

BELL SYSTEM PRACTICES
Outside Plant Construction
and Maintenance

SECTION G50.220.3
Issue 1, May, 1948
AT&T Co Standard

CABLE TESTING—GENERAL
DETECTING DEFECTIVE PAIRS—
BALANCE TEST METHOD

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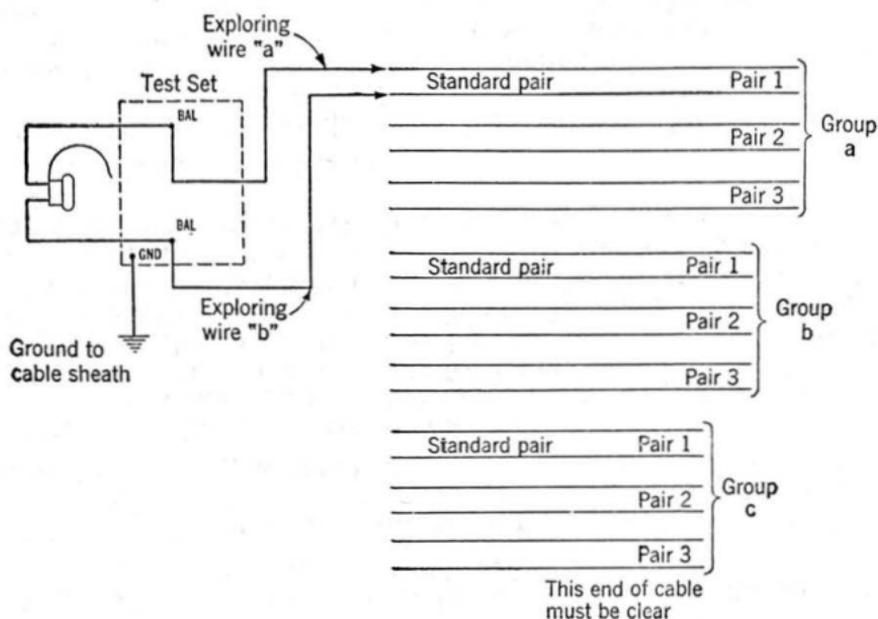
1. GENERAL

- 1.01 This section describes the balance test method of detecting defective conductors in Exchange Cable.
- 1.02 The tests are generally made using the balance test circuit of the standard splicer's test set.
- 1.03 While this test will usually be made from a Main Distributing Frame or other termination, it can also be used for making a rapid check on an open section of cable.
- 1.04 The balance test (sometimes called tone comparison test) may be used for rapidly detecting shorts, crosses and grounds. This test depends for its operation on the fact that all pairs of the same length and gauge have approximately the same capacity to ground. It will also indicate opens and split pairs, if the faults are not too close to the far end of the cable. Defects found by this method should be checked by the battery and receiver method, which is more accurate.

2. TESTING PROCEDURE

2.01 Divide the cable pairs into groups. All the pairs in each group must be of the same length and gauge. If the lengths are different, the capacities will be different and a balance can not be secured. Likewise, they should be of the same gauge, since there may be small differences in the capacities of wires of different gauges. It is also desirable that the tester have access to a diagram showing the distribution of the various groups in the cable so that he may quickly determine the reason for any small apparent unbalances.

- 2.02 Connect a receiver and two exploring wires to the terminals marked BAL as shown below.



- 2.03 Clear the conductors at the distant end of the cable and then proceed to test each group as follows:
- (a) For each group pick out a pair which seems to be free from trouble. This pair is the standard pair to which the other pairs in the same group are to be compared. Test the standard pair with battery and receiver to make sure that it is not short-circuited or grounded.

Referring to the above diagram, connect exploring wire "a" to one side of the "standard" pair, pair 1 in the above diagram. Exploring wire "b" is then connected to the other side of the same pair.

If the capacity of the tip side to ground is equal to that of the ring side, no tone will be heard in the receiver. Exploring wire "b" is then connected to the tip side of pair 2, and then in turn to each of the other conductors to be tested. If no tone is heard in the receiver in any of these tests it may be assumed that the pairs tested are free from trouble. If a tone is heard it is probable that the wires on which tone is heard are defective, or at least are not like the standard wire.

(b) The wires suspected of being defective should be tested further as follows:

Connect exploring wire "a" to both sides of the standard pair. Go over each of the faulty conductors with exploring wire "b". The conductors which give no tone are either short-circuited or crossed. If no tone is heard on either side of the faulty pair, the fault is a short circuit. If tone is heard on only one wire of the faulty pair, the fault is a cross.

Then connect exploring wire "a" to one side of the standard pair and go over the remaining faulty wires. Conductors which give a very loud tone are grounded.

The remaining faults will probably be opens. They may be tested further by connecting exploring wire "a" to each faulty conductor in turn, leaving exploring wire "b" disconnected, and comparing the tone heard on each faulty conductor with that heard on the standard conductor. An open, unless near the distant end of the cable, will give a weaker tone than that heard on the standard conductor. The tone heard on a good conductor will be of about the same intensity as that heard on the standard conductor.