SCHEDULED MAINTENANCE PROGRAM

ALL SWITCHER MODELS
ALL PASSENGER MODELS
ALL "F" MODELS
ALL GP7-GP9 MODELS
ALL SD7-SD9 MODELS

INTRODUCTION

Maintenance Instruction 1704 comprises average recommendations which we believe will insure satisfactory locomotive operation and economical maintenance costs where average load factors and average climatic conditions are encountered. It is intended to serve as a basis which users of EMD locomotives can use to establish maintenance schedules that will meet the specific requirements of their own particular operations.

In previous issues of this Maintenance Instruction we listed five fundamental requirements that are important to any successful maintenance program. We still consider them important and, since only the railroads can provide them, we are again listing them here:

1. Enough and well-trained supervision and quality workmen.
2. Mechanical forces with proper maintenance facilities and tools.
3. Sufficient time for scheduled maintenance to be completed before a locomotive is released for its next assignment.
4. Fuel, lubricating oil, and water treatment that is equal to or better than that required to insure satisfactory engine and steam generator performance.
5. A well-scheduled maintenance program, including an adequate set of maintenance records.

We call your attention to the following special maintenance item not included in the scheduled maintenance program.

After a cylinder assembly equipped with a copper-asbestos cylinder head to liner gasket has been serviced, it is important that this assembly receive the following attention after the first 1,000 miles or 72 hours of operation, or as near thereto as possible:

a. Retorque all liner and crab stud nuts while engine is hot.
b. Visually inspect blade rod bearing surface.
c. Recheck injector timing and rack setting.
d. Make a complete top deck and air box inspection for leaks which may have been previously overlooked.

* This bulletin is revised and supersedes previous issues of this number.
Section 1 covers Maintenance Recommendations for locomotives used in Passenger and Freight service. Section 2 covers Maintenance Recommendations for locomotives used in Switching service. Section 3 covers Scheduled Lubrication Recommendations.

**SECTION 1**

**LOCOMOTIVE MECHANICAL AND ELECTRICAL MAINTENANCE SCHEDULE**
**(SCHEDULE LOCOMOTIVES ACCORDING TO TYPE OF SERVICE)**

<table>
<thead>
<tr>
<th>FREIGHT</th>
<th>PASSENGER</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 WEEKS OR 5,000 MILES</td>
<td>2 WEEKS OR 10,000 MILES</td>
<td></td>
</tr>
</tbody>
</table>

**MECHANICAL**

1. **INSPECT ENGINE**
   - a. Crankcase
   - b. Pistons and liners
   - c. Cylinder head mechanism with engine idling.

2. **ENGINE AIR FILTERS**
   - a. Change filters (Impingement type only)

3. **CHECK ENGINE LUBE OIL FOR DILUTION OR WATER**

4. **CHECK ENGINE COOLING SYSTEM**
   - a. Water inhibitor
   - b. Cooling fans
   - c. Shutter operation

5. **CHANGE LUBE OIL FILTERS**
   - a. Clean lube oil strainers

6. **CHANGE CARBODY AND ELECTRICAL CABINET AIR FILTERS**

7. **CHECK CONDITION AND TENSION OF BELTS**

8. **CLEAN RADIATOR ORIFICE VENTS**

   - Engine Maintenance Manual
   - 567A and B Engines Only
   - See Item 14 for other model engines.
   - See Items 10, 22 and 31 for other type filters.
   - Engine Maintenance Manual M.I. 1752
   - Engine Maintenance Manual M.I. 580, 4102
   - More frequent maintenance will be required if fuel and lube oil used do not meet EMD specifications, M.I. 1750 and 1752.
   - Where used - M.I. 904
   - Where used
9. CHANGE OR CLEAN FUEL FILTERS
   a. Sintered bronze
   b. Suction and discharge

10. ENGINE AIR FILTERS
    a. Check oil level - add if required
       (Oil bath type)
    b. Remove and clean panels
       (Centrifugal type)

11. CHECK CONDITION AND OPERATION
    OF FAN CLUTCH

12. VISUALLY INSPECT AND CLEAN
    WHERE REQUIRED
    a. Controller
    b. Dynamic brake grids
    c. Equipment in electrical cabinet

13. WASH OUT BATTERY BOXES AND
    GREASE BATTERY TERMINALS
    a. Check battery water level and
       gravity.

MECHANICAL

14. INSPECT ENGINE
    a. Crankcase
    b. Pistons and liners
    c. Cylinder head mechanism with
       engine idling

M.I. 732 and 741 - More frequent maintenance will be required if fuel used does not meet EMD specifications - M.I. 1750

See Items 2, 22 and 31 for other type filters.
M.I. 481

Soak panels in mild alkali solution, rinse and blow dry.
Where used

M.I. 586, 1317, 5328, 5374, 4312, 5105, 5300.

If battery gravity is low or water usage high, check operation of voltage regulator - Item 27.

