

**BELL SYSTEM PRACTICES**  
**Outside Plant Construction**  
**and Maintenance**

**SECTION G10.710.1**  
**Issue 1, September, 1951**  
**AT&T Co Standard**

**MEASURING CLEARANCES**  
**B CLEARANCE ROD**

**1. GENERAL**

- 1.01 This practice describes the use of the B Clearance Rod for measuring vertical clearances and separations.
- 1.02 This method of measuring vertical clearance employs a B Clearance Rod consisting of several 4-foot sections, all fitted with threaded ferrules whereby the required length of rod may be assembled. The upper end of the top section is fitted with a hook so that the assembled rod may be suspended from the telephone wire or strand from which the measurement is to be made. A sighting disc is inserted at the joint between the top and the second sections.
- 1.03 When measuring vertical clearance, say between a telephone wire and a higher power wire at a crossing, the clearance rod is raised and hooked over the telephone wire at a point directly below the power wire. A "clearance scale" is then used to measure the "gross clearance" between the two wires. Inasmuch as the sag of the telephone wire will be increased by the weight of the rod hanging on it, it is necessary to determine this increase in sag by measuring, at the lower end of the rod, the amount the rod must be raised to free it from the wire. This "rod weight sag" is deducted from the "gross clearance" to obtain the actual clearance.

**2. MEASURING VERTICAL CLEARANCE**

- 2.01 **Assembly of Rod:** Assemble the sections of the rod beginning with the top section. The sections should be assembled with the male thread at the upper end. Assemble a sufficient number of sections so that the telephone wire or strand in the crossing may be reached with the top end of the rod. The top hook should be attached to the upper end of the top section, the sighting disc installed between the top and second sections, and the insulating section installed at the upper

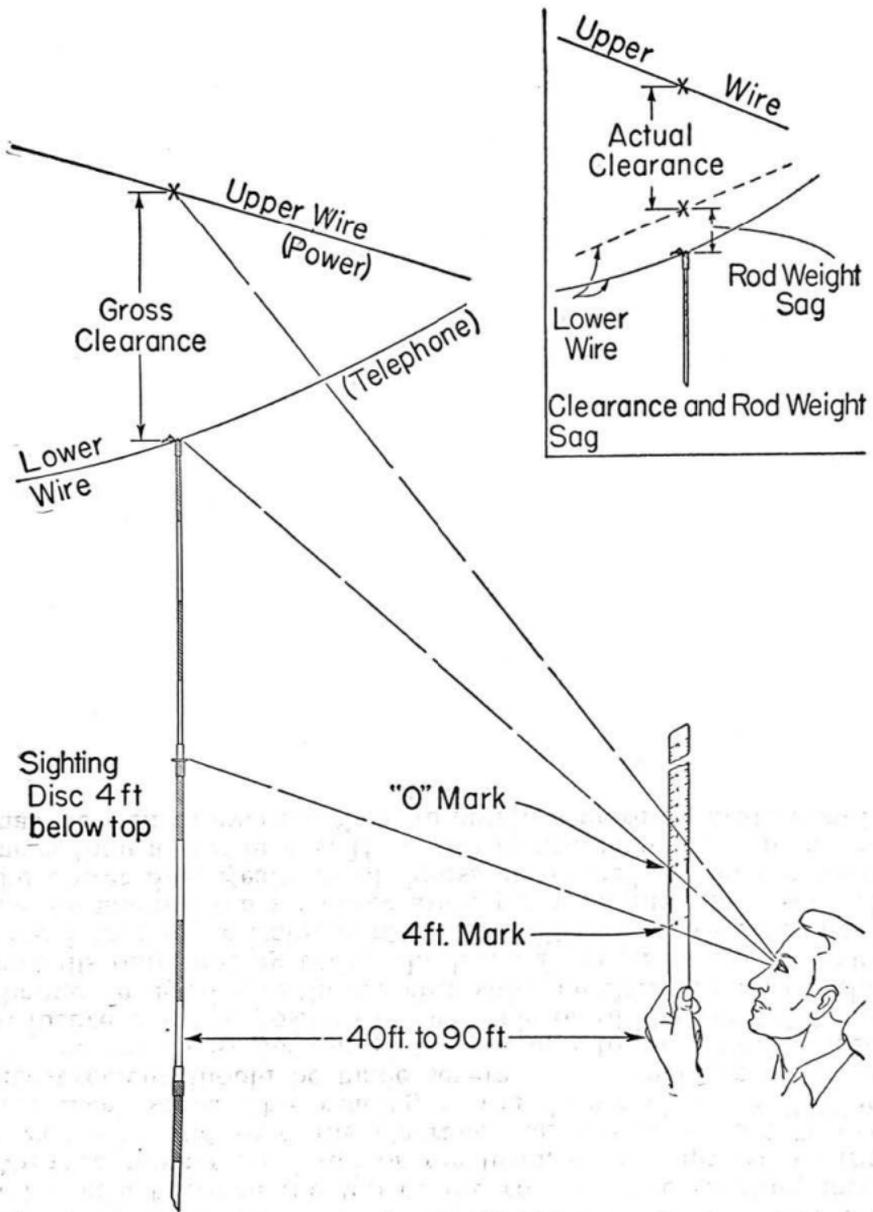
end of the 1-1/8" sections, or at the top end of the small tree pruner handle extension sections, where these are used.

