1 Head of Rail Type.
(a) Mechanically applied rail head bonds of approved type must be used except where otherwise specified by Signal Engineer.
(1) Mechanically applied type
The drilling must be in accordance with N.Y.C.S., S. & T.C.C. Dwg. 6083.
(2) Welded type (Cadweld)
Welded type rail head bonds as specified on N.Y.C.S., S. & T.C.C. Dwg. 6083 must be installed where it is not practicable to use mechanically applied rail head bonds.

2 Web of Rail Type.
(a) Web of rail bonds and drilling as specified on N.Y.C.S., S. & T.C.C. Dwg. 1156 may be used in road crossings in combination with rail head type bonds, for bonding frog and switch points and may be used where rail head type bonds are not adaptable.

DRILLING AND PREPARATION OF RAILS FOR HEAD OF RAIL AND WEB OF RAIL BONDING

3 Head of Rail Drilling.
(a) Three-eighth inch diameter twist drills, in accordance with A.A.R. Spec. 254-49, must be used for drilling bond holes.
(b) Machine should be adjusted in accordance with manufacturer's instructions so that hole drilled will conform to N.Y.C.S., S. & T.C.C. Dwg. 6083.
(c) Indicator on machine, if so equipped, should be adjusted to locate hole or holes with respect to rail end.
(d) Machine must be clamped on rail so that indicator point is in line with rail end before drilling hole or holes. Single spindle machine should be shifted on rail so that opposite indicator is in line with opposite rail end before clamping machine to drill second hole.
(e) Machines provided with adjustable level should be adjusted in accordance with manufacturer's instructions.
(f) Machine should be adjusted to rotate the drill, when under load, at a speed of 300 to 325 r.p.m. Speed should be checked occasionally with a speed indicator. If machine cannot be adjusted to operate at the proper speed, repairs to engine may be necessary.
(g) Rail clamps must be kept in adjustment to insure that machine is securely clamped to rail while drilling is in progress.
(h) Pressure should be applied on feed lever until depth stop comes in contact with rail head. This position can be observed and is indicated by speeding up of engine.
(i) Holes must be drilled dry, chips removed, and checked frequently with plug gage A.A.R. Drawing 1048, for diameter and depth, and immediately after changing drill.
(j) When drills are changed, machine must be readjusted as covered in Paragraph 3 (b).
(k) Drills operating with good cutting efficiency should cut two equal shavings or chips with no excessive noise. Drills which do not cut a properly sized hole, or which do not cut efficiently, must not be used. Such drills must be resharpened on a precision grinder, before further use.

4 Web of Rail Drilling.
(a) Holes should be drilled in the direction in which bond plug is to be driven.
(b) Machine should be adjusted to drill hole in accordance with N.Y.C.S., S. & T.C.C. Dwg. 1156.
(c) Machine should be operated in same manner as for drilling head of rail. Pressure on feed lever should be reduced when drill point perforates the opposite side of rail.

5 Preparation of Head of Rail for Welded Type Bond.
(a) Head of rail, at point of application of bond, must be thoroughly cleaned with power driven grinding wheel or recommended rail cleaning tool to produce a bright metal surface.
(b) If rail has collected oil or grease, it must be cleaned prior to grinding operation.
(c) If grinding wheel collects oil or grease it must be refaced and thoroughly cleaned.

INSTRUCTIONS FOR INSTALLING BONDS

6 Installation of Head of Rail Mechanically Applied Type Bond.
(a) Install bonds the same day holes are drilled.
(b) Use ordinary 2½ lb. hammer and strike the pin, head or punch, squarely.
(c) At least 3 or 4 solid blows with a 2 to 2½ lb. hammer are required. 1 or 2 additional blows will not be injurious.
(d) Care should be used to see that the bonds, or bond sleeves are parallel to the splice bar.
(e) Bonds must be coated with No-Ox-Id grease or equivalent after installation.
(f) After rail ends of bonded joints are heat-treated or built up by [illegible]
(g) On single track drilling should be established by direction of heaviest tonnage.

Superseded by Plan S-225
4-1-54

7 Installation of Web of Rail Plug-Type Bond.
(a) Installation shall be in accordance with N.Y.C.S., S. & T.C.C. Dwg. 1156.
(b) Install bonds the same day holes are drilled.
(c) Plugs shall be driven through the web of rail to within 3/16 in. of the shoulder with a 2½ lb. hammer. Plug must be driven from same side hole is drilled.
(d) Bonds may be coated with No-Ox-Id grease or equivalent after installation.

8 Installation of Welded Type (CADWELD) Head of Rail Bond.
(a) Bonds must be applied while rail head is clean.
(b) Welding powder must be kept dry and welding surfaces of rail and bond must be kept free of moisture.
(c) Weld bond in place according to instructions furnished by the manufacturer and conforming to N.Y.C.S., S. & T.C.C. Dwg. 6083.
(d) Bonds must be coated with No-Ox-Id grease or equivalent after installation.

CARE OF BONDING MACHINES

9 Preparation of Machine for Use.
(a) Before operating machine, it must be thoroughly cleaned and engine crank case, gear case and air cleaner must be filled to the proper level with the recommended oils.
(b) Engine crank case and air cleaner must be kept filled to the required level at all times in accordance with manufacturer's instructions, using the approved SAE weight and grade of oil recommended for the prevailing temperature under which machine is to be operated.
(c) Clean non-leaded gasoline should be used. Fuel tank must not be filled while engine is running. Avoid spilling gasoline on hot engine as this may cause an explosion and serious injury.
(d) All moving parts should be lubricated in accordance with manufacturer's instructions.
(e) Engine and all moving parts must be kept clean both inside and outside and protected so that no dirt or water enters crank case, air cleaner, fuel tank or gear case when opened for inspection or refilling.
(f) When machine is off the rail, it must be placed so that drill bit, chuck and spindle housing will not come in contact with grit or dirt.
(g) Machine should be kept adjusted in accordance with manufacturer's instructions.

