



# Maintenance Management Order

**SUBJECT:** Preventive Maintenance Servicing Guidelines for  
Lockheed Martin (LM) Tray Management System  
(TMS) Mail Staging Tower (MST) Greth Staging  
Tower Phase 2

**TO:** Maintenance Manager,  
Fort Lauderdale, Florida

**DATE:** August 16, 2010

**NO:** MMO-081-10

**FILE CODE:** TM

rorrn:mm09074ad

This Maintenance Management Order (MMO) provides Preventive Maintenance Servicing Guidelines for LM TMS MST Greth Staging Tower Phase 2. Acronym is MST. Class code is AA.

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

The workhours represented in this MMO reflect the maximum workhours required to maintain the equipment. Given local conditions, management may modify task frequencies.

## 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. 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.

Maintenance Managers are to use these preventive maintenance guidelines when preparing the route sheets for local maintenance personnel. It is the responsibility of each Maintenance Manager to ensure all WARNINGS, CAUTIONS, and NOTES are included with each applicable task as part of the preparation of any local route sheets.

For questions or comments concerning this bulletin contact the MTSC HelpDesk, either online at **MTSC>HELPDESK>Create/Update Tickets** or call (800) 366-4123.



Robert E. Albert  
Manager  
Maintenance Technical Support Center  
Maintenance Policies and Programs

Attachments:

1. Summary Workload Estimate
2. LM TMS MST: Master Checklist: 03-MST-AA-101-M: Monthly
3. LM TMS MST: Master Checklist: 03-MST-AA-102-M: Quarterly
4. LM TMS MST: Master Checklist: 03-MST-AA-103-M: Semi-Annual
5. LM TMS MST: Master Checklist: 03-MST-AA-104-M: Annual

**ATTACHMENT 1**

**SUMMARY**

**WORKLOAD ESTIMATE**

**FOR**

**LM TMS MST GRETH STAGING TOWER PHASE 2**

**SUMMARY  
WORKLOAD ESTIMATE**

Days	Routine Servicing (hrs/yr)	Repair* (hrs/yr)	Routine Servicing + Repair Time (hrs/yr)	Nonproductive Time ** (hrs/yr)	Total Servicing Per Machine (hrs/yr)
5 Day	13.30	3.99	17.29	1.73	19.02
6 Day	13.30	3.99	17.29	1.73	19.02
7 Day	13.30	3.99	17.29	1.73	19.02

\* Repair estimates based on 30% of servicing.

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

**ATTACHMENT 2**

**LM TMS MST**

**MASTER CHECKLIST**

03-MST-AA-101-M

MONTHLY

Time Total: 26 Minutes

U.S. Postal Service <b>Maintenance Checklist</b>	IDENTIFICATION													
	WORK CODE		EQUIPMENT ACRONYM						CLASS CODE		NUMBER			TYPE
	0	3	M	S	T				A	A	1	0	1	M
Equipment Nomenclature LM TMS MST		Equipment Model Greth Staging Tower Phase 2					Bulletin Filename MM09074AD			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.

SAFETY STATEMENT

- |    |   |   |     |
|----|---|---|-----|
| 1. | <p><b>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.</b></p> <p><b>THE USE OF COMPRESSED OR BLOWN AIR IS PROHIBITED.</b><br/>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.</p> | 3 | All |
|----|---|---|-----|

**WARNING**

**Be cautious when working around or on equipment when power has been applied.**

MACHINE

- |    |   |    |   |
|----|---|----|---|
| 2. | <p><b>Using IR camera and ultrasonic detector, do a general scan of the tower while in operation.</b> Note any discrepancies.</p>             | 15 | 9 |
| 3. | <p><b>Power down and lock out power.</b> Power down machine and lock out power as prescribed by current local lockout/restore procedures.</p> | 1  | 9 |

