THE BRIDGES

METHOD STATEMENT

FOR TENSILE TEST OF HT STRAND

CONTENTS

1) Purpose

The low relaxation property is achieved by a process called 'stabilizing'. This is essentially a hot stretching process, in which prestressing strand is subjected to a pre-determined tension during stress-relieving heat treatment. This results in linear hardening of the steel which substantially increases the resistance to creep and thereby reduces the relaxation losses.
These test methods are intended for use in evaluating specific strand properties prescribed in specifications for multiwire steel strand.

2) Scope

This statement covers the testing of uncoated, stress relieved 'low relaxation' seven-ply steel strands for prestressed concrete. Low relaxation strand Widely used in the bridge structures and the capacity of strands of about 100 to 240kn according to the size of the strand. It is highly important to describe those strands to meet the acceptance criteria before using it.

In tension test we will get to know about the breaking load, tensile strength, elongation, yields load and yield stress

This statement does not address all of the safety concerns, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices before test.

3) Reference Documents

- IS 14268 Uncoated stress relieved low relaxation seven-ply strand for prestressed concrete specification
- ASTM A 1061 Standard Test Methods for Testing Multi-Wire Steel Strand

4) General note

Free span:- The distances between the gripping jaws occupied by the length of strand to be tested in which the strand is not contacted or detrimentally influenced by the gripping system.

Length of lay: - The axial distance required to make one complete revolution of any wire of a strand.

Strand, two or more steel wires wound together in a helical form.

- The mechanical properties of the strand are determined by a test in which fracture of the specimen occurs in the free span between the jaws of the testing machine.
- Mechanical properties of the strand will be negatively affected if proper care is not taken to prevent damage such as severe bending, abrasion, or nicking of the strand during sampling.

- Premature failure of the test specimens may result if there is appreciable notching, cutting, or bending of the specimen by the gripping devices of the testing machine. Errors in testing will result if the wires constituting the strand are not loaded uniformly.

- The mechanical properties of the strand will be materially affected by excessive heating during specimen collection or preparation.

- Gripping difficulties will be minimized by following the suggested methods of gripping described below.

  - It is not practical to recommend a universal gripping procedure that is suitable for all testing machines. The gripping devices shall be designed such that during testing the load is distributed along the entire length of the grips. The effective gripping length as a minimum shall be equal to the length of lay of the strand.
  - Using Cushioning Material— In this method, material is placed between the grips and the specimen to minimize the notching effect of the teeth. Materials that have been used include, but are not limited to lead foil, aluminum foil, carborundum cloth, and brass shims. The type and thickness of material required is dependent on the shape, condition, and coarseness of the teeth.
  - The number of teeth in grips should be 15 to 30 per 25 mm.
  - The radius of curvature of the grooves should be approximately the same as the radius of the strand being tested. To prevent the two grips from closing tightly when the specimen is in place, the groove should be located 0.79 mm above the flat face of the grip.

- The speed of testing shall not be greater than that at which load and strain readings can be made accurately. Speed of test Load applied for displacement is 2mm per minute.

5) Test Procedures

12.7mm and 15.2mm of ply strand ware Wide used in bridges

Cut the strand by hand cutting machine for the length of 100mm to measure the dia of each

ply of strand for calculation of area of strand.

Force was applied using self-reacting frames, screw-type and hydraulically actuated frames with rated capacities between approximately 100 and 600 kN.

Use an extensometer having a gage length of not less than 600 mm. Apply an initial load of 10 % of the required minimum breaking strength to the specimen. Attach the extensometer and adjust it to a zero reading. Increase the load until the extensometer indicates an elongation value equal to or greater than the minimum specified in the applicable specification. It is not necessary to determine the total percent elongation at maximum force.

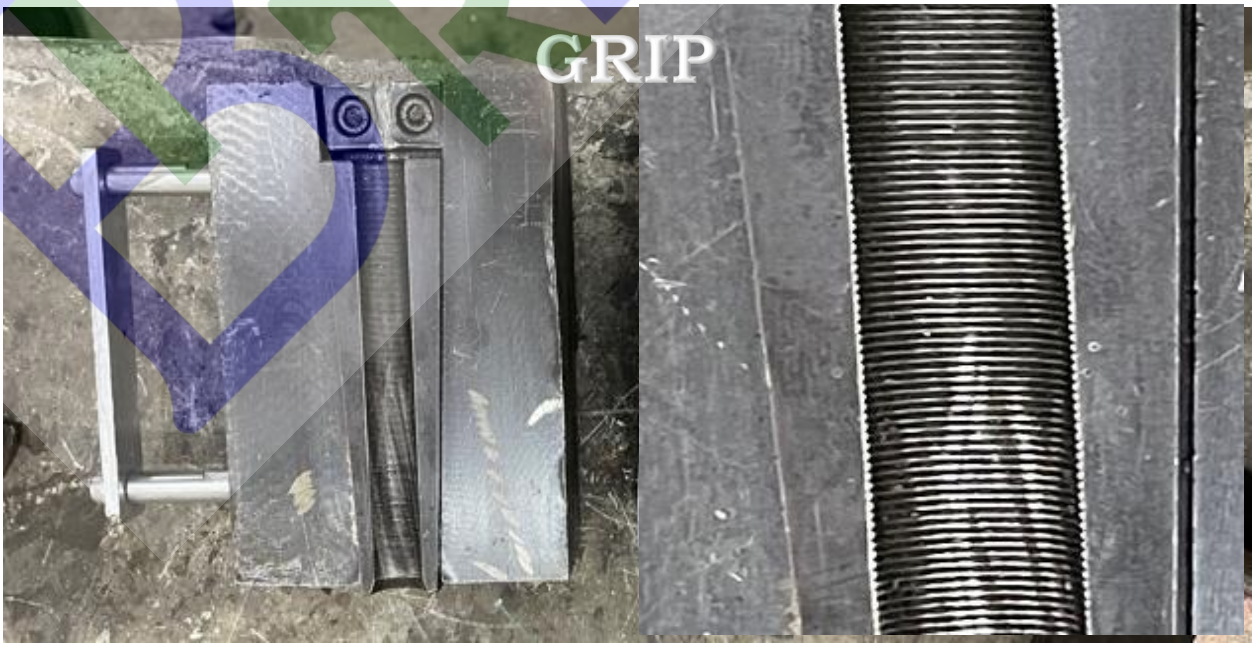
The extensometer may be removed from the specimen after the yield strength has been determined. Loading is then continued until failure of one or more wires.