2.02 **Selection of Wire at Crossing:** The term "wire," as used herein, includes power wires or cables, overhead power guys, telephone wires, telephone suspension strand, and overhead telephone guys. Select one specific wire at the upper level, and one specific wire at the lower level, usually the two wires between which the clearance is judged to be minimum. Hereafter, "upper wire" and "lower wire" mean these two specific wires, and they must at all times be singled out from other wires in the two lines.

2.03 **Hanging the Rod:** Hang the rod by its top hook on the lower wire at a point several feet to one side of the upper wire, thus avoiding the danger of raising the rod into contact with power wires. **Do not hang the clearance rod on any power wires or power guys or on foreign communication wires, cables or guys. Use rubber gloves when handling the rod in locations where there is any possibility of electrical contacts.** If the crossing is located over a highway or street, adequate safety measures must be taken before making measurements. Slide the top of the rod along the lower wire to the point which is exactly vertically below the upper wire. This may be accomplished as follows: View the rod while standing about 40 feet or more away from the rod at a point directly below the upper wire of the crossing. When in this position, the measuring rod top and the upper wire should be in the same vertical plane and the upper wire should line up with the rod top. Slide the rod to the right or left, if necessary, to place it in this position. If there is no wind, the rod itself forms a plumb line which points to the upper wire when the rod is in the correct position.

2.04 **Measuring "Gross Clearances":** Choose a convenient location somewhere between 40 and 90 feet from the rod, preferably at right angles to the upper wire. As will be noted, the clearance scale is calibrated on both sides. If the clearance to be measured is judged to be less than seven feet, the side of the scale which is calibrated to eight feet gross clearance should be used and the observer should stand at a distance of about 40 feet from the clearance rod. If the clearance to be measured appears to be over seven feet, the 16-foot side of the scale should be used and the observer should stand at a distance of about 90 feet from the clearance rod. If possible, select a location where the hand holding the clearance scale may be steadied against a firm object, such as a pole, tree, etc. The location must not be under or too close to the power line but may be under the telephone line, in which case a telephone pole

may serve to steady the hand. If no firm location is available, use a section of clearance rod or tree pruner handle to steady the hand. Hold the clearance scale in a vertical position at such a distance from the eye that the scale length between "0" and the 4-foot mark below the "0" on the scale matches exactly the rod length between the top of the rod and the sighting disc. Without moving the hand or the head, glance upward to the power wire and read the clearance on the calibrated "gross clearance" scale. This reading is the "gross clearance." This measurement should be made several times, each time letting the eye return to the top of the rod and to the sighting disc to insure that the position of the scale or of the head did not change. In sighting to these points, shift the glance by rolling the eyeballs only, not by tilting the head. In order to check accuracy, it may be desirable to make an additional "gross clearance" measurement from an observation point on the other side of the power line. Readings of "gross clearance" should not vary more than a few inches. If several measurements are made, it may be well to average them to obtain a more accurate result.