PHOTO SENSOR CLEANING

- |    |   |   |   |
|----|---|---|---|
| 4. | <p><b>Clean front and rear access clear photo sensors.</b></p> <ol style="list-style-type: none"> <li>1. Loosen captive screws fastening one safety guard to the tower base assembly and remove guard, or remove two access panels by removing mounting bolts.</li> <li>2. Using a clean, lint free cloth or a paper wipe, clean dust from the sensor window.</li> <li>3. Align the access panels, and reinstall mounting bolts, or align the safety guard</li> </ol> | 2 | 9 |
|----|---|---|---|

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Equipment Nomenclature LM TMS MST		Equipment Model Greth Staging Tower Phase 2						Bulletin Filename MM09074AD			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		
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captive screws with the holes on the tower frame. Tighten bolts or captive screws until snug.

**WARNING**

**Be cautious when working around or on equipment when power has been applied.**

- |          |    |   |   |     |
|----------|----|---|---|-----|
| MACHINE  | 5. | <b>Restore power to equipment.</b> Restore power to equipment as prescribed by the current local lockout/restore procedures.                                  | 1 | 9   |
| E-STOP   | 6. | <b>Check emergency stop switches.</b> Check emergency stop switches (2 per Staging Tower plus 1 on cell power distribution panel) to verify proper operation. | 1 | 9   |
| MACHINE  | 7. | <b>Restore equipment to service.</b> Restore equipment to service as prescribed by the current local lockout/restore procedures.                              | 1 | 9   |
| CLEAN UP | 8. | <b>Clean up.</b> Ensure all tools, lubricants, rags, etc., are removed from the work area. Notify supervisor of any deficiencies.                             | 2 | All |

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**ATTACHMENT 3**

**LM TMS MST**

**MASTER CHECKLIST**

03-MST-AA-102-M

QUARTERLY

Time Total: 69 Minutes

U.S. Postal Service  <b>Maintenance Checklist</b>	IDENTIFICATION													
	WORK CODE		EQUIPMENT ACRONYM						CLASS CODE		NUMBER			TYPE
	0	3	M	S	T				A	A	1	0	2	M
Equipment Nomenclature LM TMS MST		Equipment Model Greth Staging Tower Phase 2					Bulletin Filename MM09074AD			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.

SAFETY STATEMENT

- 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.**

**THE USE OF COMPRESSED OR BLOWN AIR IS PROHIBITED. 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.**

3 All

**WARNING**

Be cautious when working around or on equipment when power has been applied.

**WARNING**

Ensure personnel are not in the immediate tower area. Performance of the following task will cause the tower to operate.

LUBRICATION OF ARMS

- Lubricate link arms.

19 9

**WARNING**

Discard solvent soaked materials according to local procedures to prevent spontaneous combustion.

- Place paper on floor to catch any excess lubricant that may drip from link arms during lubrication.

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	0	3	M	S	T				A	A	1	0	2	M
Equipment Nomenclature LM TMS MST		Equipment Model Greth Staging Tower Phase 2						Bulletin Filename MM09074AD			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.

2. Remove lower tower guards as required by loosening captive screws fastening each guard to the tower.
3. Power down machine and lock out power as prescribed by current local lockout/restore procedures.
4. Access link arms from the front of the tower being serviced (control panel is on this side). Starting at the highest point on the tower that can be safely accessed, using 20W non-detergent oil in a zoom spout oiling bottle or equivalent, apply oil to all guide wheel bearings and the link plate bushings on both sides of the tower. Do not apply enough to cause dripping. Work down the tower until access to the link arms is no longer available.

**WARNING**

**Keep all portions of body and clothing clear of the tower while it is rotating.**

**WARNING**

**Be cautious when working around or on equipment when power has been applied.**

5. Restore equipment to service as prescribed by the current local lockout/restore procedures.
6. Position MAN/AUTO key switch in manual mode, and jog tower carousel so the metal bins are moving downward toward the control panel, until the oiled link arms are out of accessible range at the bottom of the tower.
7. Repeat steps 3-6 until all link arms have been oiled.
8. Reinstall the tower guards by aligning the guard captive screws with the holes in the frame for each guard and tightening the captive screws until snug.