Engine Maintenance Manual
567 AC, BC, and C Engines ONLY.
See Item 1 for other models.
15. CHANGE ENGINE LUBE OIL
   a. Clean oil suction screen
   b. Clean scavenging oil screens
   c. Clean oil pan
   d. Change oil filters
   e. Clean filter housing
   f. Clean and inspect oil filter relief valves

16. CHECK OPERATION AND ADJUSTMENT
   a. Overspeed trip
   b. Valve lash adjusters

17. DRAIN CONDENSATE FROM FUEL TANK

18. CHECK TRACTION MOTOR BLOWER
    DRIVE FOR SLACK AND WEAR OF
    CHAIN AND SPROCKET

19. CLEAN AND INSPECT LUBRICATING
    NOZZLE, NO. 2 TRACTION MOTOR
    BLOWER CHAIN DRIVE

20. CLEAN OIL COOLER BREATHERS

21. RENEW AIR COMPRESSOR
    UNLOADER DIAPHRAGMS

22. ENGINE AIR FILTERS
    (CENTRIFUGAL TYPE)
   a. Remove and clean
   b. Inspect for missing or loose parts

23. CHECK BELT DRIVEN TRACTION
    MOTOR BLOWER SPEED USING
    HAND TACHOMETER

24. INSPECT LEADS AND REPLACE BRUSHES
   a. Auxiliary generators and alternators
   b. Traction motors and blower motors
   c. Headlight dynamotors
   d. Cooling fan motors

ELECTRICAL

Experience with individual operations will dictate the frequency of this item. Brush life will vary from three (3) to six (6) months, depending on the type of service and operating conditions. M.I. 3900.
25. MAKE SEQUENCE CHECK OF
CONTROL CIRCUITS

26. CHECK LOW VOLTAGE ELECTRICAL
SYSTEM FOR GROUNDS

27. CHECK OPERATION OF VOLTAGE
REGULATOR

28. CHECK COOLING FAN THERMOSTATIC
SWITCH AND SHUTTER OPERATION

29. CHECK OPERATION OF AIR
COMPRESSOR CONTROL SWITCHES

30. INSPECT AND CLEAN LOAD
REGULATORS
   a. Commutator and slip ring (vane type)

   Regulator must be at operating
temperature - M.I. 4510

M.I. 5501, 5507, 5511

M.I. 5510

M.I. 4504

31. ENGINE AIR FILTERS
   (OIL BATH TYPE)
   a. Clean and change oil

See Items 2, 10 and 22 for other
type filters.
M.I. 431

32. TIGHTEN NUTS AROUND OIL COOLER
    CORE

33. CLEAN AND INSPECT AIR COMRESSOR
    VALVES, SUCTION AND DISCHARGE

M.I. 1110

34. INSPECT MAIN GENERATOR LEADS
    AND REPLACE BRUSHES

See Item 24

35. CHECK OPERATION AND
    CALIBRATION
   a. Transition meters
   b. Alarm devices
      1. High temperature
      2. Low oil pressure
      3. High oil suction
      4. No voltage

M.I. 5323, 5511, 5521, 5522, 6831
36. CLEAN AND INSPECT ISOLATION SWITCH

37. INSPECT TRACTION MOTOR AIR DUCT BELLows
   a. Alignment
   b. Leakage
   c. Wear plates and arm

38. BLOW DIRT OUT OF RADIATOR AIR PASSAGES
    With fans running and shutters open.

39. CHECK ENGINE CONTROL ADJUSTMENTS
    a. Injector timing
    b. Injector rack setting
    c. Engine speed
    d. Pilot valve setting

40. RENEW OIL PRESSURE AND SUCTION DIAPHRAGMS IN ENGINE GOVERNOR

41. RADIATOR HEADER SCREENS
    a. Clean or renew

42. CLEAN AND INSPECT SPEED RECORDER

43. LUBE OIL COOLER CORE
    a. Check temperature differential
       between lube oil and cooling water into engine.

44. INSPECT FOR LEAKS
    a. Fuel system
    b. Cooling system
    c. Lube oil system
    d. Exhaust system

        M.I. 4907

        MECHANICAL

        Engine Maintenance Manual
        Readjust pilot valve setting if engine speed is changed.

        Clean oil cooler core if required.

