Update on the NEETRAC Project

High Temperature Connector Committee Testing Support Phase II

Project No. 16-123

Principle Investigator: Joe Goldenburg
Co-PI: Dylan Summer
Project Reviewer: Nigel Hampton

Purpose

- Conduct testing on connectors used with HTLS conductors that will help the industry better understand their performance under tension
- This project will help support the ANSI C119.7 Committee on Connectors for use with High Temperature Conductor by providing information that will help them finalize a high temperature conductor test standard
- Share data (only) with the ANSI C119.7

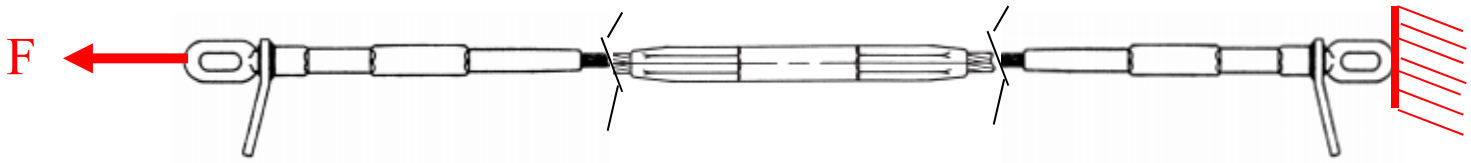
High Temperature Connector Testing

Tasks

- Order / receive materials
- ✓ Finalize testing parameters with TAs and ANSI C119.7
- Design and build tension frames
- Current Cycle Test first loop
- Current Cycle Test second loop.
- Current Cycle Test third loop
- Prepare closeout
- Write report
- Communicate with NEETRAC Technical Advisors
- Communicate with ANSI C119.7 Committee

Test Plan (General 1/2)

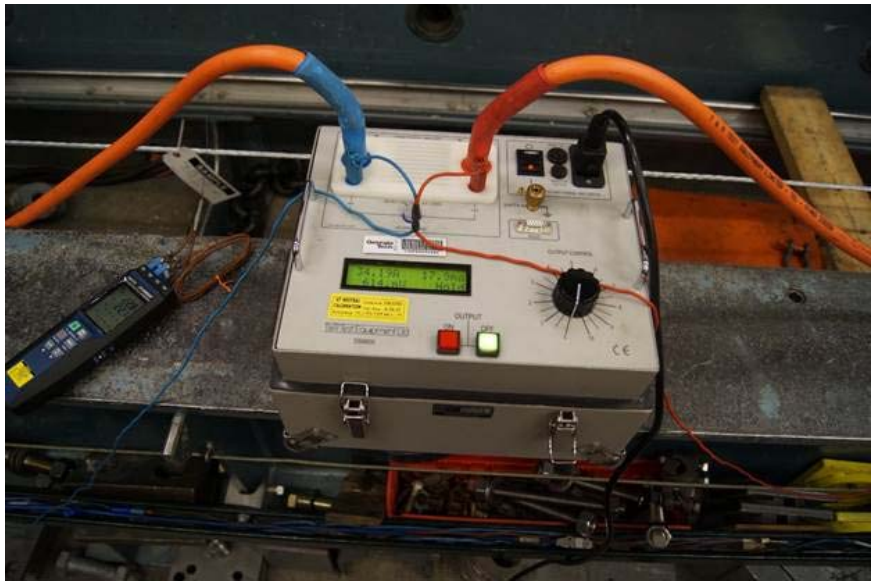
- There will be three tension conditions for each CCT loop.
- For all three conditions:
  - Samples consist of 1 AFL splice and 2 AFL dead-ends with Drake ACSS HS285.
    - Thank you Gary Sibilant / EPRI for the conductor!
    - Thank you Wayne Quesnel / AFL for the connectors!
  - Samples are approximately 30 ft. long (eye to eye).
  - Tension will be monitored continuously.
  - Control temperature is set to 250° C and continuously monitored.

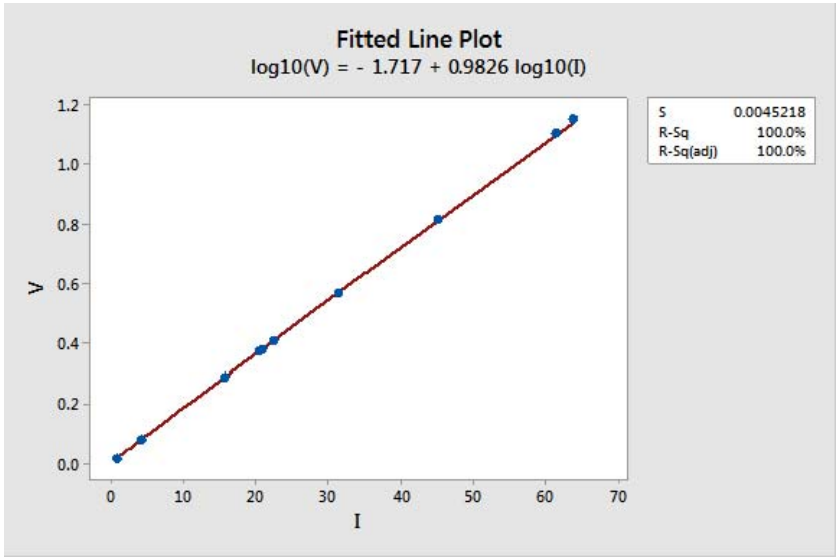


Test Plan (General 2/2)

NEETRAC DC measurement:

- DC resistance (10 amp) every 10th cycle using wire equalizers, similar to the IEC method.
- We plot multiple currents and resulting voltages to reduce error.

