

ClampStar[®]

Tensile Test Report

CSR-1631 on

Nelson River ACSR 72/7 1843 (933.9mm²) Conductor



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Introduction

This test is the first official test of the newly designed CSR-1631, manufactured to production specifications. A previous test being part of the design phase had been conducted on a prototype unit having 16 screws in each head, performed on 54/19 1590 Falcon ACSR having a listed RBS of 54,500 lbf. tensile. This is the strongest standard ACSR conductor for which the 1631 series ClampStar is designed. The optimal goal for this was to achieve a minimum of 60% of the conductors RBS, which is 32,700. Initial slip occurred at 36,508 with first strand rupture at 36,588. This did achieve 67% of the conductors rated tensile strength, however, we were not satisfied being so close to the target, and preferring a bit more margin, we increased the number of setscrews to 20 on each end for the first production units. An advantage of this design is the clamping heads can be made longer or shorter, with more or fewer fasteners as needed, in the event additional strength is desired.



The 1631 series ClampStar is designed with a conductor diameter range of 1.345" to 1.631" (34mm – 41.4mm) for any aluminum stranded conductor including ACSR as well as other constructions. The first application for the 1631 series was on 72/7 1843 (933.9mm²) Nelson River ACSR, having 44,962 lbf. (200kN) RBS, and is the subject of this test report.

Test Procedure

A ClampStar CSR-1631 was prepared for the test. Corona caps were left off for clarity of measurement and observance, as they contribute nothing to the physical strength. The test was performed on the tensile test machine at the Mansfield, OH assembly plant. The conductor samples were new, unused, and had been stored indoors in the as received condition. The conductors were hand straightened prior to cutting but were not cleaned or otherwise prepared prior to installation in the ClampStar unit.



These units are supplied with shear-head type torque limiting fasteners. The fasteners were tightened sequentially; making 3 passes per the instructions prior to a final pass to shear off the heads at maximum torque, of approximately 70 lbf/ft.

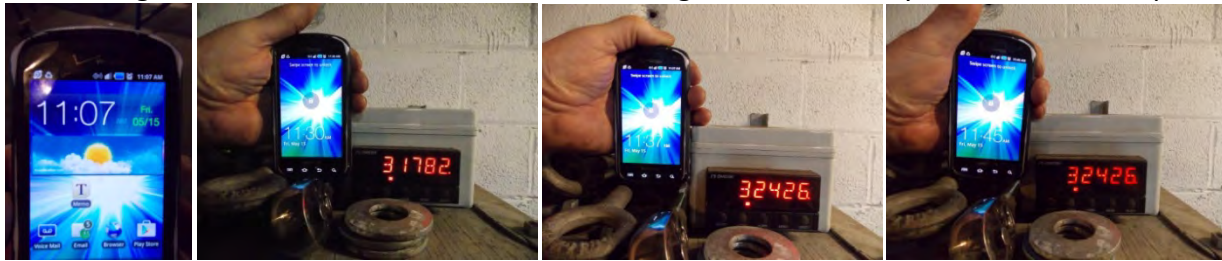
Due to the limited length of the test bed, and the long deadends used to secure the conductor, the full length of 12' of free conductor was not possible, and therefore the conductor was limited to 9 feet per side between clamping means.



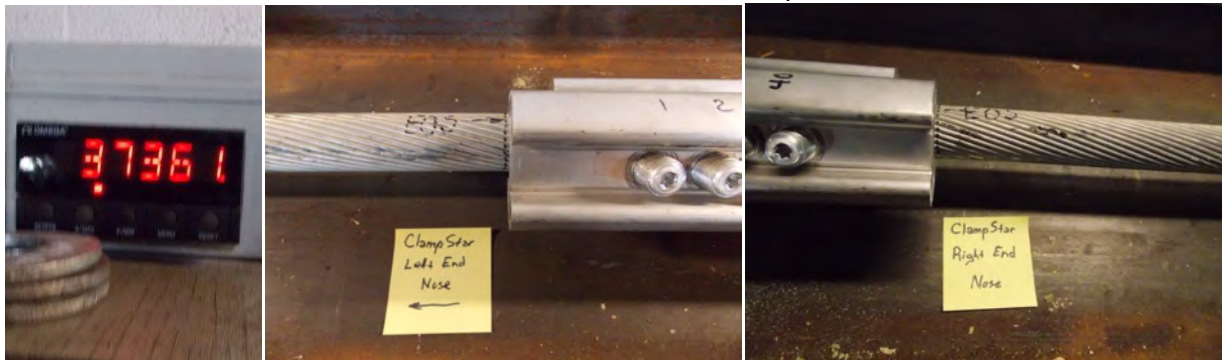
Observations of the conductor ends were made and recorded to compare for core strand slip, along with markings on the conductor stranding to observe movement.



Tension was applied to the 60% limit of 26,977 lbf. and held to observe any slip. However, due to a leaking valve, the tensile machine continued to gain incrementally over a 30 minute period.



Following the 30 minute hold at 60%+, additional tensile force was added, and additional observations were made. At 37,361 which is 83% RBS, no slip had been indicated.



At 37,888 slippage occurred on right end body, on the anchor end of the test assembly.



Conclusion

Test was terminated upon slippage of conductor at 84.2% conductor RBS, 37,888 lbf. (168.5kN). Testing demonstrates ClampStar CSR-1631 unit exceeds the guaranteed minimum holding strength of 60% RBS (ANSI C119-4 Class 1A, Normal Tension), without slip or other damage to the Nelson River ACSR conductor, actually exceeding 80%.