        Engine Maintenance Manual
        Operating Manual
45. CLEAN AIR COMPRESSOR FILTERS
   a. Intake filter
   b. Separator screen
   c. Discharge filter (Pipe line filter)

   M.I. 1110

   ELECTRICAL

46. CHECK WHEEL SLIP AND GROUND RELAY OPERATION
   M.I. 599, 2027, 5353, 5384

47. CHECK SETTING OF RELAYS IN AUTOMATIC TRANSITION CIRCUIT
   M.I. 2044, 5360, 5497, 6825, 6829, 6833, 6834, 6835

48. CLEAN AND INSPECT MAGNET VALVES
   a. Electro-pneumatic governor control
   M.I. 4704

49. UNIT EXCHANGE TRACTION MOTORS

   MECHANICAL

50. RECONDITION ALL CYLINDER ASSEMBLIES EQUIPPED WITH COPPER-ASBESTOS GASKETS
   a. Renew head seals, gaskets and liner seals
   b. Renew piston rings
   c. Clean crankcase top deck, air box and oil pan

   Engine Maintenance Manual
   567A and 567B engines -
   See Item 51 for "C" engines
MECHANICAL

51. RECONDITION ALL CYLINDER ASSEMBLIES EQUIPPED WITH GROMMETS AND ALL-METAL GASKETS
   a. Replace grommets, all-metal gaskets and lower liner seals
   b. Renew piston rings
   c. Clean crankcase top deck, air box and oil pan

52. TAKE COMPRESSION LEAD READINGS OF ALL CYLINDERS

53. REMOVE BATTERIES, CLEAN AND PAINT BATTERY BOXES

54. RECONDITION ACCESSORY DRIVE GEAR (LEAF SPRING TYPE ONLY)

55. UNIT EXCHANGE INJECTORS

56. RECONDITION AIR COMPRESSOR CYLINDER ASSEMBLIES

57. RECONDITION WATER PUMPS

58. RENEW ALL WATER HOSES

Engine Maintenance Manual
567AC, 567BC and 567C engines

Engine Maintenance Manual

Change to hardened face plates

ELECTRICAL

59. RECONDITION FUEL PUMP AND MOTOR

60. RENEW VERNATHERM BULB ASSEMBLY
    #8081076

M.I. 4101, 4110

M.I. 5501

ELECTRICAL

61. UNIT EXCHANGE TRACTION MOTORS

62. DYNAMIC BRAKE BLOWER MOTORS
   a. Inspect leads and replace brushes if required.
<table>
<thead>
<tr>
<th>FREIGHT</th>
<th>PASSENGER</th>
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<tbody>
<tr>
<td>4 YEARS OR</td>
<td>4 YEARS OR</td>
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<tr>
<td>480,000 MILES</td>
<td>960,000 MILES</td>
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</tbody>
</table>

**REMARKS**

Engine Maintenance Manuals

63. INSTALL NEW THRUST COLLARS AND NEW LOWER MAIN BEARINGS

64. UNIT EXCHANGE ENGINE GOVERNOR

65. UNIT EXCHANGE ENGINE BLOWERS

66. UNIT EXCHANGE COOLING FAN (TYPE 1666 ONLY)

<table>
<thead>
<tr>
<th>FREIGHT</th>
<th>PASSENGER</th>
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</thead>
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<td>6 YEARS OR</td>
<td>6 YEARS OR</td>
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<tr>
<td>720,000 MILES</td>
<td>1,440,000 MILES</td>
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</tbody>
</table>

67. UNIT EXCHANGE ENGINE ASSEMBLY 567A and 567B engines only. See Item 73 for "C" engines

68. UNIT EXCHANGE MAIN GENERATOR Experience may show Items 68 through 72 can be postponed to coincide with Item 73 on late model units.

69. UNIT EXCHANGE

   a. Auxiliary generator
   b. Dynamic brake blower motor
   c. Cooling fan motors
   d. Traction motor blower motors

70. RECONDITION ENTIRE AIR COMPRESSOR ASSEMBLY M.I. 1065, 1110

71. CLEAN AND RECONDITION ENTIRE CARBODY

72. CLEAN AND RECONDITION

   a. Fuel tank
   b. Water tank
   c. Battery boxes
73. UNIT EXCHANGE ENGINE ASSEMBLY

74. RENEW HIGH VOLTAGE CABLE

75. RENEW LOW VOLTAGE WIRING

567 AC, 567 BC and 567 C engines

It is recognized that this work (Items 74 and 75) is normally scheduled with other major repairs and not at this particular time or mileage. Shop efficiency may require this operation at time of engine and generator unit exchange.

NON-SCHEDULED MECHANICAL AND ELECTRICAL MAINTENANCE

A definite schedule for the items listed below cannot be established due to variation in wheel life and truck overhaul periods. This rework to be performed at wheel change time or when truck is removed for reconditioning.

