



OFFICE OF INSPECTOR GENERAL

UNITED STATES POSTAL SERVICE

Package Processing Machine Capacity

Audit Report

Report Number
NL-AR-16-003

July 1, 2016





OFFICE OF INSPECTOR GENERAL

UNITED STATES POSTAL SERVICE

Highlights

Based on our projected package growth rate, we estimated that the Postal Service has sufficient package processing machine capacity through at least

[REDACTED]

Background

Strong consumer demand for goods purchased over the Internet has driven package volume growth in a declining mail market. This growth provides the U.S. Postal Service an opportunity to counter declining or stagnant mail volume. In August 2015, the Postal Service projected that package volume would grow at a minimum of [REDACTED] annually through 2020.

The Postal Service’s strategy for the increasing package volume is part of its Delivering Results, Innovation, Value, and Efficiency (DRIVE) Initiative 43. DRIVE is a management process to improve business strategy development and execution. DRIVE Initiative 43 is intended to establish a package processing network to support projected package growth.

Currently, the Postal Service uses 389 package sorting machines and manual sorting to process packages and bundles – groups of addressed pieces secured together as a unit – for delivery. The package processing machines are the Automated Parcel and Bundle Sorters (221), Automated Package Processing Systems (74), Parcel Sorting Machines (63), and Small Package Sorting Systems (31).

Our objective was to assess the Postal Service’s package processing machines’ capacity to meet current and future package and bundle volume.

What The OIG Found

The Postal Service has sufficient package processing machine capacity to meet its growing package and bundle volume through at least [REDACTED] when processing machines are operating at full operational performance levels (the rate and time at which a machine processes mail). However, during the peak (or holiday) season the Postal Service will need to continue to manually process excess package volume. The Postal Service’s operational philosophy is that it is [REDACTED]

[REDACTED]

The current staffing of package processing machines and mail arrival times does not always support full operational performance levels. The Postal Service could improve package machine performance and reduce manual package sorting by adjusting machine staffing and mail arrival schedules.

When package processing machines are operating at full operational performance levels the Postal Service should be able to process an average of about [REDACTED] packages monthly. However, based on current operational performance levels, the Postal Service processes about [REDACTED] packages monthly. In FY 2015, average monthly package volumes were about [REDACTED] packages.

Based on our projected package growth rate, we estimated that the Postal Service has sufficient package processing



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machine capacity through at least [REDACTED]. In addition, about [REDACTED] packages projected to be processed manually each month could be processed by package sorting machines operating at full operational performance levels. This would reduce annual manual processing costs by about [REDACTED] in each of the next 3 years.

What The OIG Recommended

We recommended the vice president, Network Operations, develop a plan to operate package processing machines at full operational performance levels to reduce manual mail processing and support continued package growth.

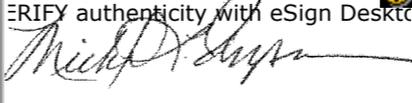
Transmittal Letter



OFFICE OF INSPECTOR GENERAL
UNITED STATES POSTAL SERVICE

July 1, 2016

MEMORANDUM FOR: ROBERT CINTRON
VICE PRESIDENT, NETWORK OPERATIONS

E-Signed by Michael Thompson
VERIFY authenticity with eSign Desktop


FROM: Michael L. Thompson
Deputy Assistant Inspector General
for Mission Operations

SUBJECT: Audit Report – Package Processing Machine Capacity
(Report Number NL-AR-16-003)

This report presents the results of our audit of the U.S. Postal Service's Package Processing Machine Capacity (Project Number 16XR001NO000).

We appreciate the cooperation and courtesies provided by your staff. If you have any questions or need additional information, please contact Margaret B. McDavid, acting director, Transportation, or me at 703-248-2100.

Attachment

cc: Corporate Audit and Response Management

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Findings

When package processing machines are operating at full operational performance levels, the Postal Service should be able to process an average of about [REDACTED] packages monthly. However, based on current operational performance levels, the Postal Service processes about [REDACTED] packages monthly.

Introduction

This report presents the results of our audit of the U.S. Postal Service's package processing machine capacity (Project Number 16XR001NO000). Our objective was to assess the Postal Service's package processing machines' capacity to meet current and future package and bundle volume. See [Appendix A](#) for additional information about this self-initiated audit.

