Procedure for Testing of Uncoated Seven-Wire Cable Pretensioning Reinforcement

1.   Scope:

This test method covers the procedure for mechanical testing of uncoated seven-wire cable for pretensioned reinforcement. The mechanical test herein is used to determine the tensile strength required in the product specifications.

2.   Apparatus:

2.1   Tension testing machine (Conforming to AASHTO T 244).

2.2   Elongation gauge.

2.3   Caliper.

3.   Procedure:

3.1   Initial sample data.

A.   Collect all samples and examine them for:

1.   Sample size must be a pair (2).

2.   Sample size must be approximately the same length, mass, and diameter.

3.   Each sample size has a separate DOT-1 & sample ID number.

4.   Minimum length of 24 inches.

B.   Record the length (1/16"), weight (0.0001 lb.), grade, and diameter (0.0001 in.) of the entire seven-wire cable.

C.   Calculate the weight per foot of the entire seven-wire cable.

Weight per foot = (Weight/length) = (0.1) lb./1000ft

D.   Separate the seven-wire cable into its individual seven strands.

E.   Pick and record the diameter (0.0001") of any two outer strands and the center strand.

F.   Each strand must be gauge marked 8 inches. Gauge marks shall be made with a permanent marker.

3.2   Testing

    A.   The two outer strands and the center strand must be tested individually.

    B.   The jaws of the tension machine must line up with the 8 inch gauge marks and be tightened.

    C.   Run the machine at a correct continuous and uniform ideal force rate as seen in table 1, until fracture occurs.

Table 1: Ideal Force Rate

Min. force rate (Lbf./Min)	Max. force rate (Lbf./Min)	Ideal force rate (Lbf./Min)
314	3140	1730

    D.   Test only one seven-wire cable from the sample size. If rejection of the results occurs, the second cable shall be tested.

3.3   Determination of tensile properties.

    A.   The tension testing machine will determine maximum load at which the wire strands fracture. Record this number as the breaking strength for each strand.

    B.   The tensile strength of the seven-wire cable is determined from taking the individual breaking strengths of the strands and using the following equation:

Tensile strength (psi) = Center + (((Outer #1 + Outer #2)/2)x6)

4.   Report:

A.   MS&T
      1. DOT-7

      Report the following:

      I.   Weight per foot of entire seven-wire cable to the nearest tenth (0.1 lb./1000ft).

      II.   Diameter of entire seven-wire cable to nearest thousandth (0.0001").

      III.   Diameter of two outer strands and center strand to nearest thousandth (0.0001").

      IV.   Tensile strength to nearest ten (psi).

      V.   Grade.

NOTE: Report first seven-wire cable's data if all minimum specifications are met. If second cable is tested, report the second cable's results if all minimum specifications are met. However, if a failure occurs on any of the second cable results then report the passing specifications of the second cable and report failure portion with the average of the two cables.

5.   **References:**

AASHTO T 244
AASHTO M 203
ASTM A416
DOT-7