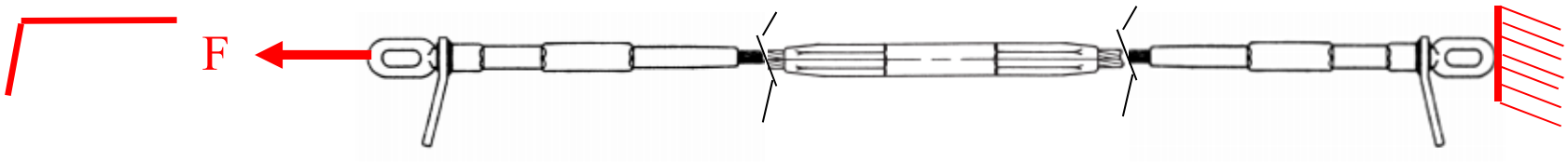




Test Plan (General)

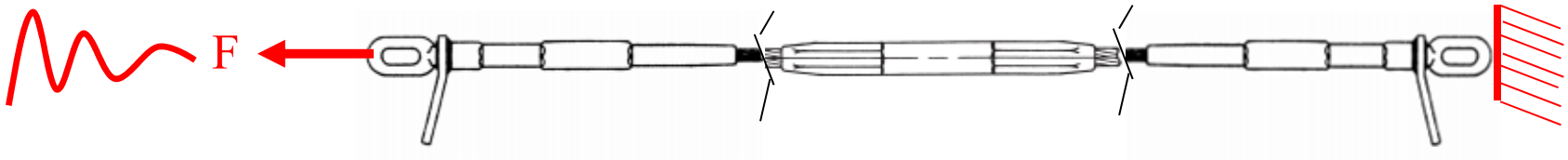
- There will be three tension conditions for each CCT loop.
- For all three conditions:
  - Samples consist of 1 splice and 2 dead-ends with Drake ACSS HS285.
  - Samples are approximately 30 ft. long (eye to eye).
  - Tension will be monitored continuously.
  - Control temperature is set to 250° C and continuously monitored.
  - DC resistance (10 amp) every 10th cycle using wire equalizers.
  - DC resistance every 50th cycle using new method developed at NEETRAC.
- After 500 cycle CCT, all samples will be separated for tensile testing.

Test Plan (Tension Conditions 1/3)
Condition 1



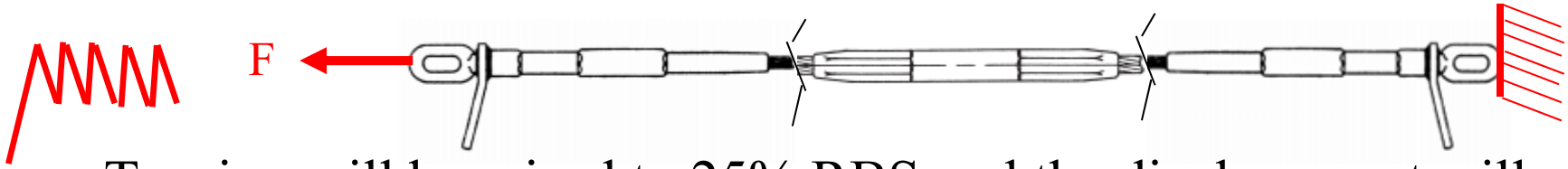
- Constant tension at 18% RBS
  - Continuous tension monitoring (1 per minute)
- Temperature cycles: temp and 250 °C for 500 cycles.
  - Continuous temperature monitoring (1 per minute)
- DC resistance (10 amp) every 10th cycle using wire equalizers.
- DC resistance every 50th cycle using new method developed at NEETRAC.