Strong consumer demand for goods purchased over the Internet has driven package volume growth in a declining mail market, providing the Postal Service an opportunity to counter declining or stagnant mail volume. In August 2015, the Postal Service projected package volume would grow at a minimum of [REDACTED] annually through 2020.

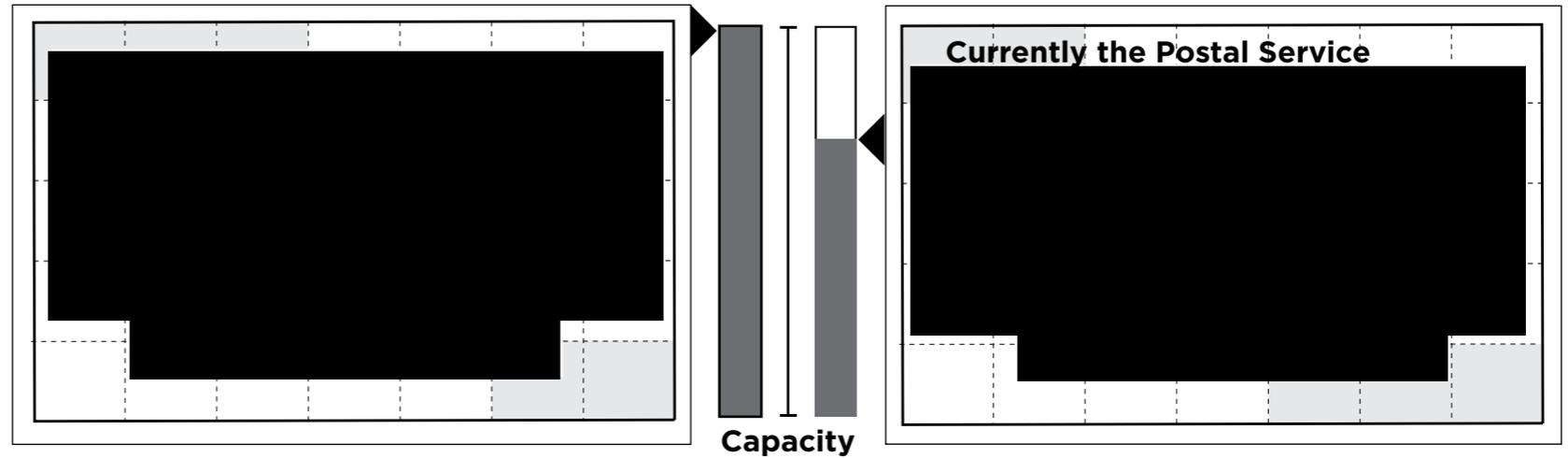
The Postal Service's package growth strategy is part of its Delivering Results, Innovation, Value, and Efficiency (DRIVE) Initiative 43. DRIVE is a management process used to improve business strategy development and execution and the Postal Service is using DRIVE 43 to build a processing network to support projected package growth.

Summary

The Postal Service has sufficient package processing machine capacity to meet its growing package and bundle volume through at least [REDACTED] when processing machines are operating at full operational performance levels (the rate at which a machine processes mail). However, during the peak (or holiday) season the Postal Service will need to continue to manually process excess package volume. The Postal Service's operational philosophy is that it is [REDACTED]. During the 2015 peak season (November 22, 2015, to January 8, 2016) the Postal Service manually processed about [REDACTED] packages.

When package processing machines are operating at full operational performance levels, the Postal Service should be able to process an average of about [REDACTED] packages monthly. However, based on current operational performance levels, the Postal Service processes about [REDACTED] packages monthly. In FY 2015, average monthly package volumes were about [REDACTED] packages.

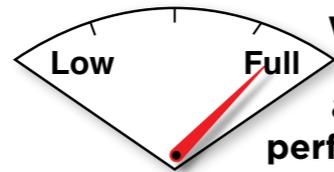
Based on our projected package growth rate, we estimated that the Postal Service has sufficient package processing machine capacity through at least [REDACTED]. In addition, about [REDACTED] packages projected to be processed manually each month could be processed by package sorting machines operating at the full operational performance levels. This would reduce annual manual processing costs by about [REDACTED] in each of the next 3 years.



