



100

A century of people **powering life.**

AUTOMATIC DE-ENERGIZATION OF DOWNED CONDUCTORS

WHAT IS THE "ARC SENSE" PROJECT?

Project Overview

Driver electrocuted after ignoring barricade and hitting wires downed in storm

Updated Mar 9; Posted Mar 9



The inferno sparked when the driver hit live electrical wires downed by the nor'easter was so bad, the male victim had not been positively identified, as of last reports.(screen shot/6ABC via Twitter)

NEW JERSEY REALTIME NEWS

Man killed by power lines knocked down during nor'easter

Updated Mar 3; Posted Mar 3



By Taylor Tiamoyo Harris, tharris@njadvancemedio.com, NJ Advance Media for NJ.com

Police in Andover say a man was killed Friday evening by power lines knocked down by the strong winds of the Nor'Easter.

Authorities responded to reports of downed power lines near Lenape Avenue at around 6:45 p.m. and found a 41-year-old who came in contact with the live lines, the Andover police said in a release.

The man, whose name was not released, was pronounced dead at the scene.

The incident is being investigated by the Andover Township Police. No further details were released.



ARC SENSE

- SEL proprietary algorithm
- Developed by Schweitzer Engineering Laboratory (SEL) in 2006 for detection of energized downed conductors
- The conductor must cause arcing
- The algorithm observes and “counts” the arcs
- No other utility has used effectively



KEY FEATURES

ARC SENSE TUNE



- Requires 0.5 SA to detect current (60A in 751, 50A in 651R-2)
- Must observe current for 24 hours to become “tuned” to the line harmonics

ARC SENSE COUNT



- There are two algorithms that “count” the arcs
- Counts are deviations from the tuned average

ARC SENSE ALARM



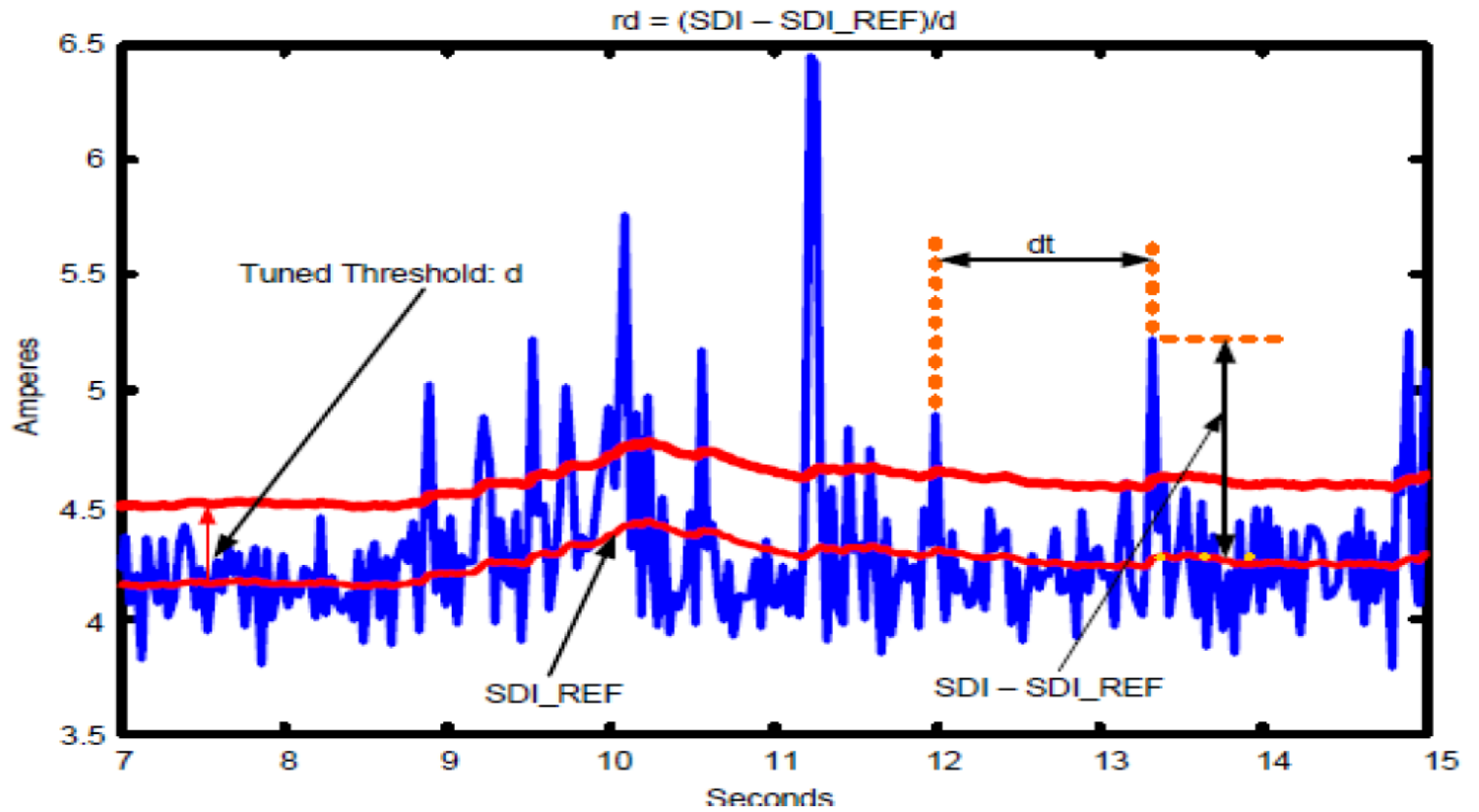
- When either algorithm has enough counts (3 or 30) it registers an alarm
- PPL built filters on the alarms to stop specious counts

