BELL SYSTEM PRACTICES
Outside Plant Construction and Maintenance

SECTION G31.305
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Provisional Standard

OPEN WIRE
INSPECTING

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1. GENERAL

1.01 The open wire portion of the outside plant requires a careful and continuous preventive maintenance program. The fundamental principles involved in open wire construction, the scattered location of the plant, the general use of bare wire, the constant exposure to weather, and to interference by construction activities, electric light and power circuits, trees, vehicles, etc., make it a vulnerable part of the plant from the viewpoint of service interruption. Improper sag, scrap wire and foreign material on wires, tree interference, defective ties and insulators are some of the common causes of trouble in the open wire plant.

1.02 In order to detect and correct faulty conditions or remove potential sources of interference before service interruptions occur and to economically keep the open wire plant in a satisfactory service condition at all times, preventive maintenance work must be carefully planned and consistently carried out.

INSPECTION

1.03 To accomplish this, a complete inspection of all open wire and associated plant should be carried out on a periodic basis, and the necessary repairs and adjustments made. (See Section G31.405.) The inspection should include such items as power hazards, insufficient clearances at highways, driveways, sidewalks, over railroads or street railways, etc., or from guys or other obstructions, tree interference, broken or loose ties, broken, missing or floating insulators, faulty connections and other similar sources of interruptions to service or hazards to employees or the public.

1.04 The frequency of inspection will in general depend upon the quality of work performed by telephone workmen, the cooperation of power and other wire using companies in properly constructing their plant, and the relations established with highway and building engineers and contractors for obtaining advance information concerning major projects affecting telephone plant. Usually inspections of exchange open wire carried out at intervals of about one year will be adequate. For toll circuits, inspections at more frequent intervals will generally be required. Local conditions are in all cases important factors in determining the required frequency of inspections. For either exchange or toll open wire, consideration should be given to the importance of the service carried on the lines, the character of the circuits, the age of the lines, prevalence and kind of tree growth, activities of power and other wire using companies, the amount of trouble, the general condition of the plant and fumes, smoke or moisture conditions, etc.

1.05 Extensive damage to plant by floods, forest fires, severe wind or sleet storms will sometimes require special inspection work or have a direct bearing on the scheduling of regular inspections.

1.06 In general it is felt that a sufficiently accurate determination of the conditions can be made by observations from the ground. It seems desirable, however, that poles be climbed in order to secure closer observations of conditions on:

(a) Terminal poles.
(b) Reverse (buck) arm poles.
(c) Test poles.
(d) Side lead termination poles.
(e) Poles at open wire loading points.
(f) Railroad and river crossing poles.
(g) Dead end and suspension poles or fixtures in long span construction.

1.07 Poles should also be climbed for making inspections when the observed conditions from the ground indicate that this procedure is warranted.

1.08 On certain classes of lines and for particular inspections local instructions may require that the inspector climb all poles.

1.09 In carrying out the inspection work for open wire plant, good judgment must be exercised on the part of the inspector in determining the conditions that are to be corrected. It should generally be the intent to carry out only that repair work necessary to insure uninterrupted and satisfactory service from the plant and the elimination of hazards to employees or the public. Minor deviations from standard practices, old standards of construction and obsolete materials should not be changed except where they present a hazard or may be expected to cause trouble.

1.10 Unauthorized attachments on poles should be noted and reported as it is desirable to have them removed if objectionable, or a suitable agreement for joint use executed if they are not objectionable.

1.11 Idle wire and associated plant shall be treated in the same manner as working plant in connection with the inspection work. Dead wire or other idle plant for which there is no further use should be reported for removal. When plant as described above and plant that is temporarily idle present hazards to employees, the public or to service, arrangements should be made to eliminate the hazards promptly.

1.12 Note building or other foreign construction operations that might interfere with telephone service or which might result in hazards to telephone employees. Consultation with those in charge of the operations, before they have progressed to a point where the telephone plant is endangered, will frequently prevent any interference with the telephone service. When it is noted that the telephone plant will interfere with the progress of building or other construction work, the conditions should be corrected or reported in accordance with local instructions.

1.13 In some cases it may be desirable to combine the open wire inspection work with inspections of drop wires, poles or cable. If combination inspections are to be made, detailed instructions concerning the various types of plant will be furnished the inspector.

1.14 The principal items which should be considered for the inspection of the open wire and associated plant are outlined in the following parts of this section.

