

MAINTENANCE TECHNICAL SUPPORT CENTER
HEADQUARTERS MAINTENANCE OPERATIONS
UNITED STATES POSTAL SERVICE



Maintenance Management Order

SUBJECT: Mail Staging Tower (MST) Daifuku Preventive Maintenance

DATE: May 28, 2014

NO: MMO-044-14

TO: Mail Staging Tower (Daifuku) Sites

FILE CODE: TM3

pmur:mm13047ab

This Maintenance Management Order (MMO) provides Preventive Maintenance Guidelines for the Mail Staging Tower (MST). This bulletin applies to Acronym MST, Class Code DA.

The workhours indicated in the workload estimate (Attachment 1) reflect the *maximum* annual workhours required to maintain each system. Management may modify task frequencies to address local conditions.

The minimum maintenance skill level required to perform each task is included in the Minimum Skill Level column of each checklist. This does not preclude higher level employees from performing any of this work.

WARNING

Various products requiring Material Safety Data Sheets (MSDS) may be utilized during the performance of the procedures in this bulletin. Ensure the current MSDS for each product used is on file and available to all employees. When reordering such a product, it is suggested that current MSDS be requested. Refer to MSDS for appropriate personal protective equipment.

WARNING

The use of compressed or blown air is prohibited. An alternative cleaning method such as a HEPA filtered vacuum cleaner, a damp rag, lint-free cloth, or brush must be used in place of compressed or blown air.

WARNING

Steps contained in this bulletin may require the use of Personal Protective Equipment (PPE). Refer to the current Electrical Work Plan (EWP) MMO for appropriate PPE requirements.

Direct any questions or comments concerning this bulletin to the MTSC HelpDesk, online at <http://mtsc.usps.gov/apps/remedyticket/index.cfm> or call (800) 366-4123 or (405) 573-2123.



Robert E. Albert

Manager

Maintenance Technical Support Center

HQ Maintenance Operations

- Attachments
1. Summary of Workload Estimate
 2. Master Checklist 03-MST-DA-001-M – Monthly PM
 3. Master Checklist 03-MST-DA-002-M – Quarterly PM
 4. Master Checklist 03-MST-DA-003-M – Annual PM

ATTACHMENT 1

SUMMARY

WORKLOAD ESTIMATE

FOR

MST SYSTEM

**SUMMARY
WORKLOAD ESTIMATE
FOR MST**

Operation	Routine Servicing (Hrs/Yr)	Repair* (Hrs/Yr)	Total Servicing & Repair Time (Hrs/Yr)	Nonproductive Time** (Hrs/Yr)	Total Servicing Per Unit (Hrs/Yr)
Monthly	36.00	10.80	46.80	4.68	51.48
Quarterly	13.87	4.16	18.03	1.80	19.83
Annual	3.53	1.06	4.59	0.46	5.05
Totals	53.40	16.02	69.42	6.94	76.36

NOTES:

*Repair estimates based on 30% of servicing.

**Based on 10% of total servicing and repair.

NOTE

The time shown does not allow for multiple assemblies on any equipment. Should multiple assemblies exist, the time must be modified at the local level to account for those occurrences. Other unique site conditions that require additional time are also to be addressed at the local level.

ATTACHMENT 2

MST MASTER CHECKLIST

03-MST-DA-001-M

Monthly Time Total: 180 minutes

U.S. Postal Service		IDENTIFICATION									
Maintenance Checklist		WORK CODE	EQUIPMENT ACRONYM					CLASS CODE	NUMBER		TYPE
		0 3	M	S	T			D	A	0 0 1	M
Equipment Nomenclature		Equipment Model					Bulletin Filename		Occurrence		
Mail Staging Tower		Daifuku					mm13047ab		Monthly		

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

SAFETY STATEMENT	1.	<p>COMPLY WITH ALL SAFETY PRECAUTIONS. Disconnect power and apply lockouts when required by this instruction. Refer to current local lockout procedures to properly shut down and lock out this machine. Open equipment and inspect dust conditions. Check for suspicious dust or unusual debris. If any unusual substance is found notify supervisor prior to proceeding with any further action on the equipment.</p> <p>THE USE OF COMPRESSED OR BLOWN AIR IS PROHIBITED.</p> <p>When cleaning is required, an alternative cleaning method such as a HEPA filtered vacuum cleaner or a damp rag must be used in place of compressed or blown air. A lint-free cloth or brush may be used on optical equipment only when other cleaning methods cannot be used. Report safety deficiencies to your supervisor immediately upon detection.</p> <p>WARNING FOR EWP/PPE: Steps contained in this bulletin may require the use of Personal Protective Equipment (PPE). Refer to the current Electrical Work Plan (EWP) MMO for appropriate PPE requirements.</p>	3	All			
		<p style="text-align: center;">WARNING</p> <p>When the inspection procedure requires turning on power to the staging unit, confirm in advance that no one except the person(s) performing the inspection is near the staging crane.</p>					
		<p style="text-align: center;">WARNING</p> <p>Never step under, over, or on the staging crane when operating the vertical travel drive motor. Do not allow anyone to ride on the staging crane.</p>					

U.S. Postal Service Maintenance Checklist	IDENTIFICATION													
	WORK CODE		EQUIPMENT ACRONYM						CLASS CODE		NUMBER			TYPE
	0	3	M	S	T					D	A	0	0	1
Equipment Nomenclature Mail Staging Tower		Equipment Model Daifuku						Bulletin Filename mm13047ab			Occurrence Monthly			

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

		WARNING					
		Be cautious when working around or on equipment when power has been applied.					
ERROR LOGS	2.	<p>Review Staging Unit Error Logs.</p> <p style="text-align: center;">NOTE</p> <p>Prior to performing any maintenance on the staging unit, review the error log history file on the cell controller to determine if there have been any persistent or significant problems occurring in the last several days.</p> <p>At the cell controller:</p> <ol style="list-style-type: none"> Click the Stop button, and then the Extended Function button on the Monitoring screen. Click the Error Log button on the Extended Function screen. On the Error Log screen, select a Start Date at least seven days prior to the current date. Leave the End Date set at the current date and the Device Name set at "All Device". Click the Set button on the Error Log Screen. Review the displayed errors using the Page Up and Page Down keys. Take note of any recurring or major problems that warrant further investigation during the inspection procedures. After reviewing the error log, click the Exit button on the Error Display screen. Click the Exit button on the Error Log screen. Click the Exit button on the Extended Function screen to return to the Monitoring screen. Report discrepancies to supervisor. 	6	9			

U.S. Postal Service		IDENTIFICATION										
Maintenance Checklist		WORK CODE	EQUIPMENT ACRONYM				CLASS CODE		NUMBER		TYPE	
		0 3	M	S	T			D	A	0	0	1
Equipment Nomenclature		Equipment Model				Bulletin Filename			Occurrence			
Mail Staging Tower		Daifuku				mm13047ab			Monthly			

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

VERTICAL TRAVEL DRIVE UNIT	3.	<p>Observe Vertical Travel Drive Unit.</p> <div style="border: 1px solid black; padding: 2px; text-align: center; width: fit-content; margin: 0 auto;">WARNING</div> <p>Following observations are to be made from outside the safety fence while the staging unit is still in operation.</p> <p style="text-align: center;">NOTE</p> <p>At least 30 minutes of prior operation is recommended to ensure an accurate temperature reading.</p> <ol style="list-style-type: none"> 1. Listen for any unusual noises from the vertical travel drive motor. 2. Observe the vertical travel drive motor for any signs of looseness, bearing failure, or other damage. Pay particular attention to the mounting bolts. 3. Using a non-contact infrared thermometer, measure the surface temperature of the vertical travel drive motor. <p style="text-align: center;">NOTE</p> <p>The measured temperature should not exceed the ambient air temperature plus 40 °C (~ 72 °F). For example, if the ambient air temperature is 25 °C (77 °F), the surface temperature on the motor should not exceed 65 °C (149 °F). [25 + 40 = 65 °C] or [77 + 72 = 149 °F]</p> <ol style="list-style-type: none"> 4. Listen for any unusual noises from the vertical travel drive pulley. 5. Observe the vertical travel drive pulley for any signs of looseness or other damage. Check to ensure the pulley is not off center. 6. Observe the vertical travel lift wires as they wrap and unwrap from the drive pulley and the upper idler pulleys to ensure uniform placement and no binding. 7. Listen for any unusual noises from the vertical travel drive encoder. 	3	9			
----------------------------	----	--	---	---	--	--	--