1. MAGNAFLUX

   a. Pinion gears
   b. Axles gears
   c. Axles with inner races removed

2. CHECK TRACTION MOTOR ARMATURE BEARINGS

   Whenever truck assembly is removed from locomotive, check traction motors for any unusual bearing noise or heat at not less than 1500 RPM. M.I. 3900

3. CLEAN AND RECONDITION HYATT JOURNAL BOXES

   M.I. 1552

SECTION 2

LOCOMOTIVE MECHANICAL AND ELECTRICAL MAINTENANCE SCHEDULE

SWITCHER
2 WEEKS

MECHANICAL

1. ENGINE AIR FILTERS

   a. Change filters (Impingement type only)

   See Items 9, 13, 19 and 27 in this section for other type filters.
MECHANICAL

2. CHECK ENGINE LUBE OIL FOR DILUTION OR WATER

3. CHECK ENGINE COOLING SYSTEM
   a. Water inhibitor
   b. Cooling fans
   c. Shutter operation

4. CHANGE LUBE OIL FILTERS
   a. Clean lube oil strainers

5. CHANGE CARBODY AIR FILTERS

6. INSPECT TRACTION MOTOR AIR DUCT BELLOWs
   a. Alignment
   b. Leakage
   c. Wear plates and arm

7. BLOW DIRT OUT OF RADIATOR AIR PASSAGES

8. CHECK CONDITION AND TENSION OF BELTS

9. ENGINE AIR FILTER (CENTRIFUGAL TYPE)
   a. Remove and clean panels.

   ELECTRICAL

10. WASH OUT BATTERY BOXES AND GREASE BATTERY TERMINALS
    a. Check battery water level and gravity

    Engine Maintenance Manual
    M.I. 1752

    More frequent maintenance will be required if fuel and lube oil used do not meet EMD specifications - M.I. 1750 and 1752.

    With fans running and shutters open.

    M.I. 904

    Soak panels in mild alkali solution, rinse and blow dry.
    See Items 1, 13, 19, and 27 for other type filters.

    If battery gravity is low and water usage is high, check operation of voltage regulator, Item 24.
MECHANICAL

11. INSPECT ENGINE
   a. Crankcase
   b. Pistons and liners
   c. Cylinder head mechanism with engine idling

12. CHANGE OR CLEAN FUEL FILTERS
   a. Sintered bronze
   b. Suction and discharge

13. ENGINE AIR FILTERS
    (OIL BATH TYPE)
   a. Check oil level - add if required

14. DRAIN CONDENSATE FROM FUEL TANK

15. CLEAN AIR COMPRESSOR FILTERS
    AND SCREENS
   a. Intake filter
   b. Separator screen
   c. Discharge filter (Pipe line filter)

16. CHECK OPERATION AND ADJUSTMENT
    a. Overspeed trip
    b. Valve lash adjusters

17. CLEAN OIL COOLER BREATHERS

18. RENEW AIR COMPRESSOR HIGH AND LOW PRESSURE UNLOADER DIAPHRAGMS

19. ENGINE AIR FILTERS
    (CENTRIFUGAL TYPE)
   a. Remove and clean
   b. Inspect for loose or missing parts

ELECTRICAL

20. CHECK COOLING FAN THERMOSTATIC SWITCH AND SHUTTER OPERATION

   Engine Maintenance Manual

M.I. 732, 741 - More frequent maintenance will be required if fuel used does not meet EMD specifications - M.I. 1750

See Items 1, 9, 19 and 27 for other type filters. M.I. 431

M.I. 1110

See Item 1, 9, 13 and 27 for other type filters.

M.I. 5501, 5507
ELECTRICAL

21. INSPECT AND CLEAN LOAD REGULATOR
   a. Commutator and slip ring (Vane type)
   b. Slip ring, contact button and brushes (Face plate type)

22. CHECK OPERATION OF AIR COMPRESSOR CONTROL SWITCHES

23. MAKE SEQUENCE CHECK OF CONTROL CIRCUIT

24. CHECK OPERATION OF VOLTAGE REGULATOR
   Must be at operating temperature
   M.I. 4510

25. VISUALLY INSPECT AND CLEAN WHERE REQUIRED
   a. Controller
   b. Dynamic brake grids
   c. Equipment in electrical cabinet

MECHANICAL

26. CHANGE ENGINE LUBE OIL
   a. Clean lube oil strainers
   b. Clean scavenging oil screens
   c. Clean oil pan
   d. Change oil filters
   e. Clean filter housing
   f. Clean and inspect oil filter relief valves

   Engine Maintenance Manual - More frequent maintenance will be required if fuel and lube oil used do not meet EMD specifications - M.I. 1750 and 1752.

27. ENGINE AIR FILTERS (OIL BATH TYPE)
   a. Clean and change oil

   See Items 1, 9, 13 and 19 for other type filters
   M.I. 431
ELECTRICAL

28. INSPECT LEADS AND REPLACE BRUSHES
   a. Main and auxiliary generators
   b. Alternators
   c. Traction motors and traction motor blower motors.
   d. Headlight dynamotors
   e. Dynamic brake blower motors
   Be certain that locomotive will operate until next inspection period before brush condemning limit is reached.