Test Plan (Tension Conditions 2/3)
Condition 2



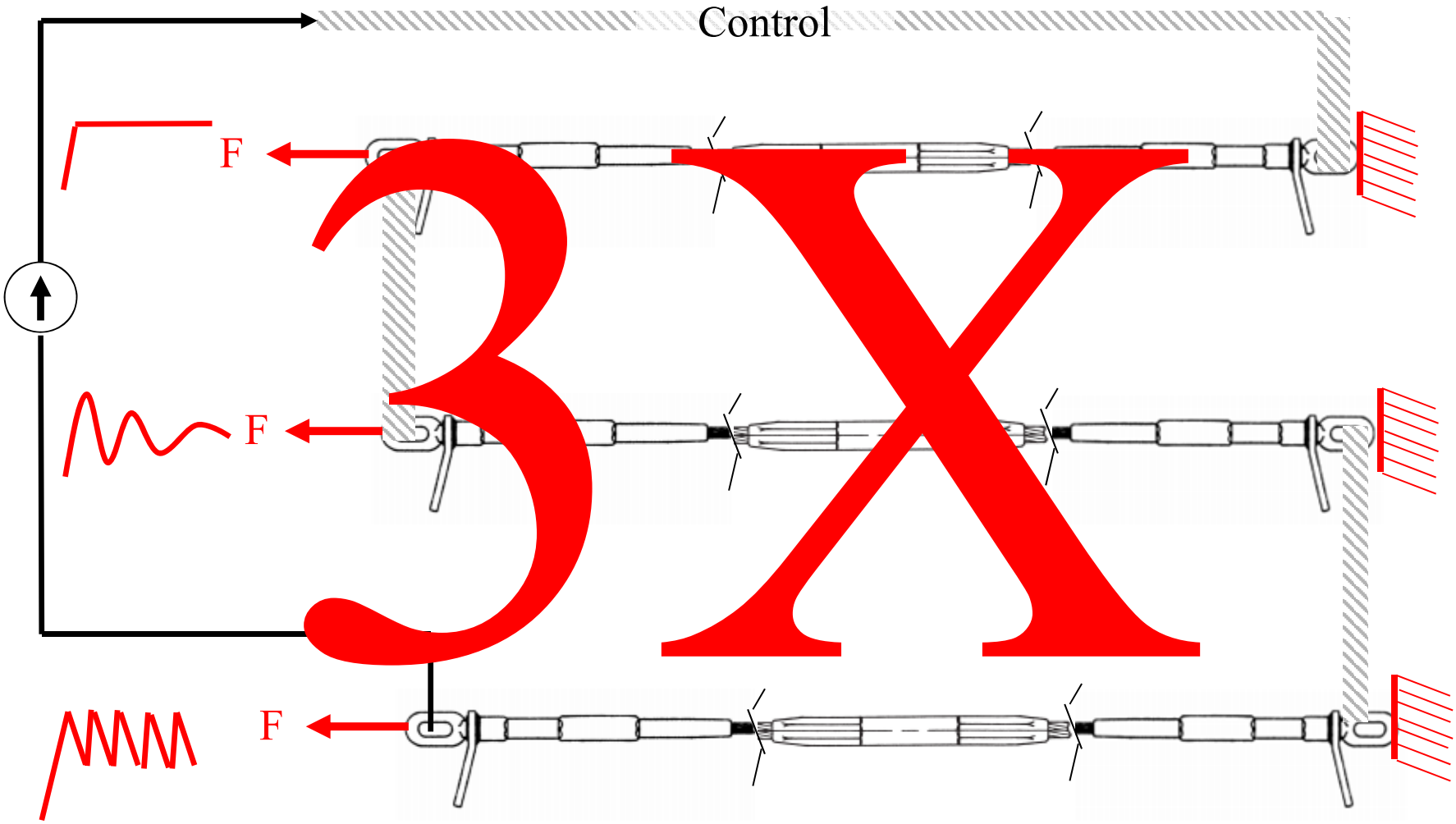
- Tension will be raised to 25% RBS and held for 20 minutes after which time displacement will be fixed.
  - The tension will vary as the conductor heats and cools.
  - Continuous tension monitoring (1 per minute)
- Temperature cycles: room temp and 250 °C for 500 cycles.
  - Continuous temperature monitoring (1 per minute)
- DC resistance (10 amp) every 10th cycle using wire equalizers.
- DC resistance every 50th cycle using new method developed at NEETRAC.

Test Plan (Tension Conditions 3/3)
Condition 3



- Tension will be raised to 25% RBS and the displacement will be fixed immediately.
  - The tension will vary as the conductor heats and cools.
  - Tension will be resent to 25% RBS every 10th cycle.
  - Continuous tension monitoring (1 measurement per minute)
- Temperature cycles: room temp and 250 °C for 500 cycles.
  - Continuous temperature monitoring (1 per minute)
- DC resistance (10 amp) every 10th cycle using wire equalizers.
- DC resistance every 50th cycle using new method developed at NEETRAC.

Test Plan (Loop Diagram)



High Temperature Connector Testing

Tension Frames

- Modular construction
- Hydraulic system for fixed tension.
- Turnbuckles for fixed displacement.

Tension Frames

- Modular construction
- Hydraulic system for fixed tension.
- Turnbuckles for fixed displacement.

Schedule

- Depends on the status of an existing NEETRAC project.
- If the existing project continues, connector testing will start 2/1/18.
- If the other project does not continue, connector testing will start on 12/1/18.
- We will know the project status by 10/25/17.