U.S. Postal Service		IDENTIFICATION									
Maintenance Checklist		WORK CODE	EQUIPMENT ACRONYM					CLASS CODE	NUMBER		TYPE
		0 3	M	S	T			D	A	0 0 1	M
Equipment Nomenclature		Equipment Model					Bulletin Filename		Occurrence		
Mail Staging Tower		Daifuku					mm13047ab		Monthly		

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

		8. Report discrepancies to supervisor.					
HORIZONTAL TRAVEL DRIVE UNIT	4.	<p>Observe Horizontal Travel Drive Unit.</p> <div style="border: 1px solid black; padding: 2px; text-align: center; width: fit-content; margin: 0 auto;">WARNING</div> <p>Following observations are to be made from outside the safety fence while the staging unit is still in operation.</p> <ol style="list-style-type: none"> Listen for any unusual noises from the horizontal travel drive motor. Observe the horizontal travel drive motor for any signs of looseness, bearing failure, or other damage. <p style="text-align: center;">NOTE</p> <p>At least 30 minutes of prior operation is recommended to ensure an accurate temperature reading.</p> <ol style="list-style-type: none"> Using a non-contact infrared thermometer, measure the surface temperature of the horizontal travel drive motor. <p style="text-align: center;">NOTE</p> <p>The measured temperature should not exceed the ambient air temperature plus 40 °C (~ 72 °F). For example, if the ambient air temperature is 25 °C (77 °F), the surface temperature on the motor should not exceed 65 °C (149 °F). [25 + 40 = 65 °C] or [77 + 72 = 149 °F]</p> <ol style="list-style-type: none"> Listen for any unusual noises from the horizontal travel drive pulley and take-up pulley. Observe the horizontal travel drive pulley and take-up pulley for any signs of looseness, bearing failure, or other damage. Ensure the pulleys have no lateral oscillations. Observe the horizontal travel drive belt for any tracking problems or excessive slack. Listen for any unusual noises from the 	3	9			

U.S. Postal Service		IDENTIFICATION									
Maintenance Checklist		WORK CODE	EQUIPMENT ACRONYM					CLASS CODE	NUMBER		TYPE
		0 3	M	S	T			D	A	0 0 1	M
Equipment Nomenclature		Equipment Model					Bulletin Filename		Occurrence		
Mail Staging Tower		Daifuku					mm13047ab		Monthly		

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

		horizontal travel drive encoder.					
		8. Report discrepancies to supervisor.					
CARRIAGE	5.	<p>Observe Carriage Operation.</p> <div style="border: 1px solid black; padding: 2px; text-align: center; width: fit-content; margin: 0 auto;">WARNING</div> <p>Following observations are to be made from outside the safety fence while the staging unit is still in operation.</p> <ol style="list-style-type: none"> Listen for any unusual noises from the conveyor drive motor, sprockets, drive chains or driven gears. Observe the conveyor drive motor for any signs of looseness, bearing failure, or other damage. Listen for any unusual noises from the lifting motor, support bearings, or the rack and pinion gears. Observe the lifting motor for any signs of looseness, bearing failure, or other damage. <p style="text-align: center;">NOTE</p> <p>At least 30 minutes of prior operation is recommended to ensure an accurate temperature reading.</p> <ol style="list-style-type: none"> Using a non-contact infrared thermometer, measure the surface temperature of the conveyor drive motor and the lifting motor. <p style="text-align: center;">NOTE</p> <p>The measured temperature should not exceed the ambient air temperature plus 40 °C (~ 72 °F). For example, if the ambient air temperature is 25 °C (77 °F), the surface temperature on the motor should not exceed 65 °C (149 °F). [25 + 40 = 65 °C] or [77 + 72 = 149 °F]</p> <ol style="list-style-type: none"> Report discrepancies to supervisor. 	3	9			

U.S. Postal Service		IDENTIFICATION											
Maintenance Checklist		WORK CODE		EQUIPMENT ACRONYM				CLASS CODE		NUMBER		TYPE	
		0	3	M	S	T				D	A	0	0
Equipment Nomenclature		Equipment Model				Bulletin Filename			Occurrence				
Mail Staging Tower		Daifuku				mm13047ab			Monthly				

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

SHUTTLE	6.	<p>Observe Shuttle Operation.</p> <div style="border: 1px solid black; padding: 2px; text-align: center;">WARNING</div> <p>Following observations are to be made from outside the safety fence while the staging unit is still in operation.</p> <ol style="list-style-type: none"> Listen for any unusual noises from the shuttle servomotor, drive gears, sprockets, or drive chains. Observe the shuttle operation for any signs of looseness, bearing failure, or other damage. Observe that the shuttle fork moves freely without binding and returns to the center position. Report discrepancies to supervisor. 	3	9			
STAGING CRANE	7.	<p>Position Staging Crane for Cleaning and Inspection.</p> <div style="border: 1px solid black; padding: 2px; text-align: center;">CAUTION</div> <p>For equipment protection, always visually check the position of the staging crane and shuttle fork when operating the crane or shuttle using the maintenance unit. When not possible to visually check the crane and shuttle position, extreme caution must be used when operating the crane or shuttle.</p> <p>Using the hand held maintenance unit, position the staging crane at a comfortable working height to allow cleaning and inspection. Report discrepancies to supervisor.</p>	3	9			
	8.	<p>Lock Out Power.</p> <div style="border: 1px solid black; padding: 2px; text-align: center;">WARNING</div> <p>Before performing the following steps you must don the appropriate PPE as required by the current Electrical Work Plan (EWP) MMO.</p>	2	All			

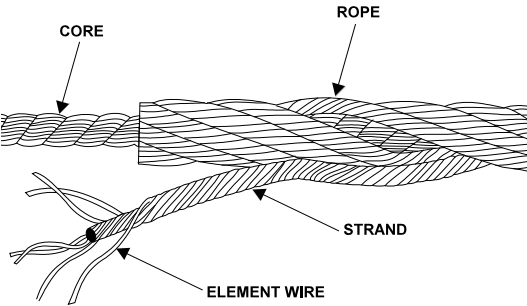
U.S. Postal Service		IDENTIFICATION										
Maintenance Checklist		WORK CODE	EQUIPMENT ACRONYM					CLASS CODE	NUMBER			TYPE
		0 3	M	S	T			D	A	0	0	1
Equipment Nomenclature		Equipment Model					Bulletin Filename			Occurrence		
Mail Staging Tower		Daifuku					mm13047ab			Monthly		

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

		<p style="text-align: center;">WARNING</p> <p>With the staging controller disconnect open, 480VAC still exists on the line side of the disconnect.</p> <p>Power down the staging unit by placing the ON/OFF switch on the staging controller in the OFF position and install a LOCKOUT/TAGOUT device.</p>					
	9.	<p>Secure Staging Crane Mask.</p> <p style="text-align: center;">WARNING</p> <p>Place the jack stands directly below the staging crane mask and raise the stands until they are just below the mask with minimal clearance. Do not attempt to support the weight of the mask with the jack stands or the vertical travel lift wires will unwrap from the vertical travel drive pulley.</p> <p>Place two 4-ton adjustable jack stands under the staging crane mask as a safety precaution to prevent the mask from falling in the unlikely event of a component failure during cleaning and inspection. Position one stand at each end allowing for ease of maintenance. Report discrepancies to supervisor.</p>	6	All			
VERTICAL TRAVEL DRIVE UNIT	10.	<p>Check Vertical Travel Drive Unit.</p> <ol style="list-style-type: none"> 1. Remove the vertical travel drive motor cover. 2. Check the vertical travel drive motor for excessive wear, bearing failure, or other signs of damage. 3. Check the vertical travel drive motor for oil leakage. 4. Check the vertical travel drive pulley for excessive wear or other signs of damage. 5. Check the drive pulley (winding drum) mounting bolts and end plate for looseness. Tighten as necessary. 	8	7			

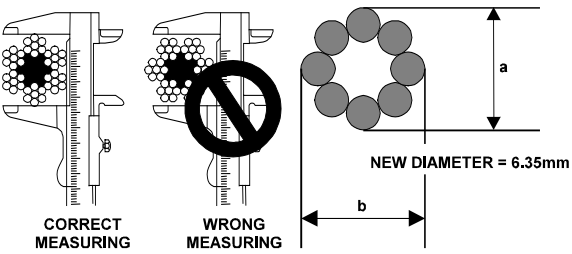
U.S. Postal Service		IDENTIFICATION											
Maintenance Checklist		WORK CODE		EQUIPMENT ACRONYM				CLASS CODE		NUMBER		TYPE	
		0	3	M	S	T				D	A	0	0
Equipment Nomenclature		Equipment Model				Bulletin Filename				Occurrence			
Mail Staging Tower		Daifuku				mm13047ab				Monthly			

