



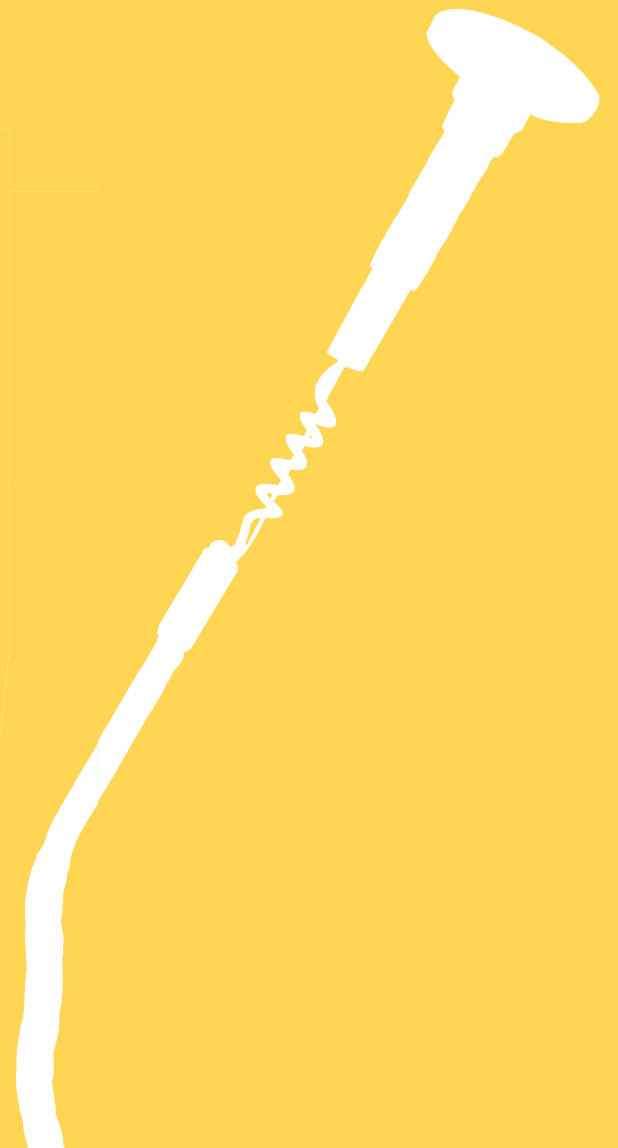
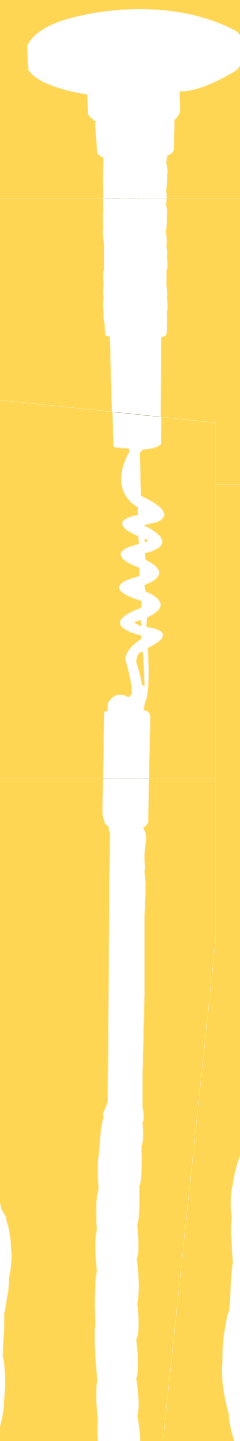
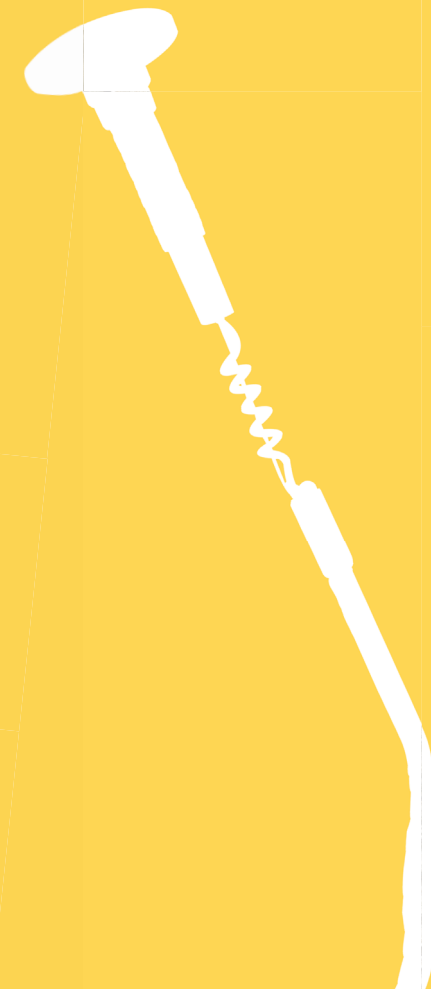
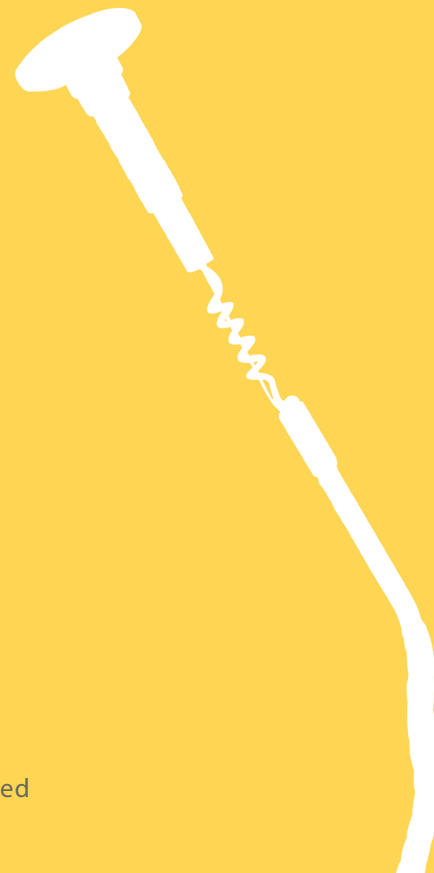
S&C ELECTRIC COMPANY
Excellence Through Innovation



