Instructional/Task Analysis

Related Information: What the Student Should Know	Application: What the Student Should Be Able to Do

Unit 1: Introduction to Preventive Maintenance

1. Purposes of a preventive maintenance inspection
2. Basis for setting up a preventive maintenance inspection schedule
3. Types of preventive maintenance inspections
4. Federal regulatory agencies
5. Periodic maintenance inspections (PMI)
6. PMI recordkeeping requirements
7. Inspector qualifications
8. Lubricants used in preventive maintenance inspections
9. Walk around inspection
10. Shop/vehicle rules, and shop setup
11. Specialty tools
12. General guidelines for conducting PMI's

1. Find information on recalls

Unit 2: In-Cab Inspection

<u>Key Off</u>

1. Check floor mats and/or coverings
2. Check seat condition, operation, and mounting
3. Check seat belts and sleeper restraints
4. Check steering wheel play or bending; check operation of horn (electronically operated, if equipped)
5. Check windshield glass for cracks or discoloration; check sun visor(s)
6. Check on lighting of all gauges and operation of interior and bunk lights
7. Check operation of gear shift

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Unit 2: In-Cab Inspection (continued)	
8. Check door glass and operation of windows (manually operated windows) 9. Check clutch free travel 10. Check condition and documentation of safety flares, spare flares, triangles, fire extinguishers, and all required decals <u>Key On</u> 1. Check key condition and operation of ignition switch 2. Check warning indicators 3. Check system voltage 4. Check operation of windshield wipers/washers 5. Check operation of all accessories and controls 6. Extract engine monitoring information <u>Engine On</u> 1. Check starter operation 2. Check engine starting/operation; record idle and governed RPM 3. Check instruments; record oil pressure 4. Test air pressure build-up time 5. Check heater, ventilation, and air conditioning operation and controls in cab and sleeper 6. Check operation of air operated horn (if equipped), and backup warning devices 7. Check door glass and window operation (air operated, if equipped) 8. Check operation of parking brake 9. Check operation of the clutch and clutch brake 10. Check mechanical, electronic, and emergency shutdown operation	1. Perform and in-cab inspection

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Unit 3: Exterior Inspection	
1. Check door operation locks, latches, and hinges (both sides)	
2. Check condition of grab handles, steps, and catwalks (cab and sleeper, both sides)	
3. Check mirrors, mountings, brackets, and glass (both sides)	
4. Check and record all physical (body) damage (all around)	
5. Check fuel tanks, mounting, lines, caps, and vents	
6. Check battery box(es), cover(s), and mounts	
7. check battery hold-downs, connections, cables, and cable routing	
8. Check/record battery(s) state-of-charge and capacity (load test)	
9. Check coupling air line, holders, glad hands, and multi-wire connection	
10. Check air drier drain valve, mounting, fittings, and connections	
11. Check fifth wheel mounting bolts, air lines, and locks	
12. Check operation of fifth wheel device	
13. Check mud flaps and brackets (both sides)	
14. Check pintle hook assembly and mounting	
15. Check frame and frame members (all around)	
16. Check and record suspension ride height	
17. Check all exterior lights, lenses, covers, and reflectors	
18. Check license plate and bracket (front and back)	
19. Check exhaust system for leaks, proper routing and damaged or missing components; check mountings for looseness and damage	
20. Check cab mounting, hinges, latches, linkages, and cables	

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Unit 3: Exterior Inspection (continued)

21. Check wiper blades, arms, and windshield washer	1. Make a battery state-of-charge test
22. Check headlight alignment	2. Determine battery state-of-charge using an open circuit voltage test
23. Lubricate all cab and hood grease fittings and lubricate door and hood hinges, latches, strikes, lock cylinders, safety latches, linkages, and cables	3. Make a battery capacity (load) test
24. Lubricate all fifth wheel grease fittings and plate.	4. Inspect, test, repair, and replace the components of tractor-to-trailer lights circuit
	5. Inspect and test an air suspension system, replace the leveling valve, and adjust frame (ride) height
	6. Inspect, replace, and aim headlights/bulbs
	7. Perform an exterior inspection

Unit 4: Brakes Inspection

Air Brakes

1. Check parking brake operation, and check for air leaks with the brakes applied and released
2. Check brake chambers and air lines for secure mounting and damage
3. Check air governor cut-in pressure, record air governor cut-out setting, and check air drier drain valve operation
4. Check one-way and double-check valves, and tractor protection valve
5. Check low pressure warning devices and air pressure build-up time
6. Inspect and record condition of brake lining pads and brake drum/rotor, and check condition of camshaft and bushing
7. Check operation and adjustment of manual/automatic slack adjusters
8. Check condition and operation of hand brake (trailer control valve)
9. Perform antilock brake system (ABS) operational system self-test
10. Check spring brake inversion system

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Unit 4: Brakes Inspection (continued)

Hydraulic Brakes 1. Check master cylinder fluid level and conditions 2. Check power brake booster(s), hoses, and check/control valves 3. Check wheel cylinders/calipers, brake lines, fittings, flexible hoses, and valves for leaks and damage 4. Check and record brake lining/pad condition and thickness 5. Check and record conditions of front and rear brake drums/rotors 6. Check parking brake operation, inspect parking brake application and holding devices 7. Check operation of hydraulic systems; pedal travel, pedal effort, and pedal free	1. Inspect, clean, and measure brake calipers, pads, and rotors (air brakes) 2. Inspect, service, and adjust slack adjuster on front axle (air brakes) 3. Remove, clean, inspect, and measure a brake drum (hydraulic brakes) 4. Adjust hydraulic drum brakes 5. Lubricate brake component grease fittings 6. Perform a brakes inspection