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

		<p>6. Check the vertical travel encoder for excessive wear, bearing failure, cracks, or other signs of damage.</p> <p>7. Check all mounting brackets, bolts, and associated hardware for cracks, looseness or other signs of damage.</p> <p>8. Report discrepancies to supervisor.</p>					
VERTICAL TRAVEL LIFT WIRES	11.	<p>Inspect Vertical Travel Lift Wires.</p> <p>NOTE</p> <p>Be sure to inspect all lift wires, including the counterweight. Pay particular attention to the portions of lift wire that pass through the upper idler pulleys.</p>  <p>Figure 1. Vertical Travel Lift Wire</p> <p>1. Inspect the vertical travel lift wires for broken strands or other signs of damage.</p> <p>NOTE</p> <p>The standard diameter for a new lift wire is 6.35 mm. The minimum acceptable diameter is 5.9 mm. Measure the lift wire diameter by applying calipers to various sections of the lift wire, particularly the sections that pass through the upper idler pulleys.</p> <p>2. Using calipers, as shown in Figure 2, measure the diameter of the lift wires at the highest wear points and ensure that the</p>	24	9			

U.S. Postal Service Maintenance Checklist	IDENTIFICATION													
	WORK CODE		EQUIPMENT ACRONYM					CLASS CODE		NUMBER			TYPE	
	0	3	M	S	T					D	A	0	0	1
Equipment Nomenclature Mail Staging Tower		Equipment Model Daifuku					Bulletin Filename mm13047ab			Occurrence Monthly				

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

		<p>diameter is not less than 5.9mm.</p> <p>3. Check to ensure the lift wires are not kinked, deformed, or corroded.</p> <p>4. Evidence of any broken strands or a diameter less than 5.9 mm (~0.232 inches) necessitates replacement of the lift wire.</p>  <p>Figure 2. Correct Method for Measuring Vertical Travel Lift Wires</p> <p>NOTE</p> <p>The lift wire should be replaced when the vertical travel brake count exceeds 2,000,000 cycles for the lift wire in question or the lift wire has been in use for more than three years. Refer to the appropriate maintenance documentation for procedures on reading the vertical travel brake count using the hand held maintenance unit.</p> <p>5. Re-install the vertical travel drive motor cover.</p> <p>6. Report discrepancies to supervisor.</p>					
HORIZONTAL TRAVEL DRIVE UNIT	12.	<p>Check Horizontal Travel Drive Unit.</p> <p>1. Remove the horizontal travel drive motor, take-up pulley and encoder covers.</p> <p>2. Check the horizontal travel drive motor for excessive wear, bearing failure, or other signs of damage.</p> <p>3. Check the horizontal travel drive pulley and take-up pulley for excessive wear, looseness,</p>	8	7			

U.S. Postal Service		IDENTIFICATION												
Maintenance Checklist		WORK CODE		EQUIPMENT ACRONYM					CLASS CODE		NUMBER		TYPE	
		0	3	M	S	T				D	A	0	0	1
Equipment Nomenclature		Equipment Model					Bulletin Filename			Occurrence				
Mail Staging Tower		Daifuku					mm13047ab			Monthly				

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

		bearing failure, or other signs of damage. 4. Check the horizontal travel encoder for excessive wear, bearing failure, cracks, or other signs of damage. 5. Check all mounting brackets, bolts, and associated hardware for cracks, looseness, or other signs of damage. 6. Report discrepancies to supervisor.					
HORIZONTAL TRAVEL DRIVE BELT	13.	Inspect Horizontal Travel Drive Belt. 1. Inspect the horizontal travel drive belt for excessive wear or other signs of damage. Check for the following conditions: a. Tooth wear – Canvas fibers on tooth becoming fluffy, rubber layer worn down and faded white, or canvas texture becoming dim or unclear due to over tensioning. b. Tooth shear – Broken teeth or cracks formed in tooth roots due to jammed pulleys, mechanical interference, or improper installation. c. Side wear – Belt edges rounded off and core fibers (wicks) exposed and frayed due to improper tracking, worn drive pulleys, or interference with belt covers. d. Partial cuts – Cuts formed by engaging foreign substances or improper installation. e. Back surface sticky / soft – Stickiness or softening of the belt back surface may have occurred from oil contamination or dirt adherence to the belt. f. Back surface cracked / worn - Cracks formed on the belt back surface due to high or low temperature extremes. 2. Check the horizontal travel drive belt for proper tension.	8	9			

U.S. Postal Service		IDENTIFICATION											
Maintenance Checklist		WORK CODE	EQUIPMENT ACRONYM					CLASS CODE		NUMBER			TYPE
		0 3	M	S	T				D	A	0	0	1
Equipment Nomenclature		Equipment Model					Bulletin Filename			Occurrence			
Mail Staging Tower		Daifuku					mm13047ab			Monthly			

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

		<ol style="list-style-type: none"> 3. Reinstall the horizontal travel drive motor, take-up pulley, and encoder covers. 4. Report discrepancies to supervisor. 					
STAGING CRANE VERTICAL TRAVEL GUIDE ROLLERS	14.	<p>Check Staging Crane Vertical Travel Guide Rollers.</p> <p>Check the vertical travel guide rollers on each end of the staging crane (12 total) for excessive wear, looseness, bearing failure, rubber separation, or other signs of damage. Report discrepancies to supervisor.</p>	6	7			
CARRIAGE AND SHUTTLE	15.	<p>Clean Carriage and Shuttle.</p> <ol style="list-style-type: none"> 1. Lower the cover on the bottom of the carriage assembly. 2. Remove the shuttle side cover(s). 3. Check for loose mail. 4. When cleaning is required, an alternative cleaning method such as a HEPA filtered vacuum cleaner, a damp cloth, lint-free cloth or brush, must be used in place of compressed or blown air. Report safety deficiencies to your supervisor immediately upon detection. 5. Report discrepancies to supervisor. 	8	7			
CARRIAGE MOTORS AND DRIVE GEARS	16.	<p>Check Carriage Motors and Drive Gears.</p> <ol style="list-style-type: none"> 1. Check the conveyor drive motor for excessive wear, bearing failure, or other signs of damage. 2. Check the conveyor drive chains, sprockets and driven gears for excessive wear, looseness, bearing failure, or other signs of damage. 3. Check the lifting motor, support bearings, and rack and pinion gears for excessive wear, bearing failure, cracks, or other signs of damage. 4. Check the vertical LM guide bearings for 	8	7			

U.S. Postal Service		IDENTIFICATION											
Maintenance Checklist		WORK CODE		EQUIPMENT ACRONYM				CLASS CODE		NUMBER		TYPE	
		0	3	M	S	T				D	A	0	0
Equipment Nomenclature		Equipment Model				Bulletin Filename				Occurrence			
Mail Staging Tower		Daifuku				mm13047ab				Monthly			

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

		<p>excessive wear, looseness, or other signs of damage.</p> <p>5. Check all mounting brackets, bolts and associated hardware for cracks, looseness, or other signs of damage.</p> <p>6. Report discrepancies to supervisor.</p>					
CARRIAGE SUPPORT / GUIDE ROLLERS	17.	<p>Check Carriage Support / Guide Rollers.</p> <p>Check the carriage main support (4 total) and side / lower guide rollers (8 total) on the underside of the carriage for excessive wear, looseness, bearing failure, rubber separation, or other signs of damage. Report discrepancies to supervisor.</p>	4	7			
CARRIAGE TRAVELING DETECTORS AND LIMIT SWITCH	18.	<p>Clean and Check Carriage Traveling Detectors and Limit Switch.</p> <p style="text-align: center;">NOTE</p> <p>The carriage traveling detectors (4 each) are U-shaped photoelectric switches located on the underside of the carriage.</p> <p>1. Check to ensure the photo sensors are securely fastened and not visibly damaged.</p> <p>2. Using a damp cloth, clean the sensor exterior and the emitter and receiver windows.</p> <p>3. Check for proper alignment.</p> <p>4. Check to ensure the carriage limit switch is secure and not visibly damaged. Pay particular attention to the roller on the actuating arm.</p> <p>5. Ensure all electrical connections are tight and the lead wires are not frayed or broken.</p> <p>6. Report discrepancies to supervisor.</p>	3	7			