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Equipment Nomenclature LM TMS MST		Equipment Model Greth Staging Tower Phase 2						Bulletin Filename MM09074AD			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.

9. Power down machine and lock out power as prescribed by current local lockout/restore procedures.
10. Position the MAN/AUTO key switch in the AUTO position.
11. Remove the cloth or paper from under the link arms after any dripping has stopped.
12. Dispose of any materials contaminated by lubricant in accordance with facility's hazardous waste storage and disposal regulations.

TENSION CHECK      3.      **Check lift chain tension.**      6      9

1. Remove access panels, as required to gain good visual access to the lift chain guides, by loosening and removing mounting bolts. Remove access panel(s).
2. Remove metal bins at bottom of tower, if required to gain good visual access to the lift chain guides, by removing screws fastening bin to the link arm assemblies on each side.
3. Visually check the chain tension at the lowest position on the plastic lower chain guides:
  - a. Check the gap between lift chain and the plastic chain guide on one side of the tower. The optimum condition is for the chain to contact the entire surface of the plastic chain guide with a minimum gap at the bottom (6:00 o'clock) position.
  - b. Check the gap between the lift chain and the plastic chain guide on the other side of the tower. The optimum condition is for the chain to contact the entire surface of the plastic chain guide with a minimum gap at the bottom (6:00 o'clock) position.
  - c. If the chain tension for either lift chain is such that the outside edge of the chain guide is visible, notify supervisor, as chain tension adjustment is required.
4. Reinstall metal bins at bottom of tower by reinstalling the screws fastening the bin to

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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.

the link arm assemblies on each side.

5. Reinstall access panel by positioning it on the tower and fastening it with 4 bolts. Tighten until snug.
6. Reinstall safety guards previously removed by positioning the guard(s) on the tower, and tightening captive screws attaching the guard(s) until snug.

BOWL AIR PRESSURE CHECK

- |  |  |   |   |
|--|--|---|---|
|  | 4. <b>Check Filter Regulator Separator (FRS) air pressure gauge and bowl, and main control cabinet fans.</b> | 3 | 9 |
|--|--|---|---|
1. Check the FRS air pressure gauge for the correct air pressure of 80 +5/-1 PSI. If necessary, adjust the regulator knob located on top of the FRS to attain proper air pressure.

**WARNING**

**Eye protection (goggles or face shield) must be worn when releasing fluids from the FRS bowl.**

2. Check FRS for water in bowl. If water is present, turn the release valve at the bottom of the bowl to drain.

OIL LEVEL CHECK

- |  |   |    |   |
|--|---|----|---|
|  | 5. <b>Check oil level in main drive unit speed reducer. Clean Lexan panels.</b> | 36 | 9 |
|--|---|----|---|

**WARNING**

**Discard solvent soaked materials according to local procedures to prevent spontaneous combustion.**

**CAUTION**

**Ensure correct plug is used for checking the oil level in the large housing.**

1. Using a paper wipe, remove dust and dirt adjacent to the level plug in the large housing.

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Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
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2. Remove the level plug and check for proper oil level.
3. Replace the level plug.
4. Clean Lexan panels using a dishwashing fluid and water. Remove all panels, and wipe them down inside and out. Then reinstall.

MACHINE	6.	<b>Restore equipment to service.</b> Restore equipment to service as prescribed by the current local lockout/restore procedures.	1	9			
CLEAN UP	7.	<b>Clean up.</b> Ensure all tools, lubricants, rags, etc., are removed from the work area. Notify supervisor of any deficiencies.	1	All			

**ATTACHMENT 11**

**LM TMS MST**

**MASTER CHECKLIST**

03-MST-AA-103-M

SEMI-ANNUAL

Time Total: 39 Minutes

U.S. Postal Service <b>Maintenance Checklist</b>	IDENTIFICATION													
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	0	3	M	S	T				A	A	1	0	3	M
Equipment Nomenclature LM TMS MST		Equipment Model Greth Staging Tower Phase 2						Bulletin Filename MM09074AD			Occurrence Semi-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. | <b>COMPLY WITH ALL SAFETY PRECAUTIONS.</b><br>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.<br><br><b>THE USE OF COMPRESSED OR BLOWN AIR IS PROHIBITED.</b><br>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. | 3 | All |
|--|----|--|---|-----|

**WARNING**

**Be cautious when working around or on equipment when power has been applied.**

**NOTE**

Cycle tower carousel so the bins come down toward the control panel. To negate carousel slip back, ensure more weight (mail) is on the carousel side toward the control panel.

