
# A new idea for:
# Grid Resilience, Wildfire Mitigation & Asset Management

*By CCOSTANZO*

The weakest link in any overhead system will always be connection points, such as; deadends, suspension clamps, and compression joints. Conductors and well-maintained towers will always outlast connectors.

Even though some connectors fail due to mechanical stress, electrical failures appear to be more commonly reported. In these situations, the connector resistance increases over time to a high enough value that a rapid deterioration of the connector occurs, resulting in catastrophic failure due to electric overheating if no intervention is made.

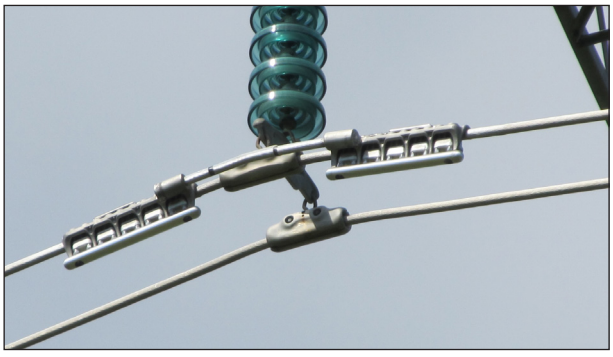
The cause of an increase in electrical resistance is usually a combination of several factors:

- High initial resistance due to improper assembly/ Installation or defective materials
- Degradation of electrical interfaces in the connectors through thermal cycling
- Oxidation of electrical interfaces due to contaminants and environmental effects

***Deadend Correction***

Fortunately, there are some cost-effective, preventive maintenance options that can reduce overall maintenance costs and even defer maintenance or replacement while at the same time, extend the life of overhead lines. Some of these options have only been available for the last decade or so and therefore it's possible that asset managers and other decision-makers may not be aware of them.

I'm referring to Electrical/Mechanical Shunts [EMS] under the trade name, ClampStar® for use on overhead connectors and damaged conductor. First introduced in 2008, with hundreds of thousands now installed, these devices extend line life while improving public safety.



***Suspension Clamp Correction***

In fact, after a few recent years of destructive wildfires that devastated California, over 50,000 of these types of shunts under the tradename ClampStar® were installed in that state to harden the grid for wildfire mitigation purposes.

Some experts argue that utilities could eliminate a large portion of the overhead connector inspection process

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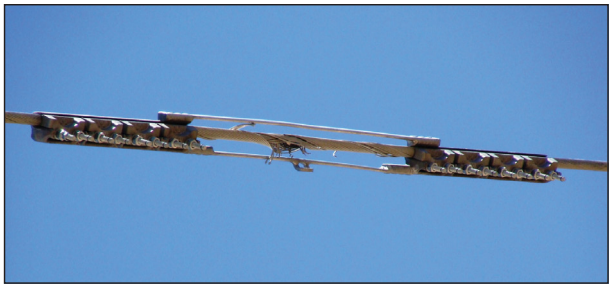
and, at the same time, at lower cost, provide a life extension solution and increase public safety just by installing ClampStars on all overhead connectors. This provides the added benefit of qualifying as a capital expense project.

Since connectors are the weakest link in the system, it only makes sense to protect them. Correcting automatic splices or any overhead connectors with ClampStar is faster, much less expensive, and results in a connection of significantly higher integrity than even that of an original, properly installed connector.

The installation results is a thermally uprated connection and a visible indication that steps have been taken to protect the general public against the possibility of power line on the ground that occurred as the result of a failed connector.

*Splice Correction*

ClampStars are the industry's only PERMANENT life extension solution for virtually all overhead conductors. Increasing power flows on some of the oldest lower-voltage circuits, especially during emergencies has put significant pressure on a power grid that was built mainly to serve local markets. ClampStars are necessary to help bring the power grid up to a level of acceptable physical soundness and reliability. They easily install in a few minutes over the existing connector. No mechanical grips, come-alongs, jumper cables, or cutters are needed. There's no need to cut power or lines and they easily install over the existing splice or connector. ClampStar provides a substantially higher integrity connection by several orders of magnitude than any other option, allowing a line to operate at increased ampacity.



***Damaged Conductor Correction***

All ClampStar designs are tested at 390°C conductor temperature. This is a significantly higher temperature than listed by any electrical test standards, with Clampstar having a continuous conductor temperature rating of 250°C.

**Classic Connectors**
Classic Connectors is an electrical connector manufacturer based in Clinton OH who create innovative devices to reinforce aging connectors, restoring their full mechanical integrity and escalating their electrical capacity by at least double of what it was when they were new. Their products are identified by the name ClampStar®
**ClampStar®** is an Engineered Electrical and Mechanical Shunt also known as the Connector Corrector that is intended to correct and reinforce the deteriorated electrical and mechanical performance of hot running, aged or degraded splices and other connectors, clamps and fittings on overhead transmission and distribution conductors. classicconnectors.com

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