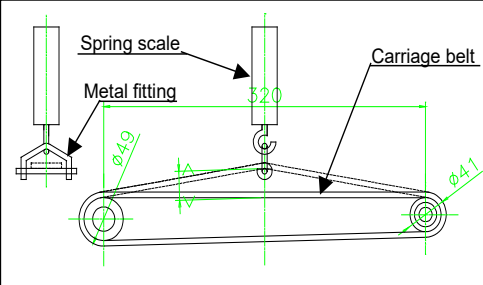
U.S. Postal Service		IDENTIFICATION										
Maintenance Checklist		WORK CODE	EQUIPMENT ACRONYM					CLASS CODE	NUMBER			TYPE
		0 3	M	S	T			D	A	0	0	1
Equipment Nomenclature		Equipment Model					Bulletin Filename			Occurrence		
Mail Staging Tower		Daifuku					mm13047ab			Monthly		

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

CARRIAGE PHOTO SENSORS	19.	<p>Clean and Check Carriage Photo Sensors.</p> <p>NOTE</p> <p>The carriage photo sensors are a combination of several different photoelectric switches and reflectors located on the topside of the carriage.</p> <ol style="list-style-type: none"> 1. Check to ensure the photo sensors are securely fastened and not visibly damaged. 2. Using a damp cloth, clean the sensor exteriors and emitter and receiver windows. 3. Check to ensure the photo sensor reflectors are secure, clean, and properly aligned. 4. Ensure all electrical connections are tight and the lead wires are not frayed or broken. 5. Check all mounting hardware for looseness. Tighten as necessary. 6. Report discrepancies to supervisor. 	4	7			
CARRIAGE BELTS	20.	<p>Inspect Carriage Belts.</p> <ol style="list-style-type: none"> 1. Inspect the carriage conveyor belts for excessive wear or other signs of damage. Check for the following conditions: <ol style="list-style-type: none"> a. Tooth wear – Canvas fibers on tooth becoming fluffy, rubber layer worn down and faded white, or canvas texture becoming dim or unclear due to over tensioning. b. Tooth shear – Broken teeth or cracks formed in tooth roots due to jammed pulleys, mechanical interference, or improper installation. c. Side wear – Belt edges rounded off and core fibers (wicks) exposed and frayed due to improper tracking, worn drive pulleys, or interference with belt covers. d. Partial cuts – Cuts formed by engaging foreign substances or improper installation. 	8	9			

U.S. Postal Service		IDENTIFICATION									
Maintenance Checklist		WORK CODE	EQUIPMENT ACRONYM					CLASS CODE	NUMBER		TYPE
		0 3	M	S	T			D	A	0 0 1	M
Equipment Nomenclature		Equipment Model					Bulletin Filename		Occurrence		
Mail Staging Tower		Daifuku					mm13047ab		Monthly		

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

		<p>e. Back surface sticky / soft – Stickiness or softening of the belt back surface may have occurred from oil contamination or dirt adherence to the belt.</p> <p>f. Back surface cracked / worn - Cracks formed on the belt back surface due to high or low temperature extremes.</p> <p>2. Check the carriage conveyor belts for proper tension using the following procedure.</p> <p>a. Raise the center of the carriage belt using a spring scale and metal fitting (to ensure uniform distribution) as shown in Figure 3.</p> <p>b. Measure the distance the belt rises when the spring scale measures 1.0 kg (35.3 ounces).</p> <p>c. If the distance is more than 5 mm (~ 3/16”), the belt needs to be tightened.</p> <p>3. Report discrepancies to supervisor.</p>					
							
		<p>Figure 3. Carriage Conveyor Belt Tensioning</p> <p>NOTE</p> <p>Replacement of the carriage belt is recommended every three years or 1,500,000 cycles of operation. Refer to the appropriate maintenance documentation for procedures on determining the carriage belt cycles of operation using the hand held maintenance unit.</p>					

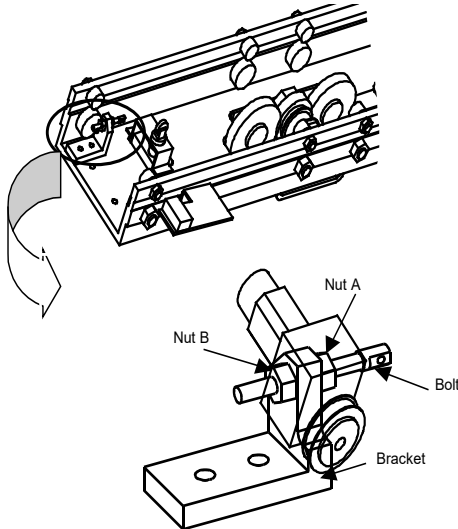
U.S. Postal Service		IDENTIFICATION										
Maintenance Checklist		WORK CODE	EQUIPMENT ACRONYM				CLASS CODE		NUMBER		TYPE	
		0 3	M S T				D A	0 0 1	M			
Equipment Nomenclature		Equipment Model				Bulletin Filename			Occurrence			
Mail Staging Tower		Daifuku				mm13047ab			Monthly			

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

SHUTTLE MOTOR AND DRIVE GEARS	21.	<p>Check Shuttle Motor and Drive Gears.</p> <p>NOTE</p> <p>Manually extend the primary shuttle fork to the full left and to the full right positions to complete the following inspections.</p> <ol style="list-style-type: none"> 1. Check the shuttle servomotor for excessive wear, bearing failure, or other signs of damage. 2. Check the shuttle drive gears for excessive wear, looseness, bearing failure, or other signs of damage. 3. Check all mounting brackets, bolts, and associated hardware for cracks, looseness, or other signs of damage. 4. Report discrepancies to supervisor. 	6	7			
SHUTTLE CHAINS	22.	<p>Inspect Shuttle Chains.</p> <p>NOTE</p> <p>Manually extend the primary shuttle fork to the full left and to the full right positions to complete the following inspections.</p> <ol style="list-style-type: none"> 1. Check the shuttle chains for excessive wear, twists, or other abnormalities. 2. Check the shuttle chain sprockets for excessive wear, looseness, bearing failure, or other signs of damage. 3. Check to ensure the master link C-clips are securely attached. 4. Check to ensure the chain adjustment nuts (A and B) are securely fastened. See Figure 4. 5. Check the shuttle chains for proper tension. Both chains should have equal tension when the shuttle fork returns to the center position. 6. Check to ensure the chain adjustment bolts have not reached their limits. 	4	9			

U.S. Postal Service Maintenance Checklist	IDENTIFICATION													
	WORK CODE		EQUIPMENT ACRONYM					CLASS CODE		NUMBER			TYPE	
	0	3	M	S	T					D	A	0	0	1
Equipment Nomenclature Mail Staging Tower		Equipment Model Daifuku					Bulletin Filename mm13047ab			Occurrence Monthly				

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

		<p>7. Check the chains for light lubrication. If necessary, use a slight amount of Extra Heavy DTE oil by Mobil to lubricate the chains.</p>  <p>Figure 4. Shuttle Chain Adjustment Nuts</p> <p>8. Report discrepancies to supervisor.</p>					
SHUTTLE CAM FOLLOWERS AND GUIDE TRACKS	23.	<p>Clean and Check Shuttle Cam Followers and Guide Tracks.</p> <p>NOTE</p> <p>Manually extend the primary shuttle fork to the full left and to the full right positions to complete the following inspections.</p> <ol style="list-style-type: none"> 1. Check to ensure the cam followers rotate smoothly when turning them by hand. 2. Clean and check the shuttle guide tracks for damage or foreign materials. 3. Report discrepancies to supervisor. 	4	7			

U.S. Postal Service		IDENTIFICATION									
Maintenance Checklist		WORK CODE	EQUIPMENT ACRONYM					CLASS CODE	NUMBER	TYPE	
		0 3	M	S	T			D	A	0 0 1	M
Equipment Nomenclature		Equipment Model					Bulletin Filename		Occurrence		
Mail Staging Tower		Daifuku					mm13047ab		Monthly		