2.05 **Rod Weight Sag:** Inasmuch as the weight of the rod will increase the sag of the lower wire, it is necessary to measure this sag increase so that it may be deducted from the "gross clearance" as obtained in Paragraph 2.04. This sag increase may be measured with a standard tape. Place the end of the tape on the ground directly below the rod, step on it and note the reading on the tape at a reference point on the rod when it is hanging on the wire. Note the tape reading at this same point on the rod when the rod has been raised (with the tape sliding through the hands) until the top hook just leaves the wire. Subtract the original reading from this second value. The difference is, of course, the amount of sag increase caused by hanging the rod on the wire, or the "rod weight sag." The net clearance is obtained by deducting the "rod weight sag" from the "gross clearance."

2.06 The B Clearance Rod may also be used for making direct measurements involving **telephone plant only.**

2.07 **Telephone Conductors above Electric Conductors:** If it is desired to determine the vertical clearance between telephone wires, cables, or guys that are above electric wires, cables, or guys, the B Clearance Rod may be used, as outlined in Paragraph 3.01, to determine the height of the power wire above ground and the height of the telephone wire above ground. The difference between these two measurements is the vertical clearance between the two wires. When making these measurements, the B Clearance Rod should be held at a point vertically below the intersection of the two lines.

### 3. OTHER MEASUREMENTS

3.01 The B Clearance Rod (with the clearance scale) may be used for measuring the height of power wires or equipment, as shown in the following sketch. Assemble a rod length which will reach to a height safely below the power level; that is, not nearer to the power wires or equipment than the clearance required for a telephone line crossing under a power line of the voltage involved. Hold the rod in a vertical position, at a point directly below the position on the power wire or equipment where the measurement is desired, and then use the scale, as shown, for measuring from the rod top to the power wire. Add the scale measurement to the rod length to obtain the distance from the power wire to the ground.

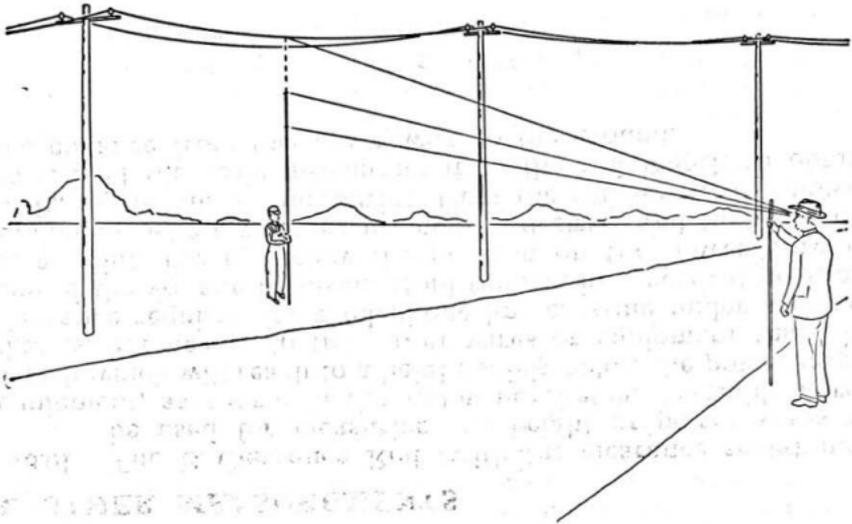


Diagram illustrating the setup for a surveying instrument, showing a person observing through a telescope or similar device, with lines indicating the field of view or measurement points.

The diagram illustrates the setup for a surveying instrument, showing a person observing through a telescope or similar device, with lines indicating the field of view or measurement points. The setup consists of a horizontal line supported by several vertical posts. A person is standing on the right side, looking through a telescope or similar instrument mounted on a post. Lines radiate from the instrument towards the ground, indicating the field of view or measurement points. The ground is depicted with a horizon line and some irregular shapes representing terrain.