THE DIFFERENCE A FUSE LINK CAN MAKE -SILVER ELEMENT COMPARISON



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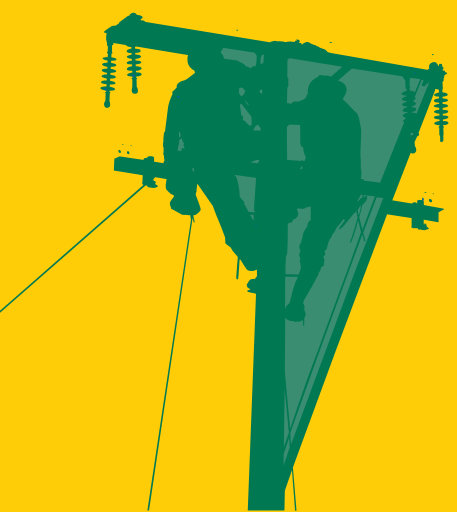


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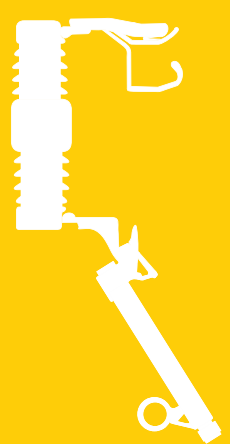
Have you ever had a cutout operate on a blue sky day? For no apparent reason? Every utility has these “nuisance” fuse link operations, and they cause unplanned outages for you and your customers. Your fuse links could be costing you a lot more than you think!

DESIGN MAKES A DIFFERENCE



1.5%

Percentage of fuse links that operate when they are not designed to, causing **unplanned outages**.*



THIS COSTS YOU REAL MONEY

1.5% may not seem like a lot, but every time a fuse link has a nuisance operation it results in a truck roll. **These truck rolls add up.** If a utility purchases 200,000 fuse links annually and uses just 1.5% of them for nuisance replacements, the result is 3,000 unnecessary and unplanned truck rolls. At a conservative \$500 a truck roll, this comes out to...



\$1,500,000 a year spent on replacing fuse links.

WHAT IS YOUR TOTAL COST PER FUSE LINK?

The story gets worse the more nuisance operations you have. The chart below shows the impact to your O&M costs as the percentage of nuisance operations changes. This affects the total cost you pay for your fuse links.

Your \$5 fuse link is actually **costing you \$13... or more**



# of Fuse Links Purchased a Year	Percentage of Nuisance Operations				
	1.5%	2.0%	2.5%	3.0%	3.5%
25,000	\$187,500	\$250,000	\$312,500	\$375,000	\$437,500
50,000	\$375,000	\$500,000	\$625,000	\$750,000	\$875,000
75,000	\$562,500	\$750,000	\$937,500	\$1,125,000	\$1,312,500
100,000	\$750,000	\$1,000,000	\$1,250,000	\$1,500,000	\$1,750,000
200,000	\$1,500,000	\$2,000,000	\$2,500,000	\$3,000,000	\$3,500,000
TOTAL COST PER FUSE LINK†	\$13	\$15	\$18	\$20	\$23

* Percentage based on data provided by utilities, independent third-party testing of industry fuse tolerances, and S&C's own testing performed in its Advanced Technology Center. † Total cost per fuse link rounded up to the nearest dollar.

Other Manufacturers

SO CALLED SILVER ELEMENTS

Some manufacturers claim to offer silver-element fuse links, but in reality the elements are not entirely silver but are of copper or tin construction.

Copper and Tin fuse elements do not absorb heat effectively. As these fuses carry currents close to their minimum melting point, the fuses can become damaged. This affects their ability to accurately interrupt the fault currents for which they were designed.

Over time, fuse links become less tolerant of heating and operate under load currents or low fault currents.

COILED DESIGN

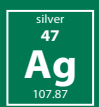
Other manufacturers use a design where the element is tightly wound to the strain wire. This type of design may not tolerate the mechanical stress daily changes in load current or surges cause. This can lead to fuse-element damage, a nuisance operation, and an unplanned outage for your customers.

CRIMPING CONNECTION

Crimped connections have the potential to loosen during normal handling and operation. When the fuse-element connection is compromised, the fuse link will operate and will often lead to a nuisance operation.

Positrol® Fuse Links

SILVER ELEMENTS



Silver melts at 960° C, a much higher temperature than other elements. During 90% of its melting time, silver is in the heating phase and absorbs a lot of heat before changing state.

This allows fuse links with silver elements to carry currents that are very close to the minimum melting time without any damage to the element itself.

HELICALLY COILED

Fuse links installed in a cutout are subject to mechanical tension. As the element in the link heats and cools under typical load currents, the element expands and contracts.

A helically coiled design allows for these mechanical and electrical stresses. This avoids damage to the fuse element under normal operating conditions.

SWAGING CONNECTION

How a fuse element is connected to the fuse link influences how reliably it will operate. Swaging allows the fuse element to be securely attached to the other components of the fuse link. This provides a reliable connection for current transfer and a secure connection while the fuse link is subject to mechanical tension.

