AINTENANCE TECHNICAL SUPPORT CENTER
HEADQUARTERS MAINTENANCE OPERATIONS
UNITED STATES POSTAL SERVICE

Maintenance Management Order

SUBJECT: Preventive Maintenance for Seegrid Automated Guided Vehicle (AGV) Tow Motors

DATE: August 4, 2021

TO: All Sites Using Seegrid AGV Tow Motors

PUB NO: MMO-098-20
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REV LEVEL: ag

This Maintenance Management Order (MMO) provides Operational and Preventive Maintenance Guidelines for Seegrid Automated Guided Vehicle (AGV) tow motors. This bulletin applies to Acronym AGV and Class Code ST.

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

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 bargaining unit employees from performing any of this work.

WARNING

Various products requiring Safety Data Sheets (SDS) may be utilized during the performance of the procedures in this bulletin. Ensure the current SDS for each product used is on file and available to all employees. When reordering such a product, it is suggested that current SDS be requested. Refer to SDS 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 Electrical Work Plan (EWP) Personal Protective Equipment (PPE). Refer to the current EWP MMO for appropriate EWP PPE and barricade requirements.

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

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Attachments
1. Summary Workload Estimate For AGV_ST
2. Master Checklist 03-AGV-ST-001-M – AGV_ST Preventive Maintenance (PM)

ATTACHMENT 1

SUMMARY WORKLOAD ESTIMATE

FOR AGV_ST

SUMMARY WORK LOAD ESTIMATES FOR AGV_ST

Operation Days	Routine Servicing per Machine (Hrs/Yr)***	Repair Time per Machine (Hrs/yr)*	Routine Servicing + Repair Time (Hrs/Yr)	Non-Productive Time per Machine (Hrs/yr) **	Total Servicing per Machine (Hrs/Yr)	Operational Maintenance + Total Servicing		
						1 Tour Hrs/Yr OpM x 1	2 Tours Hrs/Yr OpM x 2	3 Tours Hrs/Yr OpM x 3
5 Days	72.94	21.88	94.82	9.50	104.46	104.46	104.46	104.46
6 Days	85.07	25.52	110.59	11.07	121.81	121.81	121.81	121.81
7 Days	97.20	29.16	126.36	12.65	139.16	139.16	139.16	139.16

* **Repair maintenance estimates based on 30% of preventive maintenance.**

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

*** **Allotment for LDC 37 (excludes modifications, alterations, training, and non-productive allowances).**

THRESHOLDS and PM TIME SUMMARY Hrs PER Year			OPERATIONAL MAINTENANCE PER MACHINE		
Daily (7 days)	84.93				
Weekly	0.00		One Tour	Two Tours	Three Tours
Monthly	7.37	5 Day	0	0	0
Bi-Monthly	4.01	6 Day	0	0	0
Quarterly	0.00	7 Day	0	0	0
Semi-Annual	0.00				
Annual	1.00				

ATTACHMENT 2

MASTER CHECKLIST

03-AGV-ST-001-M

AGV_ST PREVENTIVE MAINTENANCE (PM)

Time Total: (145) minutes

U.S. Postal Service Maintenance Checklist	IDENTIFICATION															
	WORK CODE		EQUIPMENT ACRONYM								CLASS CODE		NUMBER			TYPE
	0	3	A	G	V						S	T	0	0	1	M
Equipment Nomenclature: Automated Guided Vehicle	Equipment Model: Seegrid AGV Tow Motor										Bulletin Filename: mm20095					Occurrence: Daily

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	**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. 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 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. **WARNING FOR EWP/PPE:** Steps contained in this bulletin may require the use of Electrical Work Plan (EWP) Personal Protective Equipment (PPE). Refer to the current EWP MMO or appropriate EWP PPE and barricade requirements. **WARNING:** Various products requiring Safety Data Sheets (SDS) may be utilized during the performance of the procedures in this bulletin. Ensure the current SDS for each product used is on file and available to all employees. When reordering such a product, it is suggested that current SDS be requested. Refer to SDS for appropriate personal protective equipment.	1	07			

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.
VEHICLE: VISION GUIDANCE UNIT	2	**Verify VGU (Vision Guidance Unit) is secure.** 1. Ensure all connectors are seated and secure, including the ground wire. Ensure VGU is level. 2. Ensure VGU is secured to the mast with four bolts. 3. Verify the cameras are clean.	2	09			C
VEHICLE: VEHICLE INTERFACE MODULE	3	**Verify the VIM (Vehicle Interface Module) is secure and all connectors are seated and secure including the ground wire.**	2	09			C
VEHICLE: POWER DISTRIBUTION MODULE	4	**Verify the PDM (Power Distribution Module) is secure and that all connectors are seated and secure.**	2	09			C
VEHICLE: GRAPHICAL OPERATOR INTERFACE	5	**Verify the GOI (Graphical Operator Interface) is secure and all connectors are seated and secure.**	2	09			C
VEHICLE: STEERING ASSEMBLY	6	**Verify target fasteners are tightened.** 1. Verify the chain is tensioned according to specifications. 2. Verify a light film of lubrication is on the chain. 3. Verify the home/limit sensors and brackets are tight. 4. Inspect the sprocket for looseness. 5. Verify the encoder is secure and the set screws are tight. 6. Check tiller encoder alignment. 7. Use Maintenance Manual on MTSC AGV equipment page as a reference guide.	2	09			C
CHASSIS: HITCH	7	**Inspect Hitch for damage and alignment Per MTSC KB0013419.**	15	09			M
VEHICLE: WHEELS	8	**Check load wheels for flat spots, cracks, missing pieces and separation from the hubs.** 1. Check drive wheels for flat spots, cracks, missing pieces and separation from the hubs. 2. If issues are found, create a work order and repair immediately.	3	09			C
VEHICLE: LUBRICATION	9	**Lubricate the lower steering bearings.** 1. Lubricate the rear wheels.	11	09			C

