BELL SYSTEM PRACTICES
Outside Plant Construction and Maintenance

SECTION G51.124.1
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AT&TCo Standard

SUSPENSION STRAND
TENSIONING — PRECAUTIONS

Contents **Page**

1. GENERAL

1.01 This section, which replaces Issue 1, has been reissued to remove references to obsolete material. This section also replaces Section G51.124.3, Issue 1.

1.02 Experience has indicated that failures of one or more of the wires in suspension strand may occur in the vicinity of the suspension clamps if the strand is left in plant without supporting cable and the strand is subject to vibration as a result of cross winds.

1.03 The probability of failures occurring increases as tensions increase. The approximate values of tensions at which strand may be susceptible to failures of this type are:

Size of Suspension Strand	Tension in Strand
6,000 pound strand	*2,000 pounds or more
10,000 pound strand	*3,000 pounds or more
16,000 pound strand	4,000 pounds or more
25,000 pound strand	6,000 pounds or more

*These values will not normally be reached under present stringing practices.

1.04 Ordinarily, the vibrations which contribute to the development of strand failures are not likely to occur where the line is sheltered by buildings, trees, or other windbreaks on both sides and within 300 feet of the line. They are more likely to occur where the line is fully exposed and the direction of the prevailing wind is across the line.

2. LOCATION OF POINTS OF FATIGUE FAILURE

2.01 In those cases where fatigue failures have been experienced, the usual location of the point of failure has been near the end of the suspension clamp, either outside or within the clamp. The failure in most cases will be confined to one wire of the strand although in cases of prolonged periods of exposure to vibration and high tension, two or more wires may fail. In inspecting strand that is in questionable condition, it is important that the suspension clamps be loosened and the condition of the strand determined within the suspension clamp as well as adjacent to it.

3. RECOMMENDED METHOD OF PREVENTING FATIGUE FAILURES

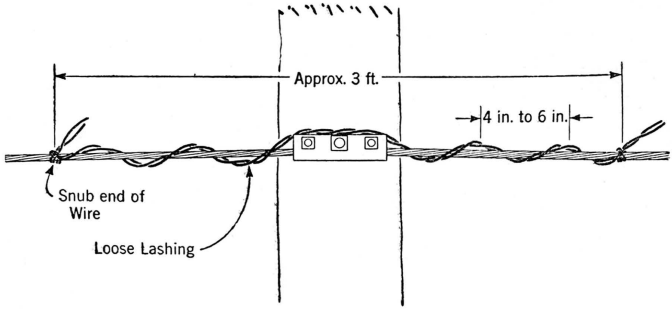
3.01 When strand is about to be tensioned and it appears that because of cold weather conditions or other factors, the tensions in the strand might reach the values shown in Paragraph 1.03 and remain at that level for several days (during which time the strand would not be supporting a cable and might be subject to vibrations) one of the following methods should be employed to prevent the development of fatigue failures. The effect of temperature changes on strand tensions can be estimated by referring to the tables in the section covering strand stringing tensions.

(A) Low Tension in Suspension Strand

3.02 Leave the suspension strand in a slack condition, that is, at a tension not exceeding 1,000 pounds and with the suspension clamps only tight enough to prevent the strand from dropping out of the clamps. Strand tensioned to 1,000 pounds or less is not subject to the development of fatigue failures, regardless of the time it is left in plant without carrying cable.

(B) Use of Vibration Dampers

3.03 If conditions make it impracticable or undesirable to leave the suspension strand at such a low tension and there is a possibility of critical tensions occurring during the period when there will be no cable on the strand, the development of fatigue failures can be prevented by the application of vibration dampers at each pole as illustrated below.



Twisted pair wire
Do not untwist paired wire.
Leave damper in place until after cable has been placed.

4. CABLE SUBSTITUTIONS

4.01 When strand has been placed and tensioned in advance of placing the cable, the size of strand should be checked, before placing the cable, to be sure it is proper for the size and type of cable being placed.

4.02 This precaution is necessary because of possible substitutions in the cable. Alpeth sheath may be exchanged for lead, or aluminum conductors for copper. A different gauge or number of pairs may be received as a result of supply conditions or of changes in plan.

4.03 If the strand is smaller than required for the cable received, the strand must be replaced or the job referred to the engineer.

4.04 If the strand is **larger** than normally required for the cable being placed, the tension should be checked and adjusted, if necessary, to the value prescribed for strand of the **proper** size for the cable being placed. For example, if **10M** strand was placed, but **6M** is the proper size for the cable being placed, the tension of the **10M** strand should be the tension prescribed for **6M** strand. This is particularly important in the case of aluminum conductor cable, to reduce the tendency to bow.

5. SPECIAL SITUATIONS

5.01 The tension for strand placed to support aluminum conductor cable is less than for strand to support copper conductors; therefore a false dead end is required at a junction of these cables, even though the strand may be continuous.

5.02 At points where the strand would normally be reduced in size because of diminishing weight of the cable, it is sometimes advantageous to carry the larger size strand throughout the run, as discussed in the section on placing strand. In these cases the strand beyond the false dead end should be placed at the tension prescribed for the smaller strand which would normally have been placed.

5.03 Under some conditions, such as increased clearance requirements, it is necessary for the engineer to prescribe larger than normal strand placed at greater than normal tensions. When such details are shown on the construction drawings, strand should be tensioned accordingly.