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

SHUTTLE LIMIT SWITCH	24.	<p>Check Shuttle Limit Switch.</p> <ol style="list-style-type: none"> 1. Check the shuttle limit switch plunger for smooth up and down operation. 2. Check to ensure the limit switch actuating roller turns smoothly. <p style="text-align: center;">WARNING</p> <p>Discard or dispose of chemical soaked materials according to MSDS and in accordance with local procedures.</p> <ol style="list-style-type: none"> 3. If necessary, clean the limit switch plunger and/or roller with alcohol. 4. Reinstall the carriage and shuttle side covers. 5. Report discrepancies to supervisor. 	2	7			
STAGING BINS AND SUPPORT TRUSSES	25.	<p>Check Staging Bins and Support Trusses.</p> <ol style="list-style-type: none"> 1. Check the staging bins to ensure they are not bent or damaged. 2. Check to ensure all staging bins are level. 3. Remove any foreign materials or loose mail from the staging bins. 4. Check the support trusses to ensure they are not bent or damaged. 5. Report discrepancies to supervisor. 	14	7			
INPUT / OUTPUT / REJECT CONVEYORS	26.	<p>Check Input / Output / Reject Conveyors.</p> <ol style="list-style-type: none"> 1. Check drive rollers, idler rollers, and O-rings belts for excessive wear, torn or rough edges, or any visible damage. 2. Replace the O-ring belts if there are any signs of slippage. Pay particular attention to the input conveyor. 3. Report discrepancies to supervisor. 	6	7			

U.S. Postal Service		IDENTIFICATION											
Maintenance Checklist		WORK CODE		EQUIPMENT ACRONYM				CLASS CODE		NUMBER			TYPE
		0	3	M	S	T				D	A	0	0
Equipment Nomenclature		Equipment Model				Bulletin Filename				Occurrence			
Mail Staging Tower		Daifuku				mm13047ab				Monthly			

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

PHOTO SENSORS / REFLECTORS	27.	<p>Clean and Check Input / Output / Reject Conveyor Photo Sensors / Reflectors.</p> <ol style="list-style-type: none"> 1. Check to ensure the photo sensors and associated reflectors are securely fastened and not visibly damaged. 2. Ensure all electrical connections are tight. 3. Using a damp cloth clean the sensor exterior, emitter window, and associated reflector. 4. Check photo cell alignment. 5. Report discrepancies to supervisor. 	6	7			
INPUT CONVEYOR STOP PLATE	28.	<p>Check Input Conveyor Stop Plate.</p> <p>Check the input conveyor stop plate for excessive wear, looseness, solenoid failure, frayed or broken wires, or other signs of damage. Report discrepancies to supervisor.</p>	2	7			
MAINTENANCE UNIT	29.	<p>Check Maintenance Unit.</p> <ol style="list-style-type: none"> 1. Check for physical damage to the maintenance unit. 2. Check for damage to the maintenance unit wiring. 3. Check for damage to the box that holds the maintenance unit. 4. Check for damage to the status indicator light. 5. Check for damage to the key-lock switch. 6. Check for damage to the emergency stop push button. 7. Report discrepancies to supervisor. 	3	7			
STAGING CRANE	30.	<p>Unsecure Staging Crane Mask.</p> <p>Remove the two 4-ton adjustable jack stands that were placed under the staging crane mask. Remove all tools, lubricants, rags, etc., from inside the staging unit. Report discrepancies to supervisor.</p>	6	All			

U.S. Postal Service		IDENTIFICATION										
Maintenance Checklist		WORK CODE	EQUIPMENT ACRONYM					CLASS CODE	NUMBER			TYPE
		0 3	M	S	T			D	A	0	0	1
Equipment Nomenclature		Equipment Model					Bulletin Filename			Occurrence		
Mail Staging Tower		Daifuku					mm13047ab			Monthly		

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

		<div style="border: 1px solid black; padding: 2px; display: inline-block;">WARNING</div> Be cautious when working around or on equipment when power has been applied.					
	31.	Restore Equipment To Service. <div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">WARNING</div> Before performing the following steps you must don the appropriate PPE as required by the current Electrical Work Plan (EWP) MMO. </div> Restore electrical power by removing your LOCKOUT/TAGOUT device and placing the ON/OFF switch on the staging controller in the "ON" position. Ensure the mode selection key switch is in the ON-LINE position. Reset any faults and return the staging unit to operational status.	3	All			
CLEAN UP	32.	Clean Up. Ensure all tools, lubricants, rags, etc., are removed from the work area. Report all deficiencies to your supervisor.	3	All			

ATTACHMENT 3

MST MASTER CHECKLIST

03-MST-DA-001-M

Quarterly Maintenance

Quarterly Time Total: 208 minutes

U.S. Postal Service		IDENTIFICATION											
Maintenance Checklist		WORK CODE		EQUIPMENT ACRONYM				CLASS CODE		NUMBER		TYPE	
		0	3	M	S	T				D	A	0	0
Equipment Nomenclature		Equipment Model				Bulletin Filename				Occurrence			
Mail Staging Tower		Daifuku				mm13047ab				Quarterly			

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

SAFETY STATEMENT	1.	<p>COMPLY WITH ALL SAFETY PRECAUTIONS. Disconnect power and apply lockouts when required by this instruction. Refer to current local lockout procedures to properly shut down and lock out this machine. Open equipment and inspect dust conditions. Check for suspicious dust or unusual debris. If any unusual substance is found notify supervisor prior to proceeding with any further action on the equipment.</p> <p>THE USE OF COMPRESSED OR BLOWN AIR IS PROHIBITED. When cleaning is required, an alternative cleaning method such as a HEPA filtered vacuum cleaner or a damp rag must be used in place of compressed or blown air. A lint-free cloth or brush may be used on optical equipment only when other cleaning methods cannot be used. Report safety deficiencies to your supervisor immediately upon detection.</p> <p>WARNING FOR EWP/PPE: Steps contained in this bulletin may require the use of Personal Protective Equipment (PPE). Refer to the current Electrical Work Plan (EWP) MMO for appropriate PPE requirements.</p>	3	All			
		<p style="text-align: center;">WARNING</p> <p>When the inspection procedure requires turning on power to the staging unit, confirm in advance that no one except the person(s) performing the inspection are near the staging crane.</p>					
		<p style="text-align: center;">WARNING</p> <p>Never step under, over, or on the staging crane when operating the vertical travel drive motor. Do not allow anyone to ride on the staging crane.</p>					

U.S. Postal Service Maintenance Checklist	IDENTIFICATION														
	WORK CODE		EQUIPMENT ACRONYM						CLASS CODE		NUMBER			TYPE	
	0	3	M	S	T				D	A	0	0	2	M	
Equipment Nomenclature Mail Staging Tower		Equipment Model Daifuku						Bulletin Filename mm13047ab			Occurrence Quarterly				

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

STAGING CRANE	2.	<p>Position Staging Crane for Cleaning and Inspection.</p> <p style="text-align: center;">CAUTION</p> <p>For equipment protection, always visually check the position of the staging crane and shuttle fork when operating the crane or shuttle using the maintenance unit. When it is not possible to visually check the crane and shuttle position, use extreme caution when operating the crane or shuttle.</p> <p>Using the hand held maintenance unit, position the staging crane at a comfortable working height to allow cleaning and inspection.</p>	3	9			
	3.	<p>Lock Out Power.</p> <p style="text-align: center;">WARNING</p> <p>Before performing the following steps you must don the appropriate PPE as required by the current Electrical Work Plan (EWP) MMO.</p> <p style="text-align: center;">WARNING</p> <p>With the staging controller disconnect open, 480VAC still exists on the line side of the disconnect.</p> <p>Power down the staging unit by placing the ON/OFF switch on the staging controller in the "OFF" position and install a LOCKOUT/TAGOUT device.</p>	2	All			
	4.	<p>SECURE STAGING CRANE MASK.</p> <p style="text-align: center;">CAUTION</p> <p>Place the jack stands directly below the staging crane mask and raise the stands until they are just below the mask with minimal clearance. Do not attempt to support the weight of the mask with the jack stands or the vertical travel lift wires will unwrap from the vertical travel drive pulley.</p>	6	All			

U.S. Postal Service		IDENTIFICATION											
Maintenance Checklist		WORK CODE		EQUIPMENT ACRONYM				CLASS CODE		NUMBER		TYPE	
		0	3	M	S	T				D	A	0	0
Equipment Nomenclature		Equipment Model				Bulletin Filename				Occurrence			
Mail Staging Tower		Daifuku				mm13047ab				Quarterly			