MECHANICAL

29. TAKE COMPRESSION LEAD READINGS OF ALL CYLINDERS
    Engine Maintenance Manual

30. CHECK ENGINE CONTROL ADJUSTMENTS
    Readjust pilot valve setting if engine speed is changed.

31. RENEW OIL PRESSURE AND SUCTION DIAPHRAGMS IN ENGINE GOVERNOR

32. INSPECT AND CLEAN AIR COMPRESSOR VALVES
    M.I. 1110

33. RADIATOR HEADER SCREENS
   a. Clean or renew

34. CLEAN AND INSPECT SPEED RECORDER
    If used.

ELECTRICAL

35. CHECK WHEEL SLIP AND GROUND RELAY OPERATION
    M.I. 599, 2027, 5353, 5384

36. CHECK SETTINGS OF RELAYS IN AUTOMATIC TRANSITION CIRCUIT
    M.I. 2044, 5360, 6825, 6829, 6833

37. INSPECT AND CLEAN ISOLATION SWITCH
    M.I. 4907

38. CHECK LOW VOLTAGE ELECTRICAL SYSTEM FOR GROUNDS
39. CHECK OPERATION AND CALIBRATION
   a. Transition meters
   b. Alarm devices
      1. High temperature
      2. Low oil
      3. High suction
      4. No voltage

M.I. 5511, 5521, 5522, 5323, 6831

40. LUBE OIL COOLER CORE
   a. Check temperature differential between lube oil and cooling water into engine.
   Clean oil cooler core if required

41. REMOVE BATTERIES AND PAINT BOXES

M.I. 5511, 5521, 5522, 5323, 6831

42. RENEW DIAPHRAGMS
    (Pneumatic-Hydraulic Governor)
   a. Transmitter - Controller
   b. Receiver - Governor

Engine Maintenance Manual

43. RECONDITION ALL CYLINDER ASSEMBLIES EQUIPPED WITH COPPER ASBESTOS-GASKET
   a. Renew head seals, gaskets, and liner seals
   b. Renew piston rings
   c. Clean crankcase top deck, air box and oil pan

Engine Maintenance Manual
567A and 567B engines only. See Item 47 for "C" engines.
MECHANICAL

44. UNIT EXCHANGE INJECTORS

45. RECONDITION AIR COMPRESSOR CYLINDER ASSEMBLIES

Experience may show that Items 44 and 45 can be postponed to coincide with engine cylinder assembly reconditioning (Item 47) on late model units.

46. RECONDITION WATER AND FUEL PUMPS

Engine Maintenance Manual M.I. 4110

SWITCHER

6 YEARS

MECHANICAL

47. RECONDITION ALL CYLINDER ASSEMBLIES EQUIPPED WITH GROMMETS AND ALL-METAL GASKETS

a. Replace grommets, all-metal gaskets, and lower liner seals
b. Renew piston rings
c. Clean crankcase top deck, air box and oil pan

Engine Maintenance Manual

567AC, 567BC, and 567C engines

48. RECONDITION ACCESSORY DRIVE GEAR (LEAF SPRING TYPE ONLY)

Engine Maintenance Manual

Change to hardened face plates

49. INSTALL NEW THRUST COLLARS AND NEW LOWER MAIN BEARINGS

Engine Maintenance Manual

50. UNIT EXCHANGE ENGINE GOVERNOR

51. UNIT EXCHANGE ENGINE BLOWERS

52. RENEW COOLING FAN BEARING

Switcher type only

SWITCHER

8 YEARS

53. UNIT EXCHANGE ENGINE ASSEMBLY

567A and 567B engines only

Engine Maintenance Manual
54. UNIT EXCHANGE MAIN GENERATOR

Experience may show that Items 55 through 61 can be postponed to coincide with Item 62 on late model units.

55. UNIT EXCHANGE TRACTION MOTORS

56. UNIT EXCHANGE

a. Auxiliary generator
b. Dynamic brake blower motors
c. Cooling fan motors
d. Traction motor blower motors

57. RECONDITION ENTIRE AIR COMPRESSOR ASSEMBLY

58. CLEAN AND RECONDITION HOOD AND CAB

59. CLEAN AND RECONDITION

a. Fuel tank
b. Battery boxes

60. RENEW HIGH VOLTAGE CABLE

It is recognized that this work is normally scheduled with other major repairs and not at this particular time or mileage. Shop efficiency may require this operation at time of engine and generator unit exchange.

61. RENEW LOW VOLTAGE WIRING

It is recognized that this work is normally scheduled with other major repairs and not at this particular time or mileage. Shop efficiency may require this operation at time of engine and generator unit exchange.

62. UNIT EXCHANGE ENGINE ASSEMBLY

567AC, 567BC, and 567C engines
NON-SCHEDULED MECHANICAL AND ELECTRICAL MAINTENANCE

A definite schedule for the items listed below cannot be established due to variation in wheel life and truck overhaul periods. This rework to be performed at wheel change time or when truck is removed for reconditioning.