Unit 5: Tires and Wheels Inspection

1, Check tires for irregular wear patterns and proper mounting of directional tires 2. Check tire matching (diameter and tread) on dual tire installations 3. Check condition of tires 4. Check valve caps and stems 5. Check and record tread depth, and probe for embedded debris 6. Check and record air pressure 7. Check lugs, spacers, wheels, and mounting hardware 8. Check dual mating with square 9. Check king pin wear 10. Check tandem axle alignment and spacing 11. Check toe-in 12. Check wheel bearings for looseness and noise	1, Diagnose unusual tire wear patterns, check tire pressure, measure and match tires, and re-torque lugs 2. Check toe; adjust as needed 3. Remove, inspect, clean, replace, and adjust wheel bearings and seals 4. Perform a tires and wheels inspection

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Unit 6: Under-Vehicle Inspection	
1. Check frame and frame members for cracks and damages	
2. Check engine mounts for looseness and deterioration	
3. Check electrical wiring, routing, and hold-down clamps	
4. Check exhaust system (under vehicle) for leaks, proper routing, and damaged or missing components; check mountings for looseness and damage	
5. Check clutch linkage/cable for looseness or binding	
6. Check transmission mounts	
7. Check transmission case, seals, lines, cooler, and fittings for leaks and cracks; check breather	
8. Check transmission oil level, type, and condition (standard transmission)	
9. Check U-joints, yokes, drive lines, and center support bearings for looseness, damage, and proper phasing	
10. Check axle housings for cracks and leaks; check axle breather	
11. Check drive axle(s) oil level, type, and condition	
12. Check oil level and condition in non-drum hubs	
13. Check two-speed axle unit operation and oil level	
14. Check steering gear for leaks and secure mounting	
15. Check steering shaft U-joints, pinch bolts, splines, pitman arm-to-steering sector shaft, tie rod ends, and linkage assist power steering cylinders	
16. Check springs, hangers, shackles, spring U-bolts, and insulators	
17. Check shock absorbers	

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Unit 6: Under-Vehicle Inspection (continued)

18. Check air suspension springs, mounts, hoses, valves, linkage, and fittings
19. Check vibration damper

1. Change transmission oil and filter
2. Check axle fluid level and condition; change oil and filter; clean magnetic plug(s)
3. Inspect and service driveshaft, slip joints, yokes, drive flanges, and U-joints; check phasing of all yokes
4. Inspect front suspension components
5. Inspect rear spring suspension components
6. Perform drive train lubrication
7. Perform an under-vehicle inspection

Unit 7: Engine Compartment Inspection

Engine Off

1. Check belts, tensioners, and pulleys
2. Check engine oil
3. Check engine for oil, coolant, and fuel leaks
4. Change engine oil and filters, inspect and clean magnetic drain plugs, and take an oil sample
5. Check electrical wiring routing, and hold-down clamps; including Engine Control Module/Powertrain Control Module (ECM/PCM)
6. Check throttle linkages and return springs
7. Check starter mounting and connections
8. Check alternator mounting and connections
9. Check windshield washer fluid
10. Check hydraulic brake master cylinder fluid level and condition
11. Check hydraulic clutch slave and master cylinder
12. Check power brake booster(s), hoses, and check/control valves
13. Check power steering fluid and filter

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Unit 7: Engine Compartment Inspection (continued)

14. Check power steering pump, mounting and hoses for leaks, condition, and routing
15. Check steering gear for leaks and secure mounting
16. Check steering shaft U-joints, pinch bolts, splines, pitman arm-to-steering sector shaft, tie rod ends, linkage, and linkage-assist power steering cylinders
17. Check A/C condenser/compressor and lines for mounting, condition, and leaks
18. Check fuel pump and fuel line mountings
19. Check water separator/fuel heater
20. Check air filter
21. Check turbocharger for leaks; check mountings and connections
22. Check radiator; service coolant filter/conditioner
23. Check coolant recovery system, and coolant hoses and clamps
24. Check coolant for contamination, additive concentration, and protection levels
25. Pressure test cooling system and radiator cap
26. Check fan assembly and shroud
27. Check air supply system
28. Check tilt cab system

Engine On

1. Check engine for oil, coolant, air, and fuel leaks
2. Check air induction system
3. Check transmission oil level, type, and condition (automatic transmissions)
4. Check/record alternator current and voltage output
5. Check air conditioning system
6. Check operation of engine/exhaust brake

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Unit 7: Engine Compartment Inspection (continued)	
7. Check operation of fan clutch 8. Check HVAC inlet filters and ducts 9. Check exhaust system for leaks, proper routing and damaged or missing components; check mountings for looseness and damage	1. Inspect and adjust drive belts and tensioners 2. Take oil sample, and change oil and filter(s) 3. Inspect engine coolant level and condition 4. Pressure test coolant system and radiator cap 5. Make a charging system output test; determine needed repairs 6. Perform an engine compartment inspection
Unit 8: Cargo Handling Devices Inspection	
1. Check fluid levels 2. Check all hydraulic components 3. Check all electrical components 4. Check liftgate components 5. Lubricate ramp	1. Lubricate cargo handling devices 2. Perform a cargo handling devices inspection
Final Assessment	
	1. Perform a complete preventive maintenance inspection