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

		Place two 4-ton adjustable jack stands under the staging crane mask as a safety precaution to prevent the mask from falling in the unlikely event of a component failure during cleaning and inspection. Position one stand at each end allowing for ease of maintenance. Report discrepancies to supervisor.					
VERTICAL TRAVEL DRIVE UNIT	5.	<p>Clean Vertical Travel Drive Unit.</p> <div style="border: 1px solid black; padding: 2px; text-align: center; margin: 10px 0;">WARNING</div> <p>The use of compressed or blown air is prohibited. When cleaning is required, an alternative cleaning method such as a HEPA filtered vacuum cleaner or a damp rag must be used in place of compressed or blown air. A lint-free cloth or brush may be used only on optical equipment when other cleaning methods can not be used.</p> <ol style="list-style-type: none"> Remove the vertical travel drive motor cover. Using HEPA filtered vacuum cleaner, vacuum the motor, brake assembly, encoder, and vertical travel drive pulley. Report discrepancies to supervisor. 	8	7			
VERTICAL TRAVEL DRIVE MOTOR BRAKE GAP	6.	<p>Inspect Vertical Travel Drive Motor Brake Gap.</p> <ol style="list-style-type: none"> On the vertical travel drive motor, remove the encoder lead wire drawing cover. Remove the encoder plug. Remove the manual release bolts diagonally mounted at two positions on the circumference of the fan cover. Remove the fan cover. Measure the brake gap by placing a feeler gauge between the fixed iron core and the movable iron core. Take measurements in at least three points around the circumference. 	15	9			

U.S. Postal Service Maintenance Checklist	IDENTIFICATION														
	WORK CODE		EQUIPMENT ACRONYM						CLASS CODE		NUMBER			TYPE	
	0	3	M	S	T					D	A	0	0	2	M
Equipment Nomenclature Mail Staging Tower		Equipment Model Daifuku						Bulletin Filename mm13047ab			Occurrence Quarterly				

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Run Hours	Pieces Fed (000)	Freq.
		<p align="center">NOTE</p> <p>Normal brake gap should be 0.4 to 0.5 mm. If any of the gap measurements exceed the limit value listed below for the motor frame used, the brake gap must be adjusted. If the gap is too large to measure, reduce the number of adjusting washers and re-measure.</p> <p>6. Motor Frame No. F112M</p> <ul style="list-style-type: none"> a. 3.7kw Motor Capacity b. FB-5B Brake Type c. Normal Gap Value: 0.4 - 0.5mm d. Limit Gap Value: 1.0mm <p>7. Motor Frame No. F132S</p> <ul style="list-style-type: none"> a. 5.5kw Motor Capacity b. FB-8B Brake Type c. Normal Gap Value: 0.4 - 0.5 mm d. Limit Gap Value: 1.0 mm <p align="center">NOTE</p> <p>To reduce the brake gap, turn the three brake gap adjustment bolts clockwise. Turn each bolt little by little in a rotating pattern to ensure a uniform gap. Re-check gap as the adjustments are being made.</p> <p>8. Motor Frame No. F132M</p> <ul style="list-style-type: none"> a. 7.5kw Motor Capacity b. FB-10B Brake Type c. Normal Gap Value: 0.4 - 0.5 mm d. Limit Gap Value: 1.2 mm <p>9. Re-install the fan cover.</p> <p>10. Re-install the manual release bolts.</p> <p>11. Re-install the encoder plug and encoder lead wire drawing cover.</p> <p>12. Report discrepancies to supervisor.</p>					

U.S. Postal Service		IDENTIFICATION											
Maintenance Checklist		WORK CODE	EQUIPMENT ACRONYM					CLASS CODE		NUMBER			TYPE
		0 3	M	S	T				D	A	0	0	2
Equipment Nomenclature		Equipment Model					Bulletin Filename			Occurrence			
Mail Staging Tower		Daifuku					mm13047ab			Quarterly			

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

VERTICAL TRAVEL DRIVE MOTOR	7.	<p>Check Vertical Travel Drive Motor Oil Level.</p> <ol style="list-style-type: none"> Check the oil level by observing the sight gauge mounted on the side of the vertical travel drive motor. Ensure that the oil level is between the two marks on the gauge. If the oil level is below the bottom mark, add additional oil (Mobil Gear 629, ISO VG 150) as follows: <ol style="list-style-type: none"> Pull out the oil filler plug cap located on the opposite side of the drive motor. Add the specified oil until the oil level is between the two marks. <p style="text-align: center;">CAUTION</p> <p>Do not overfill above top mark on sight gauge. Maximum oil capacity is 0.9 liters.</p> <ol style="list-style-type: none"> Replace the filler plug cap. Report discrepancies to supervisor. 	4	7			
VERTICAL TRAVEL LIFT WIRES	8.	<p>Lubricate Vertical Travel Lift Wires.</p> <p style="text-align: center;">WARNING</p> <p>Discard or dispose of chemical soaked materials according to MSDS and in accordance with local procedures.</p> <p style="text-align: center;">NOTE</p> <p>Be sure to lubricate all lift wires, including the counterweight.</p> <ol style="list-style-type: none"> Apply wire rope lubricant (Shell VALVATA 1000) to all accessible portions of vertical travel lift wires, including overhead portion and portion wrapped around drive pulley. Using either a brush or an oil can, apply the lubricant so that it coats and permeates into the wire. Avoid over saturation to prevent dripping. 	45	7			

U.S. Postal Service Maintenance Checklist	IDENTIFICATION														
	WORK CODE		EQUIPMENT ACRONYM						CLASS CODE		NUMBER			TYPE	
	0	3	M	S	T					D	A	0	0	2	M
Equipment Nomenclature Mail Staging Tower		Equipment Model Daifuku						Bulletin Filename mm13047ab			Occurrence Quarterly				

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

		3. Wipe up any excess lubricant that drips from the wire. 4. Reinstall vertical travel drive motor cover. 5. Report discrepancies to supervisor.					
HORIZONTAL TRAVEL DRIVE UNIT	9.	Clean Horizontal Travel Drive Unit. <div style="border: 1px solid black; padding: 2px; text-align: center; margin: 10px 0;">WARNING</div> The use of compressed or blown air is prohibited. When cleaning is required, an alternative cleaning method such as a HEPA filtered vacuum cleaner or a damp rag must be used in place of compressed or blown air. A lint-free cloth or brush may be used only on optical equipment when other cleaning methods can not be used. 1. Remove the horizontal travel drive motor, take-up pulley and encoder covers. 2. Using HEPA filtered vacuum cleaner, clean the drive motor, encoder, horizontal drive pulley and take-up pulley. 3. Reinstall the horizontal travel drive motor, take-up pulley and encoder covers. 4. Report discrepancies to supervisor.	8	7			
CARRIAGE AND SHUTTLE	10.	Clean Carriage and Shuttle. <div style="border: 1px solid black; padding: 2px; text-align: center; margin: 10px 0;">WARNING</div> The use of compressed or blown air is prohibited. When cleaning is required, an alternative cleaning method such as a HEPA filtered vacuum cleaner or a damp rag must be used in place of compressed or blown air. A lint-free cloth or brush may be used only on optical equipment when other cleaning methods can not be used. 1. Lower the cover on the bottom of the carriage assembly.	10	7			

U.S. Postal Service		IDENTIFICATION										
Maintenance Checklist		WORK CODE	EQUIPMENT ACRONYM				CLASS CODE		NUMBER		TYPE	
		0 3	M	S	T			D	A	0	0	2
Equipment Nomenclature		Equipment Model				Bulletin Filename			Occurrence			
Mail Staging Tower		Daifuku				mm13047ab			Quarterly			

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

		2. Remove the shuttle side cover(s). 3. Using a HEPA filtered vacuum cleaner, vacuum out the conveyor motor, lifting motor, shuttle motor, all drive gears and sprockets, drive chains and entire carriage assembly. 4. Reinstall the carriage and shuttle side covers. 5. Report discrepancies to supervisor.					
STAGING CONTROLLER	11.	<p>Clean Staging Controller.</p> <p style="text-align: center;">WARNING</p> <p>Before performing the following steps you must don the appropriate PPE as required by the current Electrical Work Plan (EWP) MMO.</p> <p style="text-align: center;">WARNING</p> <p>With the staging controller disconnect open, 480VAC still exists on the line side of the disconnect.</p> <p style="text-align: center;">WARNING</p> <p>The use of compressed or blown air is prohibited. When cleaning is required, an alternative cleaning method such as a HEPA filtered vacuum cleaner or a damp rag must be used in place of compressed or blown air. A lint-free cloth or brush may be used only on optical equipment when other cleaning methods can not be used.</p> 1. With power disconnected and locked out, open the staging controller panel door. 2. Using a HEPA filtered vacuum cleaner, vacuum the interior of the staging controller. 3. Close the staging controller door.	5	9			