1. MAGNAFLUX  
   a. Pinion gears  
   b. Axle gears  
   c. Axles with inner races removed

2. CHECK TRACTION MOTOR ARMATURE BEARINGS  
   Whenever truck assembly is removed from locomotive, check traction motors for any unusual bearing noise or heat at not less than 1500 RPM. M.I. 3900

3. CLEAN AND RECONDITION HYATT JOURNAL BOXES  
   M.I. 1552

SECTION 3

LOCOMOTIVE LUBRICATION SCHEDULE AND LUBRICANTS

The frequency of the lubricating periods indicated in this Section has been established by information received from those Railroads following EMD lubrication recommendations. It may be found that more or less frequent lubrication may be necessary than indicated herein. This is not necessarily an indication that the information is in error or that the equipment is defective. Final schedules must be determined from operating conditions, using the specified periods as a guide.

The following assemblies now have factory sealed bearings which require no further lubrication. When older types of these assemblies having unsealed bearings are replaced, the Unit Exchange or Repair and Return order should specify the installation of sealed bearings.

   a. Fuel pump motors, headlight dynamotors, and cab heater motors.  
   b. Cooling fan motors.  
   c. Traction motor blower motors.  
   d. Dynamic brake blower motors.  
   e. Auxiliary generators  
   f. Traction motors.

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<thead>
<tr>
<th>FREIGHT</th>
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<tr>
<td>1 WEEK OR</td>
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<tr>
<td>2,500 MILES</td>
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1. TRACTION MOTOR - Armature Bearing (Oil Type - 12 tooth pinion only)  
   See M.I. 1756. Add 6 ounces to each bearing.
<table>
<thead>
<tr>
<th>PASSENGER</th>
<th>SWITCHER</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 WEEK OR 5,000 MILES</td>
<td>1 MONTH</td>
<td></td>
</tr>
<tr>
<td>2. TRACTION MOTOR - Support Bearings</td>
<td></td>
<td>See M.I. 1756. Fill to 5&quot;. Capacity 5 quarts. Do not overfill.</td>
</tr>
<tr>
<td>3. TRACTION MOTOR - Gear Case</td>
<td></td>
<td>Sinclair Jet TM or equivalent. Add as inspection indicates. Keep teeth from becoming bright.</td>
</tr>
<tr>
<td>4. TRACTION MOTOR - Blower Chain Case (E7 - No. 1 engine only)</td>
<td></td>
<td>See M.I. 1756. Check level, add oil as necessary.</td>
</tr>
<tr>
<td>5. JOURNAL BOX - Roller Bearing Type</td>
<td></td>
<td>See M.I. 1756. Maintain to fill plug level. Use gauge 8084927.</td>
</tr>
<tr>
<td>7. SPEED RECORDER - Drive Cable</td>
<td></td>
<td>Per manufacturer's instructions.</td>
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<th>FREIGHT</th>
<th>2 WEEKS OR 5,000 MILES</th>
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<tr>
<td>8. TRACTION MOTOR - Support Bearings</td>
<td>See M.I. 1756. Fill to 5&quot;. Capacity 5 quarts.</td>
</tr>
<tr>
<td>9. TRACTION MOTOR - Gear Case</td>
<td>Sinclair Jet TM or equivalent. Add as inspection indicates. Keep teeth from becoming bright.</td>
</tr>
<tr>
<td>11. SPEED RECORDER - Drive Cable</td>
<td>Per manufacturer's instructions.</td>
</tr>
<tr>
<td>12. COUPLER - Standard and fixed types</td>
<td>Ball bearing grease. Apply grease at fittings as required.</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>PASSENGER</th>
<th>2 WEEKS OR 10,000 MILES</th>
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</thead>
<tbody>
<tr>
<td>13. TRACTION MOTOR - Armature Bearings - Oil Type</td>
<td>See M.I. 1756. Add 6 ounces to each bearing.</td>
</tr>
</tbody>
</table>
14. TRACTION MOTOR - Armature Bearing - Oil Type (All gear ratios except 65/12, see Item 1) See M.I. 1756. Add 6 ounces to each bearing.

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<th>FREIGHT</th>
<th>PASSENGER</th>
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<tr>
<td>1 MONTH OR 10,000 MILES</td>
<td>1 MONTH OR 20,000 MILES</td>
</tr>
</tbody>
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15. CONTROLLER - Drum Type Light oil. Add several drops to top oil holes.


17. BELL RINGER SAE #10 oil. Add as required.

18. LINKAGE - Throttle, Governor and Shutter (where applicable) Ball bearing grease and light oil. Sparingly apply appropriate lubricant as determined by fitting concerned.


20. DIAPHRAGM - Centering device, lower center stem and coupling centering device. Ball bearing grease. Lubricate at grease fittings.

21. SPEED RECORDER UNIT Per manufacturer's instructions.

22. COOLING FANS - Mechanical Driven
   a. FT See M.I. 1756. Add oil to top of filler hole.
   b. Grease packed SW & E7 Ball bearing grease. Add small amount of grease.
   c. Well type SW & E7 See M.I. 1756. Fill to overflow plug.