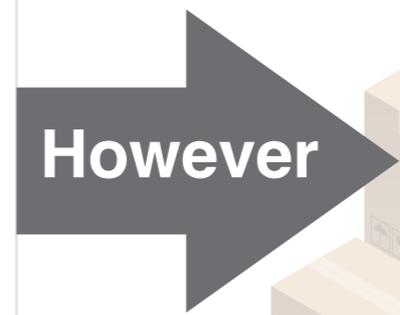
*In FY 2015, average monthly package volumes were about **627 million packages.***

The Postal Service has sufficient package processing machine capacity to meet growing package volume through at least

[Redacted]



when processing machines are operating at full operational performance levels



during the peak season the Postal Service will need to continue to manually process excess package volume.



About [Redacted] packages projected to be processed manually each month could be processed by package sorting machines operating at the full operational performance levels.

This would reduce annual manual processing costs by about

[Redacted]

in each of the next **3 years.**

Projected Package Growth Rate

During the 2015 peak season **November 22, 2015 to January 8, 2016** the Postal Service *manually* processed about

[Redacted]



Current Package Processing Machine Capacity

Our analysis shows the Postal Service has sufficient capacity to accommodate current package volume on its existing package sorting equipment. The Postal Service can process ██████████ packages a year when machines are operating at target or full operational performance levels (see Table 1). In FY 2015, the Postal Service processed about ██████████ packages, which equates to excess capacity of about ██████████ packages (██████████).

In FY 2015, the Postal Service processed about ██████████ packages, which equates to excess capacity of about ██████████ packages (██████████).

Table 1: Current Processing Machine Capacity

Processing Machine	Number of Machines	Target Throughput (per hour)	Target Runtime Goal (per hour)	Annual Capacity*
Automated Parcel and Bundle Sorter (APBS) ¹	221	██████	██	██████████
Automated Package Processing System (APPS) ²	74	██████	██	██████████
Parcel Sorting Machine (PSM) ³	63	██████	██	██████████
Small Package Sorting System (SPSS) ⁴	31	██████	██	██████████
Total	389			██████████

Source: Mail and Image Reporting System (MIRS) and the Postal Service.

*Annual capacity for the APBS, APPS, and PSM was calculated by multiplying the number of machines by the target throughput by the target runtime goal by 303 mail processing days in a year.

In FY 2015, machines actually processed just ██████████ packages (see Table 2), or about ██████████ fewer packages (██████████) than they could if operating at full operational performance levels. As a result some packages were sorted manually.

Table 2: Current Machine Actual Performance

Processing Machine	Number of Machines	Actual Throughput (per hour)	Actual Runtime (per hour)	Annual Capacity at Actual Performance Level *
APBS	221	4,238	██	██████████
APPS	74	6,638	██	██████████
PSM	63	3,380	██	██████████
SPSS	31	4,500	██	██████████
Total	389			██████████

Source: MIR and the Postal Service.

*Annual capacity for the APBS, APPS, and PSM was calculated by multiplying the number of machines by the actual throughput by the actual runtime goal by 303 mail processing days in a year.

1 An existing mail processing machine that sort parcels.

2 An existing mail processing machine that sort parcels.

3 An existing mail processing machine that sort parcels.

4 A new mail processing machine adapted to incorporate barcode reading and optical character reading capabilities for sorting packages.

We project annual package growth rates of [REDACTED] over the next 3 fiscal years based on a time-series analysis of historical package volume.