PHYSICAL PROPERTIES

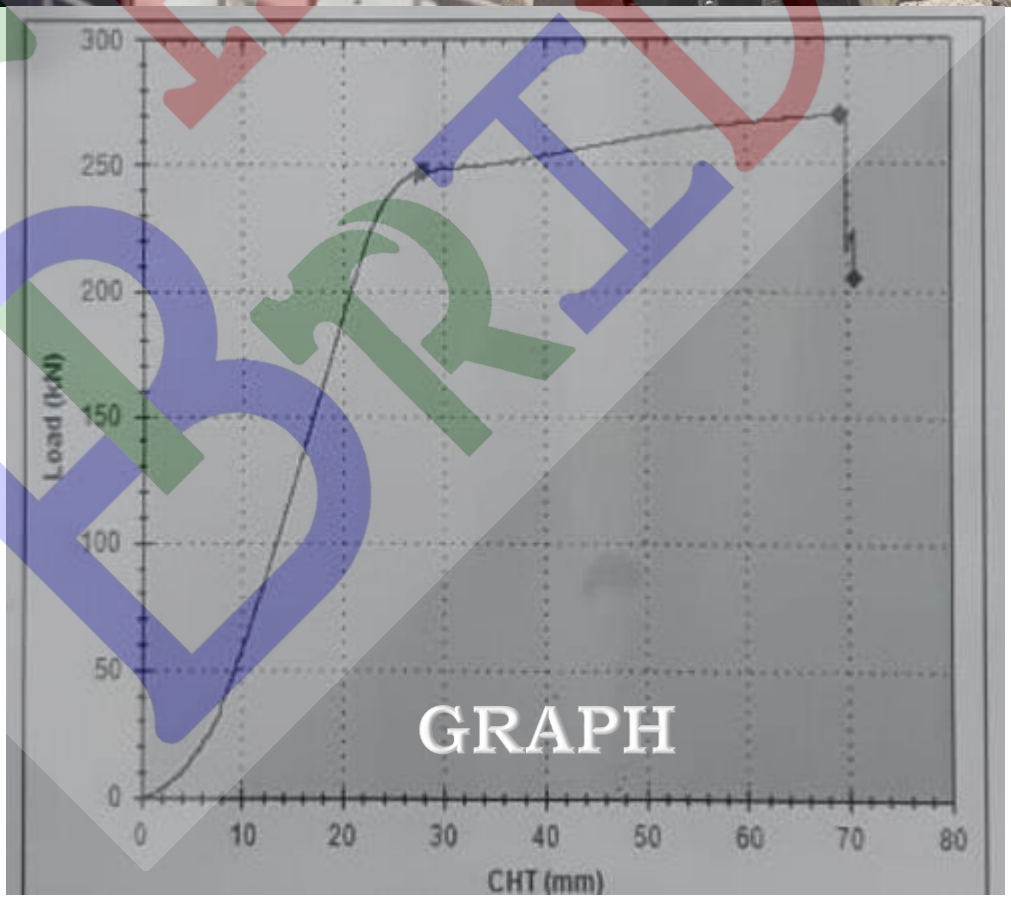
Class	Nominal Dia of Strand	Breaking Strength of Strand		0.2 % Proof Load (90% of Breaking Strength)	
	mm	kN	kgs	kN	kgs
(1)	(2)	(3)	(4)	(5)	(6)
I	9.5	89.0	9 078	80.1	8 170
	11.1	120.1	12 250	108.1	11 026
	12.7	160.1	16 330	144.1	14 698
	15.2	240.2	24 500	216.2	22 052
II	9.5	102.3	10 434	92.1	9 394
	11.1	137.9	14 065	124.1	12 658
	12.7	183.7	18 737	165.3	16 860
	15.2	260.7	26 592	234.6	23 929

DIMENSIONS, TOLERANCES AND MASS OF WIRE STRANDS

Class	Nominal Dia of Strand	Tolerance	Nominal Area of Strand	Nominal Mass of Strand
(1)	(2) mm	(3) mm	(4) mm^2	(5) kg/km
I	9.5	±0.40	51.6	405
	11.1	±0.40	69.7	548
	12.7	±0.40	92.9	730
	15.2	±0.40	139.4	1 094
II	9.5	+0.66 −0.15	54.8	432
	11.1	+0.66 −0.15	74.2	582
	12.7	+0.66 −0.15	98.7	775
	15.2	+0.66 −0.15	140.0	1 102




BREAKING POINT


300
250
200
150
100
50
0
Load (kN)
0
10
20
30
40
50
60
70
80
CHT (mm)
GRAPH