MACHINE

- |  |    |  |    |   |
|--|----|--|----|---|
|  | 2. | <b>Check drive motor chain tension.</b><br><br>1. Position MAN/AUTO key switch in manual mode and jog tower carousel so the metal bins are moving downward toward the control panel. Jog the tower carousel to move a minimum distance of 5 bins.<br><br>2. Power down the machine and lock out its power as prescribed by the current local lockout/restore procedures.<br><br>3. Disable conveyor section(s) attached to the | 10 | 9 |
|--|----|--|----|---|



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Equipment Nomenclature LM TMS MST		Equipment Model Greth Staging Tower Phase 2						Bulletin Filename MM09074AD			Occurrence Semi-Annual			

Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
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tower in the immediate area of the drive motor chain being checked.

4. Remove drive motor chain guard by loosening the screws fastening the guard to the tower.

**NOTE**

This operation requires a combination square or a protractor square with a bubble-type level and a minimum of 16 inch steel rule (i.e. Sears Craftsman 939568 or equivalent).

5. Position the steel rule on the corner of the tower structure or the conveyor rail at a 45-degree angle with the horizontal tower structure or conveyor rail.
6. Move steel rule as required, while maintaining 45-degree angle, until end of the steel rule just contacts the bottom portion of the drive chain.
7. With end of steel rule just in contact with sagging chain and at 45-degree angle, measure distance between edge of the tower structure or the conveyor rail and the chain. Record this as measurement 1.
8. While keeping the end of the steel rule in the same chain link as was used in step 7 and the edge of the steel rule on the edge of the tower structure or the conveyor rail, (and maintaining approximately a 45 degree angle), push the rule into the drive chain until the chain is taut. Measure the distance between the edge of the tower structure or the conveyor rail and the chain. Record this as measurement 2.
9. Subtract measurement 1 from measurement 2. If result is less than 1 inch, or result is greater than 2 inches, notify supervisor. Drive chain needs tensioning.
10. Restore conveyor section(s) previously disabled.

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Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
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**WARNING**

**Be cautious when working around or on equipment when power has been applied.**

**WARNING**

**Ensure personnel are not in the immediate tower area as the performance of following task will cause the tower to operate.**

MACHINE	3.	<b>Restore equipment to service.</b>	Restore equipment to service as prescribed by the current local lockout/restore procedures.	1	9
	4.	<b>Lubricate lift and drive motor chains.</b>		21	9

**WARNING**

**Discard solvent soaked materials according to local procedures to prevent spontaneous combustion.**

1. Place paper on the floor under the lift chains to catch excess oil as it drips from the chain during lubrication.
2. On the cell control PC, enter login ID and password.
3. Select Cell Control.
4. Select Tower Control.
5. Under the Tower heading, select the tower number for the tower being checked.
6. Select Cell Status.
7. Under the Device ID heading, highlight the tower number for the tower being checked and the conveyor number(s) for the conveyor section(s) adjacent to the drive motor chain being serviced.
8. Select Device Off-line.

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Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
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9. Select Tower Control.
10. Select Velocity. Set velocity to 20,000.
11. Select Velocity Move.
12. Operate the tower.
13. Access drive motor chain, place paper or oil catch pan under drive motor chain and apply 20W, non-detergent oil to drive motor chain, as the chain is moving, until the entire chain is wet, but not dripping.
14. Remove paper or oil catch pan from underneath the drive motor chain after any dripping has stopped.
15. Power down the machine and lock out its power as prescribed by the current local lockout/restore procedures.
16. Reinstall drive motor chain guard by aligning the screws with the holes in the tower frame. Tighten the screws until snug.