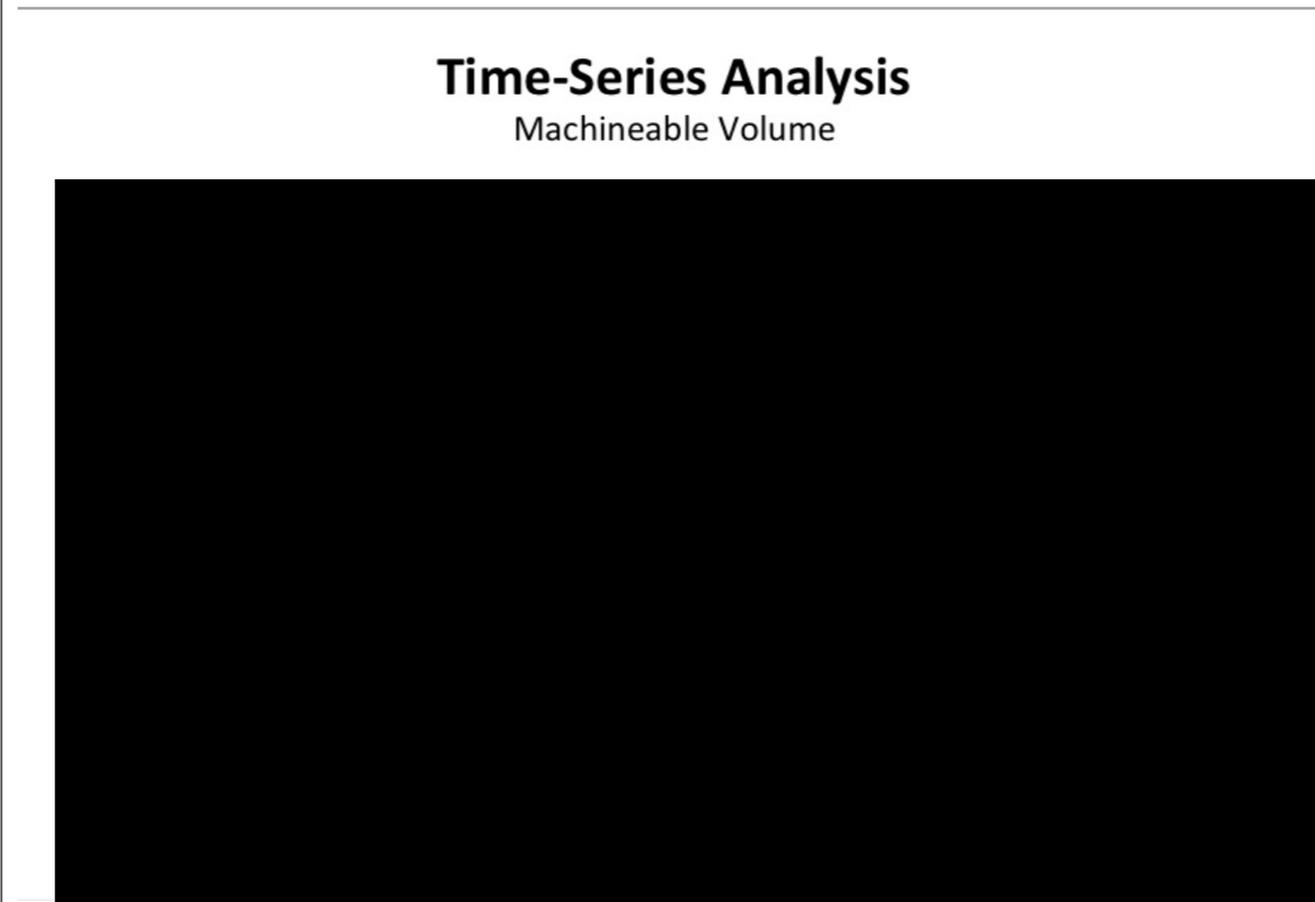
To meet future package volume growth, the Postal Service must increase use of its package processing machines through improved machine throughput and increased machine runtimes.

Future Package Processing Machine Capacity

We project annual package growth rates of [REDACTED] over the next 3 fiscal years based on a time-series analysis of historical package volume.⁵ A month-to-month analysis found that existing machines have sufficient capacity, when operating at full operational performance levels, to process all package volume for every month except during peak season through [REDACTED] 8. The Postal Service’s operational philosophy is that it is not [REDACTED] s. During the 2015 peak season (November 22, 2015 to January 8, 2016) the Postal Service manually processed about [REDACTED] packages.

However, when operating at actual performance levels, monthly capacity declines from [REDACTED] packages to [REDACTED] packages (a [REDACTED]). In FY 2015, the Postal Service processed an average of about [REDACTED] packages a month. As a result, package sorting machines were not sorting all packages and some packages were manually processed (see Figure 1).