23. COOLING FANS - Idler FT, SW, E7 Ball bearing grease. Add small quantity.
24. COOLING FANS - Jackshaft E7 - SW
   a. Grease type
   b. Oil type
   Ball bearing grease. Add small quantity.

   See M.I. 1756. Fill to side level plug.

25. AIR COMPRESSOR - "Vortox" air cleaners (Switchers)

26. COOLING FAN - 90° drive clutch (FT)
   Ball bearing grease. Add small amount of grease to both clutch throw out bearings in sheave of fan drive at front of engine. See M.I. 1756. Apply oil to clutch pins and rollers.

27. TRACTION MOTOR BLOWER
   Bearing FT & E7
   Ball bearing grease. Add small amount to shaft bearings.

28. HYDRO-PNEUMATIC DRAFT GEAR - E7
   SAE #10 oil. Check oil level in tanks with gear at half travel. Fill to side level plug.

29. BATTERY - Terminals
   Petroleum jelly. Maintain a liberal coating on terminals.

30. TRACTION MOTOR - Armature bearings, grease type - D7 - D7A
   Lubrico M6 or Regal Starfax #2. Add 2 ounces to each bearing.

31. BRAKE BLOWER MOTOR - FT
   Ball bearing grease. Add one shot from hand gun.
<table>
<thead>
<tr>
<th>FREIGHT 3 MONTHS OR 30,000 MILES</th>
<th>PASSENGER 3 MONTHS OR 60,000 MILES</th>
<th>SWITCHER 3 MONTHS</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>32. MAIN GENERATOR - Bearing</td>
<td></td>
<td></td>
<td>Lubric M6 or Regal Starfax #2. Add not over 1 ounce to bearing. Capacity 34 ounces.</td>
</tr>
<tr>
<td>33. FLEXIBLE COUPLINGS - Falk and Gear Types</td>
<td></td>
<td></td>
<td>NLGI#3 grease. Fill to capacity.</td>
</tr>
<tr>
<td>34. HAND BRAKE WHEEL</td>
<td></td>
<td></td>
<td>Light oil. Apply sparingly through oil hole provided.</td>
</tr>
<tr>
<td>35. BRAKE-SLACK ADJUSTER SCREWS</td>
<td></td>
<td></td>
<td>Graphite grease. Keep surfaces coated.</td>
</tr>
<tr>
<td>36. LINKAGE BEARINGS - Electrical contactors as required. Refer to specific Maintenance Instructions</td>
<td></td>
<td></td>
<td>Light machine oil. Apply sparingly to operating linkage. Wipe off excess.</td>
</tr>
<tr>
<td>37. CHANGE ENGINE LUBE OIL (Freight and Passenger only)</td>
<td></td>
<td></td>
<td>See M.I. 1752. Quantity depends on engine size. See specific operating manual.</td>
</tr>
<tr>
<td>38. CHANGE OIL IN AIR COMPRESSOR OIL BATH AIR FILTER</td>
<td></td>
<td></td>
<td>M.I. 1110</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SWITCHER 6 MONTHS</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>FREIGHT 6 MONTHS OR 60,000 MILES</th>
<th>PASSENGER 6 MONTHS OR 120,000 MILES</th>
<th>SWITCHER 6 MONTHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>40. ISOLATION SWITCH - (all except Type P, refer to M.I. 4907)</td>
<td>Electric contact grease #8196884. Apply to contacts sparingly.</td>
<td></td>
</tr>
<tr>
<td>41. CONTROLLER SLIDING CONTACTS - (other than roller switch type)</td>
<td>Electric contact grease #8196884. Apply to contacts sparingly,</td>
<td></td>
</tr>
<tr>
<td>42. REVERSE CONTACTS</td>
<td>Electric contact grease #8196884. Apply to contacts sparingly,</td>
<td></td>
</tr>
<tr>
<td>FREIGHT 6 MONTHS OR 60,000 MILES</td>
<td>PASSenger 6 MONTHS OR 120,000 MILES</td>
<td>Switcher 6 MONTHS</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>44. VOLTAGE REGULATOR (Allis Chalmers Type)</td>
<td>Clock oil. One drop on each sector bearing and connecting pin.</td>
<td></td>
</tr>
<tr>
<td>45. ELECTRO-PNEUMATIC GOVERNOR CONTROL LINKAGE AND AIR CYLINDERS (FT, F2, E7, TR2)</td>
<td>Use engine oil on linkage and air engine oil on cylinders. Apply sparingly with hand oiler.</td>
<td></td>
</tr>
<tr>
<td>46. SWITCHES - Pressure and Temperature</td>
<td>Light oil. Oil moving parts sparingly.</td>
<td></td>
</tr>
<tr>
<td>47. SPEED RECORDER - Drive</td>
<td>Per manufacturer's instructions.</td>
<td></td>
</tr>
<tr>
<td>48. 90° FAN DRIVE - Gear Box (FT)</td>
<td>See M.I. 1756. Clean and change oil. Capacity 3 gallons.</td>
<td></td>
</tr>
<tr>
<td>49. TRACTION MOTOR BLOWER - Chain Drive (E7)</td>
<td>See M.I. 1756. No. 1 engine only. Drain, flush and refill.</td>
<td></td>
</tr>
<tr>
<td>51. MARS HEADLIGHT</td>
<td>Ball bearing grease. Add 1 ounce to gear housing at push type fitting.</td>
<td></td>
</tr>
<tr>
<td>52. WINDSHIELD WIPER</td>
<td>Air engine oil. Lubricate air chamber parts.</td>
<td></td>
</tr>
<tr>
<td>53. DEFROSTER MOTOR</td>
<td>Light machine oil. Lubricate sparingly with hand oiler.</td>
<td></td>
</tr>
<tr>
<td>54. HARDWARE - Door and Window</td>
<td>Engine oil. Lubricate sparingly with hand oiler.</td>
<td></td>
</tr>
<tr>
<td>55. AIR COMPRESSOR UNLOADER - all metal type</td>
<td>Light machine oil. Lubricate moving parts when valves are inspected and cleaned.</td>
<td></td>
</tr>
<tr>
<td>FREIGHT 1 YEAR OR 120,000 MILES</td>
<td>PASSenger 1 YEAR OR 240,000 MILES</td>
<td>Switcher 1 YEAR</td>
</tr>
<tr>
<td>56. TRAIN CONTROL MOTOR GENERATOR (Where used)</td>
<td>Ball bearing grease. Per manufacturer's instructions.</td>
<td></td>
</tr>
</tbody>
</table>
57. AIR CYLINDERS - Reverser, Cam
Switch, Braking and Power Contactors