**NOTE**

Mail trays may be removed from metal bins to access the lift chains. If mail trays are removed from the metal bins, care must be used to ensure the correct tray is replaced in each metal bin.

17. Access the lift chains from the front of the tower being serviced (control panel is on this side). Starting at the highest point on the tower that can be safely accessed and using 20W, non-detergent oil in a zoom spout oiling bottle or equal, apply oil to the lift chains on both sides of the tower until the chain is wet, but not dripping. Work down the tower until access to the lift chains is no longer available.

**WARNING**

**Be cautious when working around or on equipment when power has been applied.**

U.S. Postal Service		IDENTIFICATION												
<b>Maintenance Checklist</b>		WORK CODE		EQUIPMENT ACRONYM					CLASS CODE		NUMBER			TYPE
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Equipment Nomenclature LM TMS MST		Equipment Model Greth Staging Tower Phase 2					Bulletin Filename MM09074AD			Occurrence Semi-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.		

18. Restore equipment to service as prescribed by the current local lockout/restore procedures.
19. Position MAN/AUTO key switch in manual mode, and jog tower carousel so the metal bins are moving downward toward the control panel, until the oiled sections of lift chains are just out of accessible range at the bottom of the tower. This can be performed by noting the number of the bin just below where oiling was started and jogging the tower until that bin just becomes no longer accessible.
20. Power down the machine and lock out its power as prescribed by the current local lockout/restore procedures.
21. Repeat steps 17-20 until the entire length of each lift chain has been oiled.
22. Reinstall any tower guards previously removed.

**WARNING**

**Be cautious when working around or on equipment when power has been applied.**

23. Restore equipment to service as prescribed by the current local lockout/restore procedures.
24. Place the MAN/AUTO key switch in automatic mode.
25. At the Tower Management menu, press OK in the TMS: Error dialog box.
26. Select Cell Status.
27. Under the Device ID heading, highlight the tower number for the tower being checked and the conveyor number(s) for the conveyor section(s) previously disabled.
28. Select Device Online.
29. Press Exit.
30. At the TMS Main Menu, press Log Off.

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Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
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31. Remove the paper placed under the lift chains after any dripping has stopped.

**WARNING**

**Discard solvent soaked materials according to local procedures to prevent spontaneous combustion.**

5. **Handling of used oil and oil contaminated materials.** Dispose of any materials contaminated by lubricants or used oil in accordance with facility's hazardous waste storage and disposal regulations. 2 9

CLEAN UP

6. **Clean up.** Ensure all tools, lubricants, rags, etc., are removed from the work area. Notify supervisor of any deficiencies. 2 All

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**ATTACHMENT 5**

**LM TMS MST**

**MASTER CHECKLIST**

03-MST-AA-104-M

ANNUAL

Time Totals:

Staging Tower - 132 Minutes

U.S. Postal Service <b>Maintenance Checklist</b>	IDENTIFICATION													
	WORK CODE		EQUIPMENT ACRONYM						CLASS CODE		NUMBER			TYPE
	0	3	M	S	T				A	A	1	0	4	M
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Part or Component	Item No	Task Statement and Instruction (Comply with all current safety precautions)	Est. Time Req (min)	Min. Skill Lev	Thresholds		
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SAFETY STATEMENT

- |    |   |   |     |
|----|---|---|-----|
| 1. | <p><b>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.</b></p> <p><b>THE USE OF COMPRESSED OR BLOWN AIR IS PROHIBITED. 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.</b></p> | 3 | All |
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**WARNING**

**Be cautious when working around or on equipment when power has been applied.**

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|---------------|----|---|----|---|
| SPEED REDUCER | 2. | <p><b>Change speed reducer oil.</b></p> <ol style="list-style-type: none"> <li>1. On the Cell Control PC, enter login ID and password.</li> <li>2. Select Cell Controller.</li> <li>3. Select Tower Control.</li> <li>4. Under the Tower heading, select the tower number for the tower to be serviced.</li> <li>5. Select Cell Status.</li> <li>6. Under the Device ID heading, highlight the tower number for the tower to be serviced.</li> <li>7. Select Device Off-line.</li> <li>8. Select Tower Control.</li> <li>9. Select Velocity. Set velocity to 20,000.</li> </ol> | 48 | 9 |
|---------------|----|---|----|---|



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Equipment Nomenclature LM TMS MST		Equipment Model Greth Staging Tower Phase 2						Bulletin Filename MM09074AD			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.