Figure 1: Package Sorting Machine Capacities and Volume January 2013 through [REDACTED]



Source: Actual package volume obtained from WebMODS. We calculated forecasted volume using linear regression and time-series analysis.

Increase Machine Usage

To meet future package volume growth, the Postal Service must increase use of its package processing machines through improved machine throughput and increased machine runtimes.

⁵ We analyzed 35 months of historical package volume data (January 2013 through November 2015) and forecasted package volumes for that time using linear regression and time-series analysis. The 35 months covered the period December 2015 through October 2018.

About [REDACTED] packages projected to be processed manually each month could be processed by package sorting machines operating at full operational performance levels. This would reduce annual processing costs by about [REDACTED] in each of the next 3 years.

Machine Throughput

The Postal Service can maximize machine use by increasing machine throughput. For FY 2015, actual machine throughput was [REDACTED] more than planned on APBS machines and [REDACTED] and [REDACTED] less than planned on the APPS and PSM machines, respectively (see Table 3). To increase machine throughput, the Postal Service should ensure mail processing equipment is adequately staffed. Also, some smaller facilities do not have package processing equipment and rely solely on manual processing. These facilities could boost their package throughput by adding package processing equipment.

Table 3: Processing Machines Throughput — FY 2015

Processing Machine	Number of Machines	Actual Throughput	Throughput Goals	Difference
APBS	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
APPS	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
PSM	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Source: MIRS and the Postal Service.

Machine Runtime

Increasing runtime on the APBS, APPS, and PSM would also increase package processing capacity. For FY 2015, the average runtime for APBS machines was [REDACTED] a day, for APPS machines it was [REDACTED] a day, and for PSM machines it was [REDACTED] per day. The runtime goal was [REDACTED] per day (see Table 4). Ensuring mail is available at the start of the scheduled machine operating window can improve machine runtimes. Late arriving mail shortens runtimes and can cause bottlenecks and mail delays at critical times during the operating window.

Table 4: Processing Machines Runtime — Fiscal Year 2015

Processing Machine	Number of Machines	Actual Daily Runtime Hours Average	Planned Daily Runtime Hours Average	Percent Differences From Planned Daily Runtime
APBS	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
APPS	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
PSM	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Source: MIRS and the Postal Service.

Looking Forward

The Postal Service can increase its processing capabilities through improving efficiencies on existing equipment. Increasing machine throughput and runtime will enable it to move manually processed mail to the machines and address future growth in package volume. Processing packages on the package sorting machines costs the Postal Service less than processing packages manually. About [REDACTED] packages projected to be processed manually each month could be processed by package sorting machines operating at full operational performance levels. This would reduce annual processing costs by about [REDACTED] in each of the next 3 years.

Recommendation

We recommend management develop a plan to operate package processing machines at full operational performance levels in order to reduce the amount of manual processing and to support continued package growth.

We recommend the vice president, Network Operations:

1. Develop a plan to operate package processing machines at full operational performance levels in order to reduce the amount of manual processing and to support continued package growth.

Management's Comments

Management disagreed with the finding and monetary impact calculation and generally agreed with the recommendation.

Regarding the finding and related monetary impact, management stated that the methodology used to calculate the gap between actual and target performance was not fungible across distance or time and did not correctly account for new machines or the expanded use of other machines. Management stated the crux of their concern was that we aggregated all workloads across the country and compared it to the entire package processing capacity nationwide. Management stated that aggregating low-volume day capacity and assuming it is available for high-volume days is not reasonable.

Management also stated they cannot use excess capacity available at a specific site to offset demand at another location, except at a few locations. At those locations there are associated cost and service implications in moving the packages from the original location to the new plant and savings must be adjusted accordingly.

Management also stated that we erred in forecasting package growth using 35 months of historical data, indicating they have made significant investments in package processing capacity; therefore, future capacity assumption needs to reflect the end state of the capacity fleet, rather than an historical average.

Management agrees with the general goal of the recommendation and plans to maximize throughput performance on each machine. Management does not agree with the level of reduction the U.S. Postal Service Office of Inspector General (OIG) believes manual processing can achieve. The target implementation date for management's plan to maximize machine throughput is July 1, 2017.