DOWNED CONDUCTOR TRIP



- PPL has created custom logic to trip when a known downed conductor occurs
- Patent pending on this functionality

ARC SENSE TUNING



ALARM ACTIONS

OPERATOR RESPONSE SEQUENCE



Algorithm Alarms

- Uses counts from algorithm(s)

Arc Sense Alarm

- Check for other indications
- Loss of Pot
- Loss of Amps
- Customer Calls
- Meter Ping / Last Gasp

Trip to Isolate

- Open nearest device to safely deenergize

TRIPPING SEQUENCE

AUTOMATIC DETECTION AND ISOLATION



Normal PH-G Fault

- Relay trips normally as wire hits neutral on way to ground

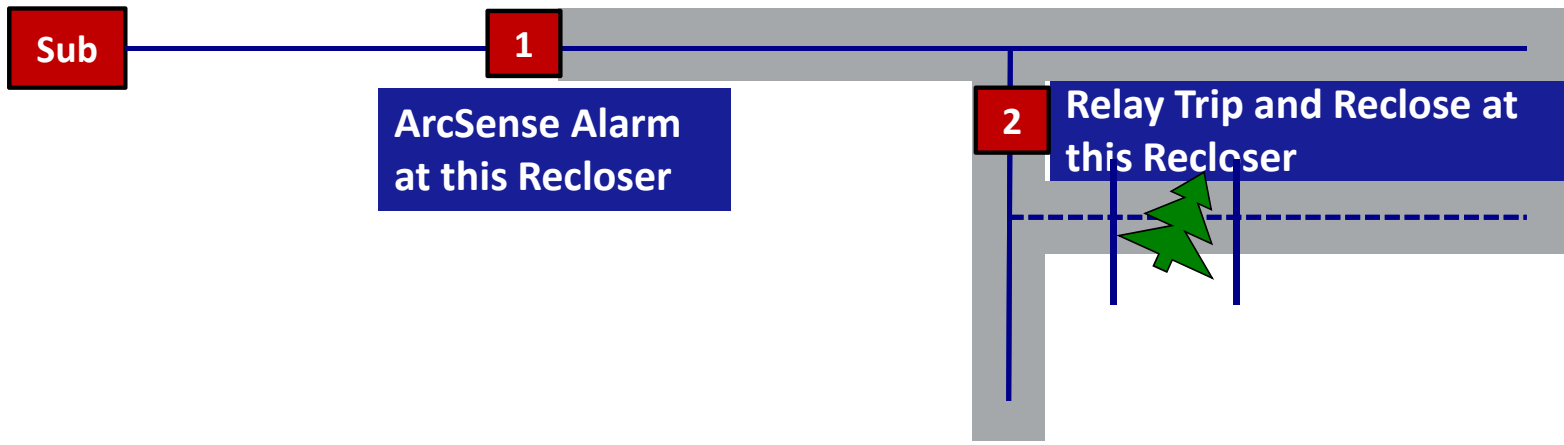
Open-phase Procedure

- Arc Sense detects the downed conductor
- *AFTER* the reclose attempt

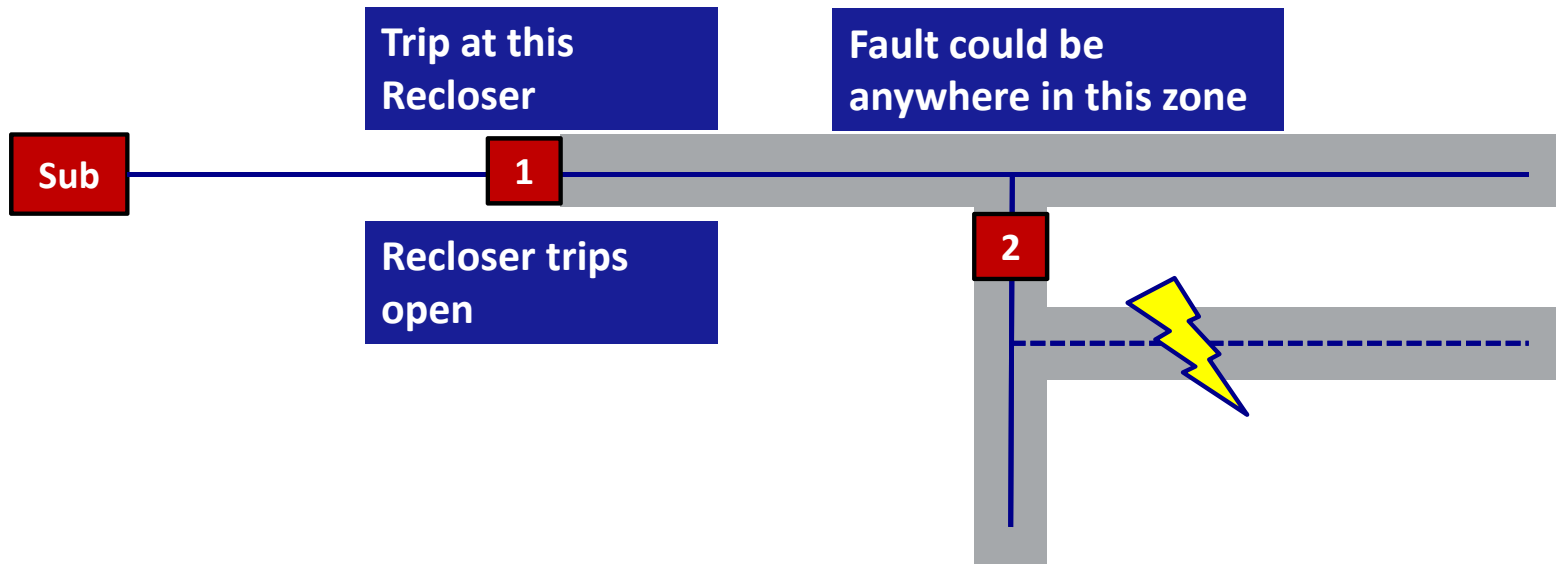
Trip Nearest Device

- Algorithm knows this sequence
- Trips open the device

EVENT HISTORY



Operator initiates ping and finds the break, opens closest device



- 1) Tree brought down wire in right-of-way
- 2) Fuse did not operate
- 3) Fire would have started
- 4) Safety hazard avoided

TRIPPING RESULTS (so far...)