**WARNING**

**Keep all portions of body and clothing clear of the tower while it is rotating.**

**NOTE**

The time for this task does not include the amount of time the tower is operated (approx. 30 minutes). During the time the tower is operating, it is expected the maintenance personnel will be performing other work. The time for this task does include the amount of time to place the tower in operation.

- 10. Select Velocity Move. Operate tower for approximately 30 minutes to ensure speed reducer oil is warm.
- 11. Power down the machine and lock out its electrical power and compressed air. Bleed the air line as prescribed by the current local lockout/restore procedures.
- 12. Disable the conveyor section(s) under the drain pan by unplugging the electrical connection from the power supply on the conveyor section supplying power to the section(s) being disabled.

**WARNING**

**Discard solvent soaked materials according to local procedures to prevent spontaneous combustion.**

**NOTE**

The speed reducer has dual-chamber housing. Identify the location of various drain, fill, and level plugs within the reducer structure. In the TMS application, only those plug locations identified by name are utilized.

- 13. Using a paper wipe, clean dust and dirt from the speed reducer oil drain, fill, and level plugs in the large housing and one of the

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drain plugs in the right-angled (small) housing.

14. Position paper towels in front of large housing to prevent oil from flowing around and behind large housing.
15. Position an oil catch pan under the oil pan drain plug.
16. Remove the oil pan drain plug.
17. Remove the drain plug, the fill plug, and the level plug from the large housing. Allow the oil to drain.
18. Remove the drain plug from the right-angled (small) housing. Allow the oil to drain.
19. After all oil has drained from both housings of the speed reducer, reinstall both drain plugs. Tighten until snug.
20. After all oil has drained from the tower oil pan, reinstall the tower oil pan drain plug on the oil pan. Tighten until snug.
21. Remove oil catch pan with waste oil from the tower.

**CAUTION**

**Do not overfill or under-fill the oil in the speed reducer. Excess oil will cause overheating. Under filling the oil will cause gear damage.**

**NOTE**

Speed reducer has dual-chamber housing. Oil is added at one common fill plug. Oil level is verified at one common level plug location. Utilize plug locations within larger housing of the speed reducer.

22. Using an approved speed reducer oil, and a 2-quart (or larger) size pump type oil can, fill the oil reservoir to the level of the oil level plug.
23. Using a 3/8" Allen wrench, reinstall the oil fill plug. Tighten until snug.

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24. Using a 3/8" Allen wrench, reinstall the oil level plug. Tighten until snug.

**WARNING**

**Discard solvent soaked materials according to local procedures to prevent spontaneous combustion.**

- 25. Using paper wipes, clean the area around both speed reducer oil drain plugs, the level plug, the fill plug, the tower oil pan drain plug, and inside the tower oil pan. Remove paper towels previously placed in the tower oil pan.
- 26. Restore equipment to service as prescribed by the current local lockout/restore procedures.
- 27. Enable conveyor section(s) previously disabled.

