

**“Merrimack” ACSS/TW/HS285 Conductor
Steel Core Tensile Tests**

Southwire Company

NEETRAC Project Number: 05-224

November, 2005



Requested by:

Mr. Uday Sinha

Southwire Company

Principal Investigator:

Janeen J. McReynolds

Janeen J. McReynolds

Reviewed by:

Paul Springer

Paul Springer, PE

“Merrimack” ACSS/TW/HS285 Steel Core Tensile Tests

NEETRAC Project Number: 05-224

November, 2005

SUMMARY

Mr. Uday Sinha of Southwire Company requested that NEETRAC perform tensile tests on five (5) extra high strength steel core samples taken from 1433 ACSS/TW/HS285 conductor. All samples exceeded their nominal rating by four percent demonstrating that the published value is appropriate for use in line designs in accordance with standard practices.

SAMPLES

One 500 ft. reel of 1433.6 kcmil “Merrimack” ACSS/TW/HS285 conductor
Steel core properties: 19 x 0.0987” strands, Nominal rating: 275 ksi or 39,251 lb

PROCEDURE

Hose clamps were installed on the sample ends before cutting a sample from the reel. Each sample was cut to 19 feet. Cast-resin laboratory fittings were used to terminate the test samples (composite conductor). Each steel strand was stripped of the galvanize coating using diluted hydrochloric acid to aid in securing the wires in the resin sockets. After the resin was cured, the aluminum strands were removed from each sample leaving only the core.

After installing the end fittings, the test gage section measured 17’4” for each sample. Samples were pre-loaded to 1000 lb, and then pulled to destruction at a loading rate of 15,000 lb/min. A data acquisition system records time, tension, and actuator position 6 times per second for the duration of the test.

RESULTS

Table 1 shows results for the five test samples.

Table 1, Loads, % Nominal Rating, and Failure Modes for Merrimack ACSS/TW/HS285 Samples			
Sample #	Max. Load, lb	% Nominal Rating	Failure Mode/Comments
0522401	40,800	104	Gage section break
0522402	40,800	104	Gage section break
0522403	40,840	104	Gage section break
0522404	40,840	104	Gage section break
0522405	40,810	104	Gage section break

Figure 1 shows load versus actuator displacement data for all samples tested.

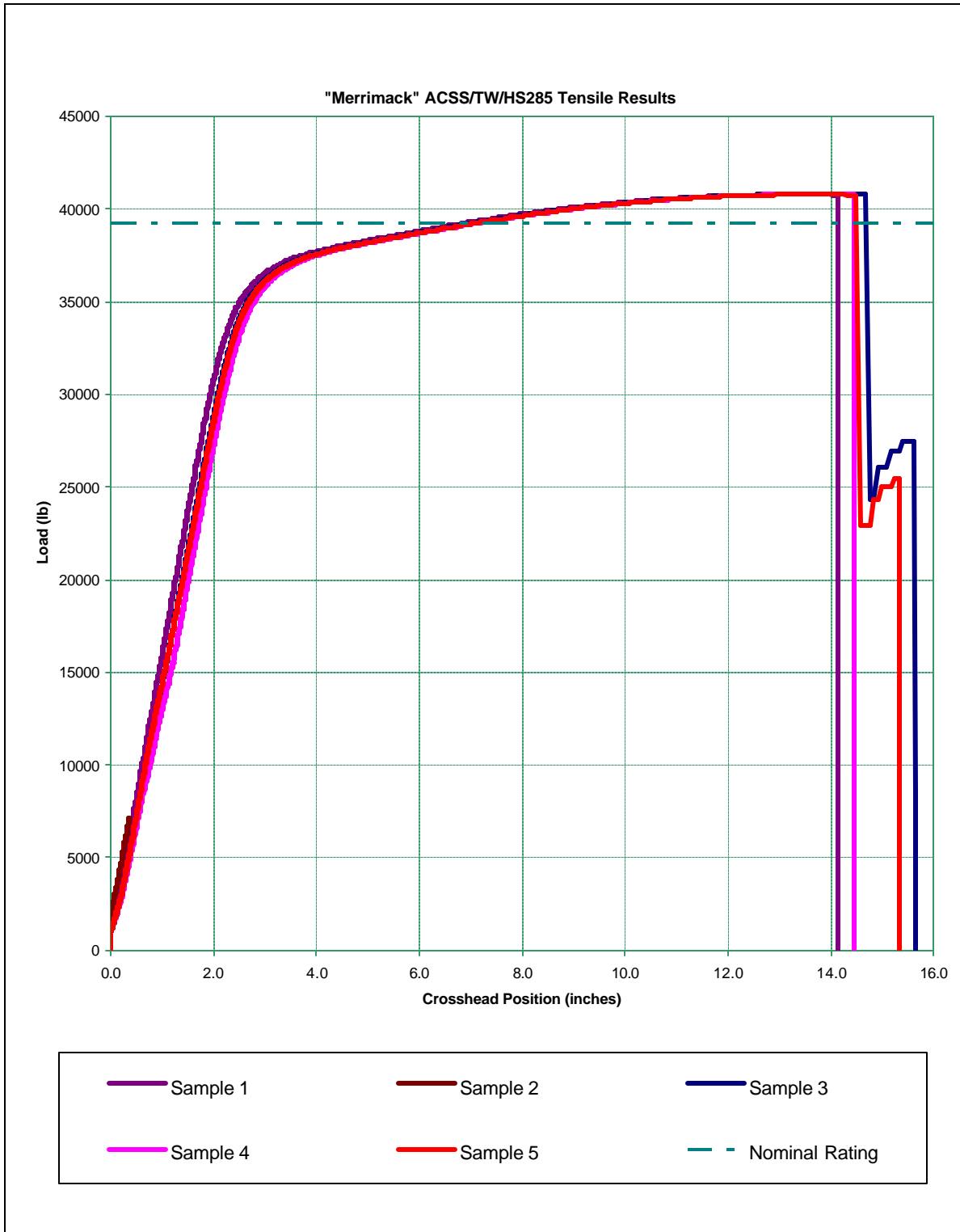


Figure 1, load vs. displacement for all Merrimack ACSS/TW/HS285 Steel Core samples

CONCLUSIONS

Test results support use of a nominal rating of 39,251 lb for the extra high strength steel core of Merrimack ACSS/TW/HS285 conductor.

EQUIPMENT LISTING

- 1) MTS Servo-hydraulic tensile machine, Control # CQ 0195 (load and crosshead data)

REFERENCES AND STANDARDS LISTING

- 1) ASTM E4, (Calibration of Load Testing Machines)
- 2) ASTM B857, Standard Specification for Shaped Wire Compact Concentric-Lay-Stranded Aluminum Conductors, Coated-Steel Supported (ACSS/TW)