U.S. Postal Service Maintenance Checklist	IDENTIFICATION														
	WORK CODE		EQUIPMENT ACRONYM						CLASS CODE		NUMBER			TYPE	
	0	3	M	S	T					D	A	0	0	2	M
Equipment Nomenclature Mail Staging Tower		Equipment Model Daifuku						Bulletin Filename mm13047ab			Occurrence Quarterly				

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

		4. Report discrepancies to supervisor.					
CELL CONTROLLER	12.	<p>Clean Cell Controller.</p> <p style="text-align: center;">WARNING</p> <p>The use of compressed or blown air is prohibited. When cleaning is required, an alternative cleaning method such as a HEPA filtered vacuum cleaner or a damp rag must be used in place of compressed or blown air. A lint-free cloth or brush may be used only on optical equipment when other cleaning methods can not be used.</p> <ol style="list-style-type: none"> Open the doors on the cell controller cabinet. Using a HEPA filtered vacuum cleaner, vacuum the keyboard, monitor, computer, UPS, and cabinet interior. Check the UPS for any faults, reset if necessary. Close the cabinet doors. Report discrepancies to supervisor. 	8	9			
INPUT / OUTPUT / REJECT CONVEYORS	13.	<p>Clean Input / Output / Reject Conveyors.</p> <p style="text-align: center;">WARNING</p> <p>The use of compressed or blown air is prohibited. When cleaning is required, an alternative cleaning method such as a HEPA filtered vacuum cleaner or a damp rag must be used in place of compressed or blown air. A lint-free cloth or brush may be used only on optical equipment when other cleaning methods can not be used.</p> <ol style="list-style-type: none"> Remove all loose string, rubber bands, labels, and other debris from the conveyor rollers. Using a HEPA filtered vacuum cleaner, vacuum conveyor rollers and framework. 	10	7			

U.S. Postal Service		IDENTIFICATION										
Maintenance Checklist		WORK CODE	EQUIPMENT ACRONYM				CLASS CODE		NUMBER		TYPE	
		0 3	M	S	T				D	A	0 0 2	M
Equipment Nomenclature		Equipment Model				Bulletin Filename			Occurrence			
Mail Staging Tower		Daifuku				mm13047ab			Quarterly			

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

		3. Report discrepancies to supervisor.					
LIFT WIRE UPPER IDLER PULLEYS	14.	<p>Inspect Lift Wire Upper Idler Pulleys.</p> <p>1. Check each idler pulley for excessive wear or other signs of damage. Pay particular attention to bearings and cable sheaves.</p> <p>2. Check all idler pulley mounting brackets for cracks or loose or missing hardware.</p> <p>3. Report discrepancies to supervisor.</p>	14	9			
LIFT WIRE SPRING HOLDERS, JAM NUTS AND MICRO SWITCHES	15.	<p>Inspect Lift Wire Spring Holders, Jam Nuts, and Micro Switches.</p> <p style="text-align: center;">NOTE</p> <p>Be sure to check the ends of all lift wires, including the counterweight.</p> <p>1. Check each lift wire spring holder for excessive wear or looseness.</p> <p>2. Ensure jam nuts (w-nuts) are secure.</p> <p>3. Ensure the "slack cable" micro switches are securely fastened and not visibly damaged.</p> <p>4. Ensure all electrical connections are tight and the lead wires are not frayed or broken.</p> <p>5. Report discrepancies to supervisor.</p>	8	9			
CARRIAGE CONTROL CABLES	16.	<p>Inspect Carriage Control Cables.</p> <p style="text-align: center;">NOTE</p> <p>The carriage / shuttle is connected to the staging controller using a series of control cables. The first set of control cables at the home position of the staging crane are housed in a black plastic cable carrier that folds up and plays out as the staging crane moves vertically inside the staging unit. A similar cable carrier is used on the staging crane mask to connect with the carriage. This cable carrier plays out as the carriage moves horizontally across the staging crane.</p> <p>1. Check for proper bending of cables at top</p>	10	9			

U.S. Postal Service Maintenance Checklist	IDENTIFICATION														
	WORK CODE		EQUIPMENT ACRONYM						CLASS CODE		NUMBER			TYPE	
	0	3	M	S	T					D	A	0	0	2	M
Equipment Nomenclature Mail Staging Tower		Equipment Model Daifuku						Bulletin Filename mm13047ab			Occurrence Quarterly				

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

		<p>and bottom, where cables enter and exit cable carriers.</p> <ol style="list-style-type: none"> Check for proper location of cables, and ensure cables are not twisted inside cable carriers. Check for damage to the cables at the top and bottom of the cable carriers. Check for damage to the rubber support plate where the cables come out of the cable carriers. Ensure the carriage is not hitting the vertical or the horizontal cable carriers. Pay particular attention to the home position. Check for damage to the plastic pieces of the cable carriers. Check for damage to the cable separator inside the cable carriers that separate the one small cable from the three large cables. Report discrepancies to supervisor. 					
VERTICAL POSITIONING PHOTO SENSORS AND LIMIT SWITCHES	17.	<p>Clean and Inspect Vertical Positioning Photo Sensors and Limit Switches.</p> <p>NOTE</p> <p>The vertical positioning photo sensors (4 each) are U-shaped photoelectric switches located on the home position end of the staging crane.</p> <ol style="list-style-type: none"> Ensure the photo sensors are securely fastened and not visibly damaged. Using a damp cloth, clean sensor exteriors and emitter and receiver windows. Check for proper alignment. Ensure vertical travel limit switches are securely fastened and not visibly damaged. Pay particular attention to roller on actuating arm. Ensure all electrical connections are tight and the lead wires are not frayed or broken. 	6	9			

U.S. Postal Service		IDENTIFICATION									
Maintenance Checklist		WORK CODE	EQUIPMENT ACRONYM					CLASS CODE	NUMBER		TYPE
		0 3	M	S	T			D	A	0 0 2	M
Equipment Nomenclature		Equipment Model					Bulletin Filename		Occurrence		
Mail Staging Tower		Daifuku					mm13047ab		Quarterly		

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

		6. Report discrepancies to supervisor.					
VERTICAL LOCATION DETECTION PLATES	18.	<p>Inspect Vertical Location Detection Plates.</p> <p>NOTE</p> <p>The vertical location detection plates (4 each) are mounted to the home position end of the staging unit. They run the entire height of the staging unit.</p> <ol style="list-style-type: none"> 1. Ensure the detection plates are not bent or damaged. 2. Ensure the detection plates are securely fastened. 3. Report discrepancies to supervisor. 	4	9			
HORIZONTAL LOCATION ZONE PLATES	19.	<p>Inspect Horizontal Location Zone Plates.</p> <p>NOTE</p> <p>The horizontal location zone plates are mounted to the side of the staging crane mask.</p> <p>Ensure the zone plates are securely fastened and not shifted from their original positions. Report discrepancies to supervisor.</p>	4	9			
BEAM LEVEL CHECK	20.	<p>Perform Beam Level Check.</p> <p>NOTE</p> <p>Since the vertical travel lift wires have a tendency to stretch, the staging crane mask must be checked for level. The staging bins / support trusses are used as a fixed reference point when performing this procedure. If the bins are not level, they must be leveled before proceeding. An alternate beam leveling procedure is shown in Figure 1.</p> <ol style="list-style-type: none"> 1. Ensure the staging crane mask is not resting on the 4-ton adjustable jack stands and the lifting wires are properly wrapped in the grooves of the drive pulley. 2. Place a string or other straight edge across 	18	9			

U.S. Postal Service Maintenance Checklist	IDENTIFICATION													
	WORK CODE		EQUIPMENT ACRONYM						CLASS CODE		NUMBER			TYPE
	0	3	M	S	T					D	A	0	0	2
Equipment Nomenclature Mail Staging Tower		Equipment Model Daifuku						Bulletin Filename mm13047ab			Occurrence Quarterly			

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

		<p>the top of the left and right staging bins directly above the staging crane mask (beam). Place one string or straight edge at the home position and one at the opposite end of the beam, i.e., first and last bays.</p> <ol style="list-style-type: none"> At the home position, measure the gap between the string and the beam. Measure the same gap at the opposite end of the beam. Compare values to determine if beam is level. If necessary, adjust the lift wire end nuts to level the beam. Report discrepancies to supervisor. <p>Figure 1. Alternate Beam Leveling Procedure</p>					
--	--	---	--	--	--	--	--

