BELL SYSTEM PRACTICES
Outside Plant Construction
and Maintenance

SECTION G10.310.9
Issue A, March, 1949-N

RAILROAD CROSSINGS

UNDERGROUND CROSSINGS

Contents

1. GENERAL

1.01 The work shall be done at such time and in such a manner as not to interfere with the proper and safe use or operation of the property and tracks of the railroad company. Previous arrangements should be made with the duly authorized representative of the railroad company for date and time of commencement in accordance with Section G10.310.1, Paragraphs 3.01 and 3.02. Where steel pipes are used, as permitted in Paragraph 6.01 (d), consideration should be given to forcing or driving them under the roadbed instead of laying them in an open trench. All contemplated plans to use metal pipe conduit beneath electric railroads shall be referred to the Engineering Department for checking and approval in regards to electrolysis conditions.

2. LOCATION

2.01 The underground systems on the railroad property shall be so located as to be subject to the least possible disturbance. Railway tracks and underground structures, including catch basins, gas pipes, etc., should be avoided and manholes, pull boxes, and terminals should, where practicable, be located away from the roadbed.

3. SIDE CLEARANCE FROM RAIL

3.01 Where underground conduit construction terminates at terminal poles, the side clearance of such poles from the nearest track rail shall be as provided in Section G10.301S for California or Section G10.301 for Nevada.

3.02 Where manholes, handholes, etc., which project above the surface of the ground are employed, the side clearance shall not be less than 12 feet from the nearest rail except that at sidings a clearance of seven feet may be allowed. At loading sidings, sufficient space shall be left for a driveway.

4. CLEARANCE BELOW BASE OF RAIL

4.01 The top of all conduit protection, except as specified in Paragraph 6.02 shall generally be located at a depth of not less than 3 feet 6 inches below the base of rail. Where this is impracticable, or for other reasons, this clearance may be reduced by agreement between the parties concerned. In no case, however, shall the top of the conduit protection extend higher than the bottom of the ballast section which is subject to working or cleaning.

4.02 Where unusual conditions exist or where proposed construction would interfere with existing construction, a greater depth than specified above may be required.

5. ARRANGEMENT OF CONDUIT SYSTEM

5.01 The arrangement of ducts in the conduit system contemplated under these practices shall consist of not more than four ducts of vitrified clay, four impregnated fiber ducts or three creosoted wood ducts in width. Where other arrangements are contemplated, additional strength of construction and protection may be required.

6. PROTECTION OF CONDUIT

6.01 Ducts extending under the roadbed section of the right-of-way shall be protected under the roadbed section as specified below and for a distance of at least six feet beyond each outside rail. In other sections of the right-of-way, concrete, creosoted plank, or other forms of protection should be provided where necessary to prevent injury to the conduit system.

(a) VITRIFIED CLAY DUCTS: The ducts shall be laid on at least four inches of concrete with at least three inches of concrete on the top and sides.

(b) IMPREGNATED FIBER AND OTHER TUBULAR COMPOSITION DUCTS: The ducts shall be completely encased in concrete. The encasement shall be at least four inches thick on the bottom and at least three inches thick on top and sides.

(c) CREOSOTED WOOD DUCTS: The ducts shall be protected on the top and bottom by means of creosoted wood plank not less than 1-1/2 inches in thickness or by three inches of concrete.

(d) STEEL PIPES: Such pipes shall normally be encased in concrete as provided in (b) above. However, where physical and electrolysis conditions will permit, a conduit system consisting of a group of not more than four steel pipes not more than four inches in diameter may be laid beneath the roadbed without any form of protection. In this case, the 3 feet 6 inch cover below base of rail shall be measured from the top of the pipe.

6.02 Where physical and electrolysis conditions will permit, a conduit consisting of not more than two steel pipes, not exceeding four inches in diameter, or two creosoted wood ducts not exceeding six inches square, or one or more cables of a type designed for burying directly in the earth, may be laid in the ground beneath railroad tracks without any form of protection at a minimum depth of eighteen inches below the base of the rail, unless the worked ballast section of the roadbed exceeds eighteen inches, in which case the conduit or cable shall be laid below the ballast section.

6.03 Cables under main line tracks shall preferably be installed in conduit to prevent disturbance to the roadbed at time of replacement.

7. EXCAVATION AND SHORING

7.01 The excavated material shall be so placed as not to interfere with railroad traffic. Ballast material excavated shall be kept separate and free from earth and extraneous materials.

7.02 Where necessary to prevent caving, the sides of the trench shall be supported with timbers as covered in the standard practices. No bracing shall extend above the base of the rail or be attached or blocked in any way to the rails or ties.

8. BACKFILLING AND REMOVAL OF SURPLUS MATERIAL

8.01 The trench shall be backfilled with earth to the subgrade line and tamped. Suitable track ballast shall be replaced under railroad supervision.

8.02 All surplus material remaining after the work has been completed shall be removed and, if disposed of upon railroad property, it shall be under railroad supervision.

9. CONCRETE

9.01 Concrete employed for protection and encasement shall be in accordance with standard practices.