2. CLEARANCES

2.01 Check all wires for conformity to local clearance regulations and for all clearances specified in Section G10.301.

Note where sufficient clearances are not obtained over private and public property, waterways, streets, driveways, alleys, sidewalks, etc.

2.02 Check clearances of wires over or under railways and railroads to be sure that they conform to all requirements of Section G10.301, Clearances for Aerial Plant and the instructions covering Railroad Crossings.

2.03 Check all wires for clearances from electric light, power, trolley feeders, contact wires, transformers, etc., including the supporting structures for plant of this nature, to make sure that trouble from direct crosses, or "power arc follow up" will not occur and so that hazards to employees, or the public, will be eliminated. Note attachments of telephone plant to poles supporting high tension circuits or of high tension circuits to poles supporting telephone plant and report all such cases in accordance with local instructions. When it is not known whether power circuits are high or low tension secure this information in accordance with local practices or as instructed by the supervisor.

2.04 Observe wires for proper separation from foreign communication circuits, signal circuits or other similar plant.

2.05 Observe clearances where wires cross or parallel suspension strand or guys, including guys from electric light, power, foreign telephone, telegraph or other pole lines.

2.06 Observe locations where action should be taken to eliminate fire hazards caused by close proximity of the line to inflammable materials or buildings.

3. SAG

3.01 Note that sag in wire is uniform, adequate and that no abnormal amount of slack is present in a sufficient degree to constitute a hazard to employees or the public or to cause interference with service. Where sag, obviously excessive, insufficient or non-uniform exists, guys, including crossarm guys, and anchors should be inspected for adequacy and defects.

4. SCRAP OR DEBRIS

4.01 Observe for pieces of scrap wire, metallic material or other debris hanging on wires. In some cases it will be found advisable to give attention to inspecting right of way, both sides of highways and vicinities immediately adjacent to open wire leads for the purpose of removing pieces of line wire, ties, cable rings, fence and bailing wire, metallic objects, etc., which might be picked up and thrown on the wires.

5. TREE INTERFERENCE

5.01 Inspect wire clearances through trees, hedges, etc., to see that there is adequate separation from limbs, branches or foliage. Clearances should be such that interference will not occur because of sleet, snow, rain and wind storms, or because of the growth which will occur before the next inspection period. Note that tree guards and attachments are in good condition and are used on insulated wire where required.

5.02 Note any dead limbs or dead trees which might fall into the line.

5.03 Where pruning has been done or where trees have been cut down note that branches and brush have been disposed of properly.

5.04 When instructed locally to do so, inspect for brush and young tree growth under lines which are likely to cause future interference.

6. WIRE

6.01 Observe wires for badly rusted or corroded conditions and for kinks, cuts, nicks, tie burns, etc., all of which are common causes of trouble. In sections where it is not known that the condition of the wire is satisfactory or in lines in the vicinity of smelters, foundries, chemical plants, mills, railroad crossings, switch yards, etc., it is advisable to make a spot inspection by climbing a number of poles at suitably selected locations to definitely determine whether deterioration exists. If the results of such an inspection indicate that the wire is badly deteriorated, it is advisable to make further climbing inspections to determine the extent of the defective wire and the amount of replacement required.

6.02 Observe twisted pair, parallel or other insulated wire in long spans, ring runs and through trees, etc., including temporary twisted pair and emergency cable, for defective insulation, faulty ties and attachments, loose connections, etc.

6.03 Inspect (by climbing pole) open wire dead ends at terminal poles, reverse (buck) arm corners, test points, side lead terminations, railroad and river crossings, bridle wire insulators, etc., to see that they are properly made and secure. Note that wire jumpers, bridle cables and bridle wires are properly placed and terminated, that no loose connections exist and that bridle rings or similar attachments are used where required. Observe bridle wires and bridle cables for abraded insulation, kinks, loose or uninsulated splices, etc.

6.04 Observe that proper size of wire is used in spans crossing over railroads and in adjacent spans. Note that con-

nections are in good condition and that line wire joints are not located in crossing span. See instructions covering Railroad Crossings.

6.05 Report locations where the placing of exchange cable or cable terminals will eliminate excessive wire. Report also the locations where it appears economical to replace defective drop wire in line spans with cable, or with crossarms and bare wire. Note locations where dead wire is in hazardous condition and should be removed.