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. Lubricate the tiller arm and coast controls. 3. Lubricate the jaw coupler. 4. Use Maintenance Manual for lubricant information.					
VEHICLE: HOOD	10	**Inspect the hood for damage.**	1	09			C
SAFETY DECALS	11	**Verify all safety decals and signs are present and intact (use Maintenance Manual to locate all decals).**	1	07			C
VEHICLE: PRIMARY OBSTRUCTION SENSOR	12	**Inspect the primary obstruction sensor lens for scratches, debris, and fibers.** 1. Wipe lens with microfiber cloth (PSN 8540-16-000-3307). 2. If the lens is scratched, generate a work order to replace as soon as possible.	1	09			C
VEHICLE: SMART PATH SENSORS	13	**Inspect the three sensors on the VGU and one sensor on the hood for scratches, debris, or fibers.** 1. Wipe lens with microfiber cloth (PSN 8540-16-000-3307). 2. If scratches are found, generate a work order and replace lens or sensor as soon as possible.	1	09			C
CHASSIS: STEERING ASSEMBLY	14	**Lubricate Steering Assembly Drive Chain.** Consult Maintenance Manual to determine proper lubricant.	5	07			A
CHASSIS: TRAMSMISSION	15	**Drain transmission oil and refill per Maintenance manual.** Consult Maintenance Manual to find lubricant type.	30	07			A
CHASSIS: TILLER ARM	16	**Lubricate tiller arm chain.** Use Maintenance Manual to determine lubricant.	5	07			A
CHASSIS: DRIVE BRAKE	17	**Check main motor brake rotor air gap.** Follow procedure from Maintenance Manual. Gap should be between 0.3 mm to 0.8 mm.	5	09			A
VEHICLE: CAMERA	18	**Remove SD card from front and rear facing cameras.** Format and reinsert. Refer to MTSC KB0013572.	15	10			M
VEHICLE: CHASSIS	19	**Clean dust from motor.** 1. Check all wiring, bolts, and nuts.	9	09			C

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 transmission for cracks, damage, and leaking. 3. Check function of steering system (mounting, movement, and play). 4. Check function of the brake using the brake button on the steer head.					
CHASSIS: HITCH	20	**Perform final two steps of hitch inspection Per MTSC KB0013419.**	4	09			M
VGU: CAMERA	21	**Take camera snapshots per Maintenance Manual for vendor.** Follow procedure from Maintenance Manual.	5	10			A
VEHICLE: CHASSIS	22	**Check drive motor and steering motor for current draw.** Use Maintenance Manual for location of test points and reference settings.	10	09			A
VEHICLE	23	**Perform Normal shutdown on AGV System.**	2	07			D
VEHICLE	24	**Perform walk around of the AGV and check for damage.** 1. Check for loose parts and hardware. 2. Ensure all warning decals are legible. 3. Check that all tires and wheels are in good condition. 4. Check that brakes are functional in forward and reverse. 5. Create a work order for any discrepancies found. Notify Maintenance.	1	07			D
VEHICLE	25	**Inspect obstruction sensors, camera lenses, and surrounding area for damage or debris.** 1. Check all sensors and camera lenses, ten on VGU, one near front bumper and dash cams. 2. Check light curtain sensor and mirrors. 3. Check three sensors on the VGU and three on the hood. 4. Check reverse sensors. 5. Clean dirt or debris with a microfiber cloth, gently wiping lenses clean. 6. Clean VGU cameras with a blower brush or use lens cleaner.	1	09			D

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.
VEHICLE	26	**Start AGV.** 1. Turn Power keyswitch to **On**. Wait for display to show “Manual Mode Screen” or “Main Menu”. 2. Honk horn. 3. Steer full left and right to check freedom of travel. 4. Press each E-stop and confirm vehicle will not move with application of throttle (each E-stop (three) in sequence). 5. Release E-stop and confirm normal operation (in sequence). 6. Turn Mode Selector switch to **Auto** mode and follow on-screen instructions. 7. Confirm AGV completes steering alignment.	2	07			D
VEHICLE	27	**Verify battery is charged to a minimum of 75% for non-opportunity charging operation or at least 40% for opportunity charging operations.**	1	07			D
VEHICLE: GOI	28	**Check GOI for fault messages, report any fault messages to maintenance.**	1	07			D
FINAL-CLEANUP	29	**Clean up.** 1. Ensure all tools, lubricants, rags, etc., are removed from the work area. 2. Note any deficiencies and generate a work order/report them to supervisor.	5	07			D