

Date: 06/07/2021

## Cost Benefit Analysis

### Buddy Bushing

#### Summary

Transmission powerline maintenance can be time-consuming and costly, but the repercussions of not keeping up with maintenance are even more costly and in some cases have caused death.

In 2018, one of California’s largest investor-owned utilities had multiple hardware failures that lead to multiple fires that killed 85 people and caused 30 billion dollars in damages. This could have all been avoided if the LineWise Buddy Bushing had been installed on these structures.

A typical setup is to have an insulator string attached via hardware to a vang hole on the structure. Over time, wind-driven vibrations create a regular and frequent motion of the hardware in the vang hole, causing a groove to form. Failure is unavoidable as long as the hardware sways back and forth wearing away at the vang hole. If something is not done to repair this problem, the groove will continue to form until the power line drops as in the case mentioned above.

<i>Features</i>	<i>Benefits</i>
<ul style="list-style-type: none"> <li>Professionally tested at the National Electric Energy Testing, Research and Applications Center</li> </ul>	<ul style="list-style-type: none"> <li>Third-party testing has proven the reliability of the Buddy Bushing</li> <li>The testing found that the Buddy Bushing increased the strength of the joint by 25%</li> </ul>
<ul style="list-style-type: none"> <li>Process improvement</li> </ul>	<ul style="list-style-type: none"> <li>Saves on cost by not having to replace part of the structure</li> <li>If it’s the type of structure where you can replace the vang hole plate, you do not have to unbolt the structure to remove the plate</li> <li>Repairs the cross arm</li> </ul>
<ul style="list-style-type: none"> <li>Risk Mitigation</li> </ul>	<ul style="list-style-type: none"> <li>Repairs the existing vang hole and keeps the energized powerlines from falling to the ground and causing fires</li> <li>Prevent loss of revenue stream</li> <li>Could save lives if fires are caused in heavily populated areas</li> </ul>
<ul style="list-style-type: none"> <li>Overall cost reduction</li> </ul>	<ul style="list-style-type: none"> <li>A project that consisted of 132 towers with 400 buddy bushings being installed over a 14 day period. When the project was complete the IOU added up the cost of the buddy bushing and new hardware plus the man hours expended and came up with a cost savings of 1.2 million over traditional tower repair methods</li> </ul>

<ul style="list-style-type: none"><li>• Machined utilizing corrosion-resistant stainless steel</li></ul>	<ul style="list-style-type: none"><li>• Extends the life of the hardware and reduces maintenance cost</li></ul>
<ul style="list-style-type: none"><li>• May be used in new construction</li></ul>	<ul style="list-style-type: none"><li>• Eliminates the vang hole wear before it can ever begin</li></ul>
<ul style="list-style-type: none"><li>• Each Buddy Bushing is is engineered for your specific application</li></ul>	<ul style="list-style-type: none"><li>• Ensures you receive a product that meets your unique loading requirments</li><li>• Each application is approved by a proffesion engineer</li></ul>

As of 06/07/2021, the Buddy Bushing has been in service for 10 years. Recent inspection indicated no wear on the hardware, vang hole or Buddy Bushing.