See [Appendix B](#) for management's comments in their entirety.

Evaluation of Management's Comments

The OIG considers management's plan to maximize throughput performance on each machine responsive to the recommendation in the report.

Regarding management's disagreement with the finding and monetary impact, our analysis used an average nationwide monthly capacity. Our package volume calculations were conservative because when aggregating volumes we deducted [REDACTED] for non-machineable packages and 20 percent of total manual package volumes when manual processing was not feasible. We confirmed the reasonableness of these assumptions with the Postal Service's vice president, Finance and Planning.

We agree with management's comment that excess capacity available at a specific site cannot be used to offset demand at another location. In addition, our report did not recommend the Postal Service transport packages to other facilities for processing.

Regarding management's concern that we erred in forecasting package growth, our analysis accounts for seasonal fluctuations. Further, our projected package growth rate of [REDACTED] is conservative when compared to the Postal Service's forecasted growth rate of [REDACTED]. Also, in determining the number of package sorting machines, we used the most current data available at the time of our audit, not data from 35 months ago. We used 31 SPSS machines because the two additional SPSS machines were not fully operational at the time of our audit.

All recommendations require OIG concurrence before closure. Consequently, the OIG requests written confirmation when corrective actions are completed. The recommendation should not be closed in the Postal Service's follow-up tracking system until the OIG provides written confirmation that the recommendation can be closed.

Appendices

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Appendix A: Additional Information

Background

The growing package segment provides the Postal Service an opportunity to counter the reduction in First-Class Mail® volume and the flattening of Standard Mail® volume. Machineable package volume increased by [REDACTED] in FY 2015 from the prior year (to [REDACTED]) and is expected to grow to [REDACTED] by FY 2018.

The Postal Service's strategy for the increasing package volume is part of its DRIVE Initiative 43. DRIVE is a management process to improve business strategy development and execution and DRIVE Initiative 43 is intended to establish a package processing network to support projected package growth.

A significant number of packages are sorted manually at both processing plants and delivery units. Current reliance on these labor-intensive operations and the expectation of continued package volume growth over the next few years provide a substantial opportunity to improve package processing and delivery efficiency. According to the Postal Service, it will accomplish this by reducing manual workhours and improving service performance through deployment of new automated package sorting equipment and enhancements to existing equipment.

Objective, Scope, and Methodology

Our objective was to assess the Postal Service's package processing machine capacity to meet current and future package and bundle volume. To accomplish our objective, we:

- Calculated machine capacity based on target and actual performance levels.
- Analyzed Function 1 total pieces handled (TPH) and non-add TPH machineable package volume and capacity from January 2013 through November 2015.⁶
- Projected machineable package volume growth for 35 months using linear regression and time series analysis for the period December 2015 through October 2018.
- Used [REDACTED] of the reported MODS manual volume in performing our analysis to account for cases that require manual processing of packages.
- Deducted [REDACTED] of total machineable package volume to account for non- machineable other packages.
- Confirmed the reasonableness of our assumptions with Postal Service officials.
- Reviewed a prior OIG report to identify causes for low package sorting machine throughput and runtime.

We conducted this performance audit from November 2015 through June 2016, 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 that the evidence obtained provides a reasonable

⁶ Included bundles in total package volume as they are processed on package sorting machines. A bundle is a group of addressed pieces secured together as a unit.

basis for our findings and conclusions based on our audit objective. We discussed our observations and conclusions with management on May 19, 2016, and included their comments where appropriate.

We used computer-processed data from MIRS and WebMODS when performing our analysis. We assessed the reliability of computer-generated data by interviewing agency officials knowledgeable about the data. We determined that the data were sufficiently reliable for the purposes of this report.

Prior Audit Coverage

Report Title	Report Number	Final Report Date	Monetary Impact
<i>Package Processing Performance During the December 2014 Peak Holiday Season</i>	NO-AR-15-006	5/27/2015	None

Report Results: Our report determined that, overall, the Postal Service’s package processing improved during the December 2014 peak season. Total workload increased by 88.2 million packages and delayed packages decreased by 1.8 million compared to the previous peak season and service scores for packages increased in six of the nine package categories. While the Postal Service was successful during the December 2014 peak holiday season, opportunities exist for improvement. We recommended management enforce the segregation of Priority from First-Class Mail for commercial mailers and post offices, ensure timely installation of machines for the peak holiday season, enhance use of the automated parcel and bundle sorter and automated package processing sorter feed systems to continuously convey packages, and improve the timing and prioritization of hiring temporary employees for the next peak season. Management agreed with the recommendations.