Grease #8196884. Apply grease to cylinder walls. Use engine oil sparingly on push and clevis pin.

58. REVERSER & CAMSWITCH - Rack &
Gear Shaft Ball Bearings - Rack & Gear

Ball bearing grease. Grease #8196884. Replace pipe plugs with grease fittings and lubricate sparingly. Apply lubricant on gear teeth.

59. AIR COMPRESSOR - Flex Coupling
Pilot

Ball bearing grease. Grease when coupling is removed for reconditioning.

LUBRICATION REFERENCE

<table>
<thead>
<tr>
<th>Name</th>
<th>Part No.</th>
<th>Quantity</th>
<th>Part No.</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Texaco Regal Starfax #2 Grease</td>
<td>8035764</td>
<td>2 lbs.</td>
<td>8079816</td>
<td>25 lbs.</td>
</tr>
<tr>
<td>Texaco #691 Car Oil</td>
<td>8039278</td>
<td>5 gal.</td>
<td></td>
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<tr>
<td>Lubriko M-6 Master Lubricants</td>
<td>8122383</td>
<td>1 qt.</td>
<td>8122384</td>
<td>1 gal.</td>
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<tr>
<td>*N. L. G. I. #3 Grade Grease</td>
<td>8102585</td>
<td>5 lbs.</td>
<td>8102587</td>
<td>25 lbs.</td>
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<tr>
<td>Shock Absorber Fluid</td>
<td>043046</td>
<td>1 gal.</td>
<td></td>
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<tr>
<td>Clock Oil</td>
<td>8067552</td>
<td>1 gal.</td>
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<td></td>
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<tr>
<td>Speed Recorder Oil</td>
<td>8082436</td>
<td>1 gal.</td>
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<td></td>
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<tr>
<td>Petroleum Jelly</td>
<td>8099452</td>
<td>1 lb.</td>
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<tr>
<td>Sinclair Jet Lube TM</td>
<td>8188793</td>
<td>35 lbs.</td>
<td>8188794</td>
<td>100 lbs.</td>
</tr>
<tr>
<td>Chevron OHT Grease</td>
<td>8190451</td>
<td>5 lbs.</td>
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<tr>
<td>Lubriplate Aero Low Flow, High Melt Grease</td>
<td>8196884</td>
<td>1 lb.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lubriplate 630AA Non Flow, High Melt Grease</td>
<td>8196886</td>
<td>1 lb.</td>
<td></td>
<td></td>
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<tr>
<td>Pioneer PO-10 Torque Motor Bearing Oil</td>
<td>8198167</td>
<td>6 oz.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shell Cyprina RA Grease</td>
<td>8249819</td>
<td>35 lbs.</td>
<td>8249820</td>
<td>120 lbs.</td>
</tr>
<tr>
<td>Air Engine Grease</td>
<td>8227283</td>
<td>1 gal.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graphite</td>
<td>8122392</td>
<td>5 lbs.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>