TOWER

3. **Grease the two pillow block bearings supporting the sprockets and drive shaft at the top of the tower.**      2      9

**WARNING**

**Discard solvent soaked materials according to local procedures to prevent spontaneous combustion.**

- 1. Using a paper wipe, clean dust and dirt from the grease fitting on each bearing.
  - 2. Using a hand grease gun filled with molybdenum grease or equivalent, apply grease to each bearing. Using a paper wipe, remove any excess grease.
4. **Vacuum tower and pushers.**      60      9
- 1. Remove tower guards, as required, by loosening the captive screws fastening the guard to the tower.
  - 2. Using a vacuum, clean dust and dirt from the following areas:

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- a. The air cylinder, solenoid valve, and proximity sensors for the pushers.
  - b. The backstop pushers.
  - c. The overpass pusher(s) and external pushers.
  - d. Around the look-in photo sensors.
  - e. The horizontal structural members and safety covers.
  - f. Top of cell PDP.
3. Replace tower guards, as required, by aligning the screws with the holes on the tower frame and tightening the screws until snug.

**CAUTION**

**The rodless air cylinder shuttle operation check, cleaning, and adjustment of air filter/regulator and rodless air cylinder speed checks must be performed in that order.**

5. **Check rodless air cylinder shuttle operation.** \* 4 9

\* Minutes for overpass pusher

\*\* Minute for external pusher \*\* 1

1. If rodless air cylinder being checked is on an overpass pusher, remove top cover on the overpass pusher enclosure by removing 6 Allen screws. Move shuttle until pusher blade extends down fully.

**NOTE**

Do not cause shuttle to bind when moving it. Apply force to move shuttle as close to shuttle as possible and parallel with rodless air cylinder.

2. Move the shuttle along the length of the rail by hand. The feel should be free moving with little side play. If shuttle does not move freely, a Gibb adjustment may be required.
3. Check the shuttle to ensure there is no side

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motion. If play is present, a Gibb adjustment may be required.

4. Move shuttle to full retract position and replace any cover(s) previously removed.

FRS

6. **Clean and adjust air filter regulator system (FRS) for compressed air to the tower.** 4 9

**WARNING**

**A face shield or safety glasses are required to prevent possible injury.**

**NOTE**

Typically each tower has an adjustable input air line with regulator.

1. Turn off and lock out the compressed air leading to the tower as prescribed by the current local lockout/restore procedures.
  2. Remove the bowl and filter from the filter/regulator controlling the air for the tower being serviced and clean filter with a clean cloth, brush, or paper wipe.
  3. Clean inside of regulator bowl with a clean cloth or paper wipe.
  4. Reinstall filter and bowl in filter/regulator.
  5. Remove lock out device from compressed air source to the filter/regulator and restore air pressure to the filter/regulator as prescribed by the current local lockout/restore procedures.
  6. Adjust air regulator to approximately 85 to 90 PSI.
7. **Check speed of rodless air cylinder.** 6 9

**CAUTION**

**Ensure a tower bin is properly aligned with external or overpass pusher to prevent damage to bin or pusher when cycling pusher.**

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**CAUTION**

**Do not exceed target times.**

1. Remove the angled cover at the end of the pusher cover by removing 6 Allen screws.
2. Extend and retract pusher by manually turning adjustment button (or knob) located on top of the solenoid-mounting block. Check time required to fully extend and fully retract the pusher.
  - a. Target time to extend the pusher is 2.5 to 3.0 seconds.
  - b. Target time to retract the pusher is 2.0 to 2.5 seconds.
3. Reinstall cover.
4. A work order will be required if the actual extend or retract target times differ from the listed target times.

**WARNING**

**Be cautious when working around or on equipment when power has been applied.**

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|---------|---|---|---|
| MACHINE | 8. <b>Restore equipment to service.</b> Restore equipment to service as prescribed by the current local lockout/restore procedures. | 1 | 9 |
|---------|---|---|---|

**WARNING**

**Discard solvent soaked materials according to local procedures to prevent spontaneous combustion.**

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|---|---|---|
| 9. <b>Handling of used oil and oil contaminated materials.</b> Handle used oil in accordance with facility's recycling program. Dispose of any materials contaminated by lubricants or used oil in accordance with facility's hazardous waste storage and disposal regulations. | 2 | 9 |
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CLEAN UP                      10. **Clean up.** Ensure all tools, lubricants, rags, etc., are removed from the work area. Notify supervisor of any deficiencies.                      1      All