10 Regular Servicing of Machine.
(a) Engine crank case and air cleaner must be drained and refilled after each 25 hours of engine operation.
(b) Gear case must be kept filled at all times with transmission grease of grade recommended by manufacturer, (or equivalent). It should be cleaned out with gasoline and refilled regularly, dependent upon use.

11 Storing of Machine.
(a) Machines stored for any length of time should be completely drained of fuel to prevent gum deposits forming on essential parts such as the carburetor, fuel filter, fuel lines and fuel tank. The following action should be taken before storing:
(1) Remove filter bowl, open shutoff valve and drain fuel tank completely.
(2) Operate engine until it stops from exhaustion of fuel.
(3) Replace filter bowl.
(4) Leave shut-off valve open.
(5) Remove spark plug, pour not more than 1 ounce of SAE No. 20 oil into cylinder and crank engine slowly to spread oil. Replace spark plug.
(6) Exposed portion of spindle and other revolving parts must be protected in accordance with N.Y.C.S., S. & T.C.C. Instruction 350.
(b) Machine must be stored in a weatherproof housing and covered with canvas to keep machine clean.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&St.L.Ry.
B.&A.R.R.
P.&L.E.R.R.

36C
8-2-1950
6-17-1952
4-1-1954

INSTALLATION OF RAIL SIGNAL BONDS INSTRUCTIONS

Approved by Representatives of lines shown.
Chairman.

Printed in U.S.A.

GENERAL

1. The installation shall be maintained in accordance with applicable plans and instructions.

2. Signs, lenses, and reflectors must be kept clean and intact.

3. Incandescent electric lamps shall be as per Plan 750 unless otherwise authorized by the Signal Engineer.

4. Wires and tags must be so arranged as to not interfere with operating parts of apparatus.

5. Doors, covers, and fastenings must be kept in good condition with suitable gaskets in place to keep out moisture and dirt.

6. Ventilators, when in use, must be kept clean to allow free circulation of air.

7. Painting shall be in accordance with Instruction 350.

8. Operation of highway crossing protection shall be checked in accordance with current instructions.

9. Proper precautions must be taken before changes or interruptions are made in track or other circuits affecting operation of crossing protection systems.

10. After repairs, adjustments or replacements, mechanism must be operated to full normal and full reverse position to see that it operates properly.

LUBRICATION

11. Avoid using too much oil. Always remove all surplus. All principal bearings, except those for the sidewalk gate shaft are either ball or roller type and need very little lubrication. Friction clutches on the motor armature shaft should always be kept free from oil.

12. *Motor Bearings* have oil fitting and should be lubricated every six months with a few drops of light oil per N.Y.C.S., Spec. 1206, Class 20, Grade A.

13. *Intermediate Gear Shaft Bearings*

    (a) W.R.S. Co. Type 3566 mechanism (Type B)
    Lubricate every six months through pressure fittings with Texas Company's Low Temp. 67 lubricant.

    (b) W.R.S. Co. Type 3562 or 3563 mechanism (Type 2A).
    Lubricate every three months with Spec. 1206, Class 20, Grade A oil.

    (c) W.R.S. Co. Type 3564 mechanism.
    Lubricate every six months through oil fittings with a few drops of oil per Spec. 1206 Class 20, Grade A.

14. *Roadway Gate and Sidewalk Gate Shaft Bearings* shall be filled with Texas Company's Low Temp. 67 lubricating grease every three to six months.

15. *Gear Teeth* shall be lubricated with Texas Company's Low Temp. 67 lubricating grease.

16. *Circuit Controller Cam Surfaces* of the W.R.S. Co. Type 3564 mechanism shall be lubricated with Texas Company's Low Temp. 67 lubricating grease every three to six months. In addition, the draglink pin, spring bolt, and guiding surfaces of the Drag Segment Cam should be lubricated with light oil per N.Y.C.S., Spec. 1206, Class 20, Grade A.

17. *Centrifugal brake* on W.R.S. Type 3562 and 3563 mechanism shall have a few drops of Spec. 1206, Class 20, Grade A oil applied to bearing supporting rollers. Texas Co. Low Temp. 67 grease shall be applied to slot in arms with a small stick.

18. *Hold Clear Device*

    (a) W.R.S. Co. Type 3562—3563—3566 mechanisms.

    Every three to six months lubricate the various pin supports in the locking pawl link and the oil holes in the armature support with N.Y.C.S., Spec. 1206, Class 20, Grade A oil. Lubricate hold-clear disc by holding a cloth moistened with oil against it while it rotates clockwise. Do not lubricate excessively.

    (b) W.R.S. Co. Type 3564 Mechanism.

    The trunnions for the moving parts of the assembly and the hold-clear pawl should have no more lubrication than is obtained by wiping with a cloth moistened with Spec. 1206, Class 20, Grade A oil. This should be done every three to six months.

ADJUSTMENTS

19. Gate arm torque and mechanism adjustments shall be in accordance with manufacturers' current instructions.

NEW YORK CENTRAL SYSTEM

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P.&L.E.R.R.

37A
2-13-1951

HIGHWAY CROSSING FLASHING LIGHT SIGNALS AND ELECTRICALLY OPERATED GATES
MAINTENANCE INSTRUCTIONS

Approved by Representatives of lines shown.
M Corcoran
Chairman.

(Printed in U.S.A.)