STAGING CRANE	21.	<p>Unsecure Staging Crane Mask.</p> <p>Remove the two 4-ton adjustable jack stands that were placed under the staging crane mask. Remove all tools, lubricants, rags, etc., from inside the staging unit. Report discrepancies to supervisor.</p>	6	All			
---------------	-----	--	---	-----	--	--	--

U.S. Postal Service		IDENTIFICATION										
Maintenance Checklist		WORK CODE	EQUIPMENT ACRONYM				CLASS CODE		NUMBER		TYPE	
		0 3	M S T				D A	0 0 2	M			
Equipment Nomenclature		Equipment Model				Bulletin Filename			Occurrence			
Mail Staging Tower		Daifuku				mm13047ab			Quarterly			

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

		<div style="border: 1px solid black; padding: 2px; display: inline-block;">WARNING</div> Be cautious when working around or on equipment when power has been applied.					
	22.	Restore Equipment To Service. <div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">WARNING</div> Before performing the following steps you must don the appropriate PPE as required by the current Electrical Work Plan (EWP) MMO. </div> <p>Restore electrical power by removing your LOCKOUT/TAGOUT device and placing the ON/OFF switch on the staging controller in the "ON" position. Ensure the mode selection key switch is in the ON-LINE position.</p>	2	All			
VERTICAL LEARNING	23.	Perform Vertical Learning. At the cell controller: 1. Click the Cancel Alarm and Error Reset buttons on the Monitoring screen to clear any faults that may exist. 2. Click the Stop button and then the Maintenance button on the Monitoring screen. 3. Click the Learning button on the Maintenance screen. 4. Select the Vertical Learning option and then click the Start button on the Learning screen. 5. Observe the staging crane as it goes through vertical learning. 6. When vertical learning is complete, click the Exit button on the Learning screen. 7. Click the Exit button on the Maintenance screen to return to the Monitoring screen.	6	9			

U.S. Postal Service		IDENTIFICATION													
Maintenance Checklist		WORK CODE		EQUIPMENT ACRONYM						CLASS CODE		NUMBER			TYPE
		0	3	M	S	T					D	A	0	0	2
Equipment Nomenclature		Equipment Model						Bulletin Filename				Occurrence			
Mail Staging Tower		Daifuku						mm13047ab				Quarterly			

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

		<p align="center">NOTE</p> <p>For newly learned parameters to take effect, the staging controller must be powered down and back up. New parameters are loaded when the staging controller restarts.</p> <ol style="list-style-type: none"> 8. Power down the staging controller by placing the ON/OFF switch on the staging controller in the "OFF" position. 9. Restore electrical power by returning the ON/OFF switch to the "ON" position. 10. Click the Cancel Alarm and Error Reset buttons on the Monitoring screen at the cell controller to clear any faults that may exist. 11. Click the Start button on the Monitoring screen and return the staging unit to operational status. 12. Report discrepancies to supervisor. 					
CLEAN UP	24.	<p>CLEAN UP.</p> <p>Ensure all tools, lubricants, rags, etc., are removed from the work area. Report all deficiencies to your supervisor.</p>	3	All			

U.S. Postal Service		IDENTIFICATION													
Maintenance Checklist		WORK CODE		EQUIPMENT ACRONYM						CLASS CODE		NUMBER			TYPE
		0	3	M	S	T					D	A	0	0	2
Equipment Nomenclature		Equipment Model						Bulletin Filename				Occurrence			
Mail Staging Tower		Daifuku						mm13047ab				Quarterly			

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

THIS PAGE BLANK

ATTACHMENT 4

MST MASTER CHECKLIST

03-MST-DA-003-M

ANNUAL

Annual Time Total: 212 minutes

U.S. Postal Service		IDENTIFICATION										
Maintenance Checklist		WORK CODE	EQUIPMENT ACRONYM				CLASS CODE		NUMBER		TYPE	
		0 3	M	S	T			D	A	0	0	2
Equipment Nomenclature		Equipment Model				Bulletin Filename			Occurrence			
Mail Staging Tower		Daifuku				mm13047ab			Annual			

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

SAFETY STATEMENT	1.	<p>COMPLY WITH ALL SAFETY PRECAUTIONS. Disconnect power and apply lockouts when required by this instruction. Refer to current local lockout procedures to properly shut down and lock out this machine. Open equipment and inspect dust conditions. Check for suspicious dust or unusual debris. If any unusual substance is found notify supervisor prior to proceeding with any further action on the equipment.</p> <p>THE USE OF COMPRESSED OR BLOWN AIR IS PROHIBITED. When cleaning is required, an alternative cleaning method such as a HEPA filtered vacuum cleaner or a damp rag must be used in place of compressed or blown air. A lint-free cloth or brush may be used on optical equipment only when other cleaning methods cannot be used. Report safety deficiencies to your supervisor immediately upon detection.</p> <p>WARNING FOR EWP/PPE: Steps contained in this bulletin may require the use of Personal Protective Equipment (PPE). Refer to the current Electrical Work Plan (EWP) MMO for appropriate PPE requirements.</p>	3	All			
		<p style="text-align: center;">WARNING</p> <p>When the inspection procedure requires turning on power to the staging unit, confirm in advance that no one except the person(s) performing the inspection is near the staging crane.</p>					
		<p style="text-align: center;">WARNING</p> <p>Never step under, over or on staging crane when operating the vertical travel drive motor. Do not allow anyone to ride on staging crane.</p>					

U.S. Postal Service Maintenance Checklist	IDENTIFICATION													
	WORK CODE		EQUIPMENT ACRONYM						CLASS CODE		NUMBER			TYPE
	0	3	M	S	T					D	A	0	0	2
Equipment Nomenclature Mail Staging Tower		Equipment Model Daifuku						Bulletin Filename mm13047ab			Occurrence Annual			

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

STAGING CRANE	2.	<p>Lower Staging Crane To Lowest Position.</p> <p style="text-align: center;">CAUTION</p> <p>For equipment protection, always visually check position of the staging crane and shuttle fork when operating the crane or shuttle using maintenance unit. When it is not possible to visually check the crane and shuttle position, extreme caution must be used when operating the crane or shuttle.</p> <p>Using the hand held maintenance unit, position the staging crane at its lowest position.</p>	3	9			
	3.	<p>Lock Out Power.</p> <p style="text-align: center;">WARNING</p> <p>Before performing the following steps you must don the appropriate PPE as required by the current Electrical Work Plan (EWP) MMO.</p> <p style="text-align: center;">WARNING</p> <p>With the staging controller disconnect open, 480VAC still exists on the line side of the disconnect.</p> <p>Power down staging unit by placing the ON/OFF switch on staging controller in the "OFF" position and install a LOCKOUT/TAGOUT device.</p>	2	All			
STAGING BINS	4.	<p>Clean Staging Unit Bins And Framework.</p> <p>Using a vacuum, clean the staging unit bins and framework starting from the top and moving across and downward. Report discrepancies to supervisor.</p>	180	7			
STAGING FRAMEWORK	5.	<p>Check Staging Unit Hardware.</p> <p>1. Check the entire staging unit framework for loose or missing hardware. Pay particular attention to the overhead support structure and the bin support trusses.</p>	18	7			

U.S. Postal Service		IDENTIFICATION											
Maintenance Checklist		WORK CODE		EQUIPMENT ACRONYM				CLASS CODE		NUMBER		TYPE	
		0	3	M	S	T				D	A	0	0
Equipment Nomenclature		Equipment Model				Bulletin Filename				Occurrence			
Mail Staging Tower		Daifuku				mm13047ab				Annual			

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
					Run Hours	Pieces Fed (000)	Freq.

		2. Check each staging bin for looseness. 3. Replace or tighten as necessary. 4. Report discrepancies to supervisor.					
		WARNING Be cautious when working around or on equipment when power has been applied.					
	6.	RESTORE EQUIPMENT TO SERVICE. WARNING Before performing the following steps you must don the appropriate PPE as required by the current Electrical Work Plan (EWP) MMO. Restore electrical power by removing your LOCKOUT/TAGOUT device and placing the ON/OFF switch on the staging controller in the "ON" position. Ensure the mode selection key switch is in the ON-LINE position. Reset any faults and return the staging unit to operational status.	3	All			
CLEAN UP	7.	CLEAN UP. Ensure all tools, lubricants, rags, etc., are removed from the work area. Report all deficiencies to your supervisor.	3	All			