6.06 At severe changes in grade, observe for excessive strain on attachments, wires and ties. See that wires are on the proper side of insulators with respect to the pull on corner poles.

7. CONNECTIONS

7.01 Hand made and other unauthorized or obsolete types of splices, joints or connections in line wire or between line and bridle wire, etc., should be observed and reported for replacement with standard sleeve splices or for correction.

7.02 Check all connections at or adjacent to poles climbed for other inspection purposes, to make sure that they are in good condition and properly made, for example, bridle wire and line wire connections at side lead terminations.

7.03 Inspect connections at cable terminals, binding posts, bridging and test connectors, etc., to be sure that they are tight and in good condition. Observe that test connectors on toll circuits are of the proper type and used only where authorized.

7.04 Line wire joints, at or adjacent to poles climbed for other inspection purposes, should be checked to see that they are properly made and free from excessive corrosion or other defects in so far as it is practicable to do so. High resistance connections and splices, generally caused by corrosion or rust, particularly in iron wire, are a common source of trouble and are difficult to locate. In areas where this trouble is prevalent, it may be desirable to make suitable tests to detect those conditions.

8. TIES

8.01 Observe line for missing, broken or loose ties. Note that ties appear in satisfactory condition, are properly placed and are of the correct size and type.

9. INSULATORS

9.01 Inspect line for missing, broken, floating and obviously loose insulators. Note also that the insulators are of the correct type.

9.02 Note that bridle wire insulators are used where required and that they are in good condition and properly installed.

9.03 Observe that interconnecting insulator wires and straps are in good condition and have been placed where required on open wire carrier circuits.

9.04 Note that the interconnecting straps clear the underside of insulator petticoats.

10. TRANSPOSITIONS

10.01 When specified locally, check transpositions for accuracy of layout and for correctness of type.

11. PROTECTIVE EQUIPMENT

11.01 Note that protector mounting is properly and securely attached to the pole. See that cover is not broken and that the hinge type covers close properly.

11.02 Inspect protector mountings for broken ground wires, defective or corroded protector springs, missing or defective protector blocks and for moisture or dust inside the mounting. Note that ground and bridle wires connecting protective equipment are properly installed and that all connections and protector blocks are in good condition.

11.03 Note that protector blocks are properly placed on open wires entering cables as required by the instructions covering Cable Protection and in accordance with local instructions with respect to the areas in which protector blocks should be provided on exchange open wires of less than one-half mile in length.

11.04 When **any** of the open wires or drops entering a particular terminal are equipped with protector blocks, as specified in the instructions covering Cable Protection, note that **all** open wires or drops entering the terminal are so equipped.

11.05 Note that the ground plate of protector mounting is properly connected to suspension strand or to sheath of underground or buried cable in accordance with Section G32.130.

12. PHANTOM REPEATING COILS

12.01 Inspect condition of phantom repeating coils on poles and the housings in which they are mounted. See that

the housing is weather-tight and securely attached and that the inside is free from dirt, wire scraps or other debris.

12.02 Make a thorough inspection of the wiring for unsatisfactory insulation and loose connections.

13. LOADING COILS

13.01 Note that loading coil cases and supports used in connection with open wire loading are in good condition and securely attached.

13.02 Inspect exposed wires for defective insulation and loose connections. Note that wires are placed properly and securely fastened.

14. LONG SPAN CONSTRUCTION

14.01 In addition to the inspection items outlined in the preceding paragraphs, special features involved in catenary and non-catenary long span construction shall be inspected as follows unless otherwise instructed by the supervisor.

14.02 Inspect special steel crossarms and angle iron braces at dead end and suspension fixtures to see that they are securely attached.

14.03 Observe all steel work for excessive rust and see that galvanizing or protective paint is in good condition.

14.04 Inspect arms and braces for warping or buckling and for any other apparent defects that are likely to weaken the structure.

14.05 Inspect head guys, riding and suspension strand at dead ends to be sure that clamps are in good condition and securely attached.

14.06 Note that wire dead ending clamps are tight and that wire loop and splice are in good condition.

14.07 See that suspension insulator eye-bolt is in good condition and that end of bolt is upset to prevent it from becoming loose.

14.08 Note that suspension insulator is not broken, that wire hanger and wood block are in good condition and span wire is securely held.

14.09 When crossarms or suspension strand hangers are badly out of alignment, observe suspension strand for non-uniform sag and inspect hangers for loose clamps.