KINECTRICS NORTH AMERICA INC. TEST REPORT
FOR 1272 kcmil 3M BRAND COMPOSITE CONDUCTOR

Test Name:	**SUSTAINED LOAD TEST ON COMPRESSION DEADEND FITTING FOR 1272 kcmil 3M BRAND COMPOSITE CONDUCTOR AT HIGH TEMPERATURE**
Test Date:	September 12-20, 2003
Cable Supplier:	3M Company
Laboratory:	Kinectrics Inc. 800 Kipling Avenue Toronto, Ontario M8Z 6C4 CANADA
Standard:	Based on ANSI C119.4-2003, Paragraph 7.3.3.1
Kinectrics Staff:	Mr. Craig Pon **Mr.** Mike Kastelein Mr. Gord Hale

OBJECTIVE

3M contracted with Kinectrics under PO # 0000969870 to conduct a high temperature sustained load test. The objective of the test was to verify the high temperature sustained load carrying capability of the Alcoa-Fujikura Ltd. (AFL) Class 1, full tension compression deadend clamp on a 1272 kcmil 3M Brand Composite Conductor. The dead-end catalogue number is B9119-A (special design for 3M Composite Conductor).

There is no ANSI requirement for high temperature sustained load testing. However, a sample was subjected to a test designed to demonstrate sustained load performance of the connector system at extreme high temperature. AC current was used to raise the conductor temperature to 240˚C for the duration of the 168 hour test. Tension for the high temperature sample was 15% RBS. Lower tension was used for the high temperature test to simulate the expected field tensions, where 15% RBS is considered an upper limit for tension at extreme conductor temperatures.

TEST SET-UP

A compression deadend clamp was installed on one end of the conductor sample. This was done by AFL at their facilities and then shipped to Kinectrics. The other end of the sample was terminated with an epoxy-resin clamp by Kinectrics.

The sample was installed in a hydraulically-activated horizontal test machine. The distance between pulling eyes of the compression clamp and the epoxy-resin clamp was about 14.4 m. The temperature in the sample was increased by circulating an AC current supplied by a current transformer through the sample. Three(3) thermocouples measured the temperature of the conductor. The current was cycled on and off to maintain the temperature of the highest reading thermocouple at the desired level.

INTRUMENTATION

The MTS equipment associated with load cell #17356-0 that monitors the load and controls the load rate was last calibrated on March 18, 2003. It is due for calibration on March 2004.

TEST PROCEDURE

A test machine having a load accuracy of ± 2% was used for this test. The tension in the sample was increased to 6,552 lbf or 15% of the rated tensile strength (43,677 lbf) of 1272 kcmil conductor. The tension was maintained at this level for 168 hours. The temperature of the sample was maintained at approximately 240^{o}C during the test. On completion of the sustained load test the sample was cooled and unloaded, and then the tension in the sample was increased at a rate of 5000 lbf/minute (2273 kgf/min) until failure.

TEST RESULT

The sample failed at 43,200 lbf or 98.9% of the rated tensile strength of the cable. The conductor failed approximately 5 feet (1.5 m) from the AFL deadend. The failure is shown in Figures 1a and 1b.

The high temperature sustained load test is not required by ANSI C119.4, but was performed to demonstrate connector performance during extreme high temperature operation. The sustained load sample exhibited a residual strength higher than the 95% RBS minimum used to qualify the residual strength of connectors under ANSI C119.4. This suggests that the extreme load and temperature does not degrade the strength of the deadend connectors.

ACKNOWLEDGEMENT

This material is based upon work supported by the U.S. Department of Energy under Award No. DE-FC02-02CH11111.

DISCLAIMER

Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the Department of Energy.

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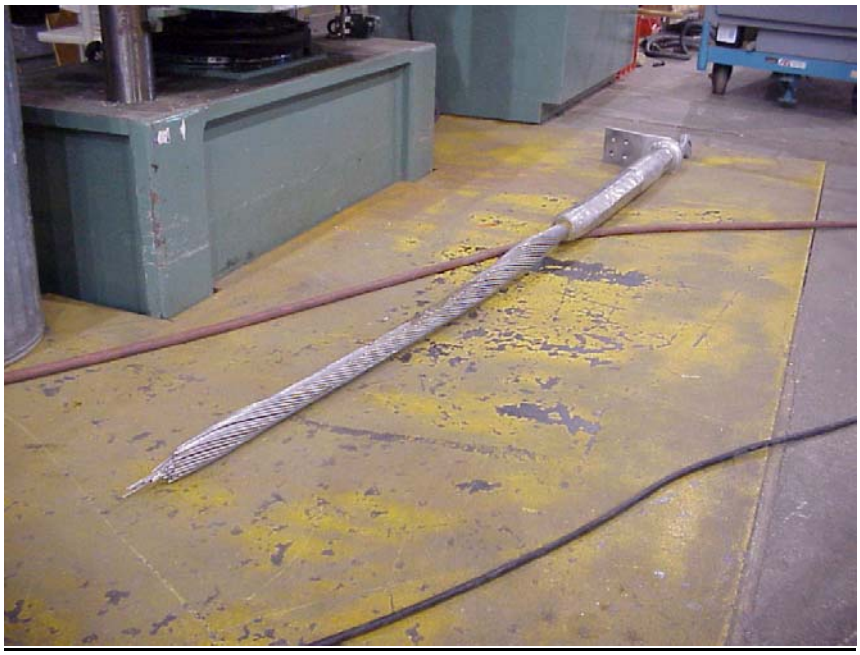

Figure 1a: 1272 kcmil Conductor after Tension to Failure after 168 Hour Sustained Load Test at 240°C

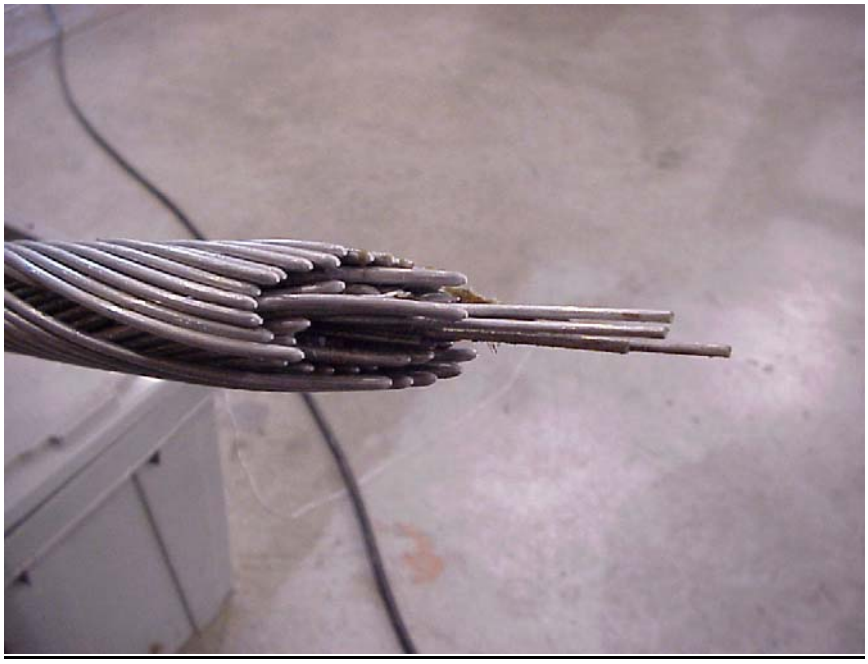

Figure 1b: 1272 kcmil Conductor after Tension to Failure after 168 Hour Sustained Load Test at 240°C (Close-Up)

DISTRIBUTION

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