the fact that some plants are currently critically short of maintenance staff and others will require additional staff as Flats Sequencing Systems (FSS) are deployed. In these cases, the savings should be characterized as cost avoidance as opposed to staff reductions.

Recommendation 1:
Develop an automated system support solution for production-based maintenance to facilitate daily maintenance routines.

Response
Management agrees that an automated system is necessary. As indicated above a system is presently in development to support CBM (not PBM). The system is a subsystem of eMARS and is called eCBM. The system is presently used for APPS equipment in the field and is being tested for utilization on AFCS equipment in ten pilot sites. It is anticipated that nationwide implementation of eCBM for AFCS will be complete by May 2008.

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Recommendation 2:
Re-issue Maintenance Management Order-064-06 (MMO-064-06) clarifying the Electronic Maintenance Activity Reporting and Scheduling work-around process for collecting Advanced Facer Canceling System machine throughput.

Response
Management agrees the MMO-046-06 required clarification. In fact, to provide needed clarification MMO-115-07 was issued on December 20, 2007 to provide a simpler means of implementing the AFCS checklists in MMO-064-06 until the eCBM system is fully functional for AFCS.

Recommendation 3:
Provide training to field maintenance supervisors on production-based maintenance capabilities, usage, and benefits.

Response
Management agrees that field maintenance managers and supervisors are critical in implementing national policy at field sites. To assist in providing field maintenance managers the requisite knowledge to properly manage new maintenance procedures an overview of condition based maintenance (not PBM) will be presented by MTSC at a National Maintenance Managers Conference scheduled for May 2008. We will also provide detailed information in MMOs and Maintenance Line articles in Quarters 2 and 3 of this fiscal year. We are also working with the National Center for Employee Development to incorporate CBM in the curriculum of relevant course offerings, including supervisor training.

Recommendation 4:
In coordination with the Senior Vice President for Operations, require site maintenance managers to adhere to MMO-064-06 requirements to implement production based maintenance.

Response
Management agrees that compliance with MMO-046-06 (as modified by MMO-115-07) is mandatory. Field compliance with this MMO will be an agenda item presented by the Manager, Maintenance Policies and Programs at an upcoming Area Manager Operations Support Meeting.

We do not believe this report contains any proprietary or business information and may be disclosed pursuant to the Freedom of Information Act.

Walter O'Tormey