<i>Readiness for Package Growth – Processing Capacity</i>	NO-AR-14-002	1/21/2014	None
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Report Results: Our report determined the Postal Service has sufficient machine capacity to process all non-peak period package volume at an average of about 29 million packages daily, which is more than sufficient to process the 24 million packages it receives. During the December peak period, the Postal Service augments its machine capacity with manual processing to avoid having excess machine capacity and its associated costs for the other 11 months of the year. To meet future package growth, the Postal Service could improve machine throughput by properly staffing machines and adjusting the mail arrival schedule. We recommended management ensure package processing equipment is adequately staffed, standardize package processing operations where feasible, and adjust mail arrival schedules where possible to increase the amount of mail available at the beginning of machine runs. Management agreed with the recommendations.

Appendix B: Management's Comments

ROBERT CONTRON
VICE PRESIDENT, NETWORK OPERATIONS



June 20, 2016

SHERRY FULLWOOD
ACTING DIRECTOR, AUDIT OPERATIONS

SUBJECT: Draft Audit Report – Package Processing Machine Capacity
(Report Number NL-AR-16-Draft)

Thank you for providing the Postal Service with the opportunity to review and comment on the subject draft report.

Management strongly disagrees with both the OIG's narrative analysis and finding of monetary impact. The methodology used to calculate the gap between actual performance and target performance fails to recognize that machine capacity is not fungible across distance or time. In addition the OIG's analysis did not correctly account for the recent introduction of the 33 Small Package Sorting System (SPSS) machines, or the expansion of Automated Parcel and Bundle Sorter (APBS) and Automated Package Processing System (APPS). Management does agree that it must continue to improve machine throughput and to increase machine runtimes to meet future package volume growth as it has already done through targeted investments and initiatives.

The crux of the concerns of management relate to the analysis performed by the OIG in reaching its conclusions. The OIG aggregated all workload from across the entire country and compared it to the total package processing capacity for the entire country. This method of aggregation took pockets of capacity and assumed them to be available for use for packages which were not sorted on automation. Typically excess capacity is available on lower volume days. These lower volume days are similar throughout the country. In addition, over capacity conditions typically occur on higher volume days, which are also similar days throughout the country. Therefore, aggregating excess capacity from low volume days and assuming that this is free capacity that can be utilized on high volume days is not reasonable or practical; service would not be met if volume were held awaiting this excess capacity event. In essence, the analysis performed would suggest that if volume exceeded capacity on a Tuesday, the excess capacity on a Sunday could be utilized to automate this volume.

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Similarly, excess capacity that is available at a specific site cannot be used to offset demand at another location except in a few locations, and in those locations there are cost and service implications associated with moving the packages from the original location to the new plant, so any savings must be adjusted accordingly, for example additional transportation would be required between these locations, as well as additional labor associated with loading and unloading this volume off of those trucks.

The OIG also erred in averaging performance over a period of 35 months and using this average data to forecast future trends. The Postal Service has made significant investments in package processing capacity over that time period, adding SPSS machines and expanding APPS and APBS machine capabilities. The actual and potential capacity available today is significantly greater than 35 months ago and therefore the future capacity assumption needs to be adjusted to reflect the end state of the equipment fleet, rather than the historical average.

The specific recommendation in this draft report is addressed below.

Recommendation 1:

We recommend the vice president, Network Operations:

1. Develop a plan to operate package processing machines at full operational performance levels in order to reduce the amount of manual processing and to support continued package growth.

Management Response/Action Plan:

Management agrees with the general goal of the recommendation and already has plans to maximize throughput performance on each machine. However Management does not agree with level of reduction of manual processing that can be achieved due to the limitations discussed earlier.

Target Implementation Date:

N/A

Responsible Manager:

N/A



Robert Cintron

cc: Mgr, Corporate Audit Response Management



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