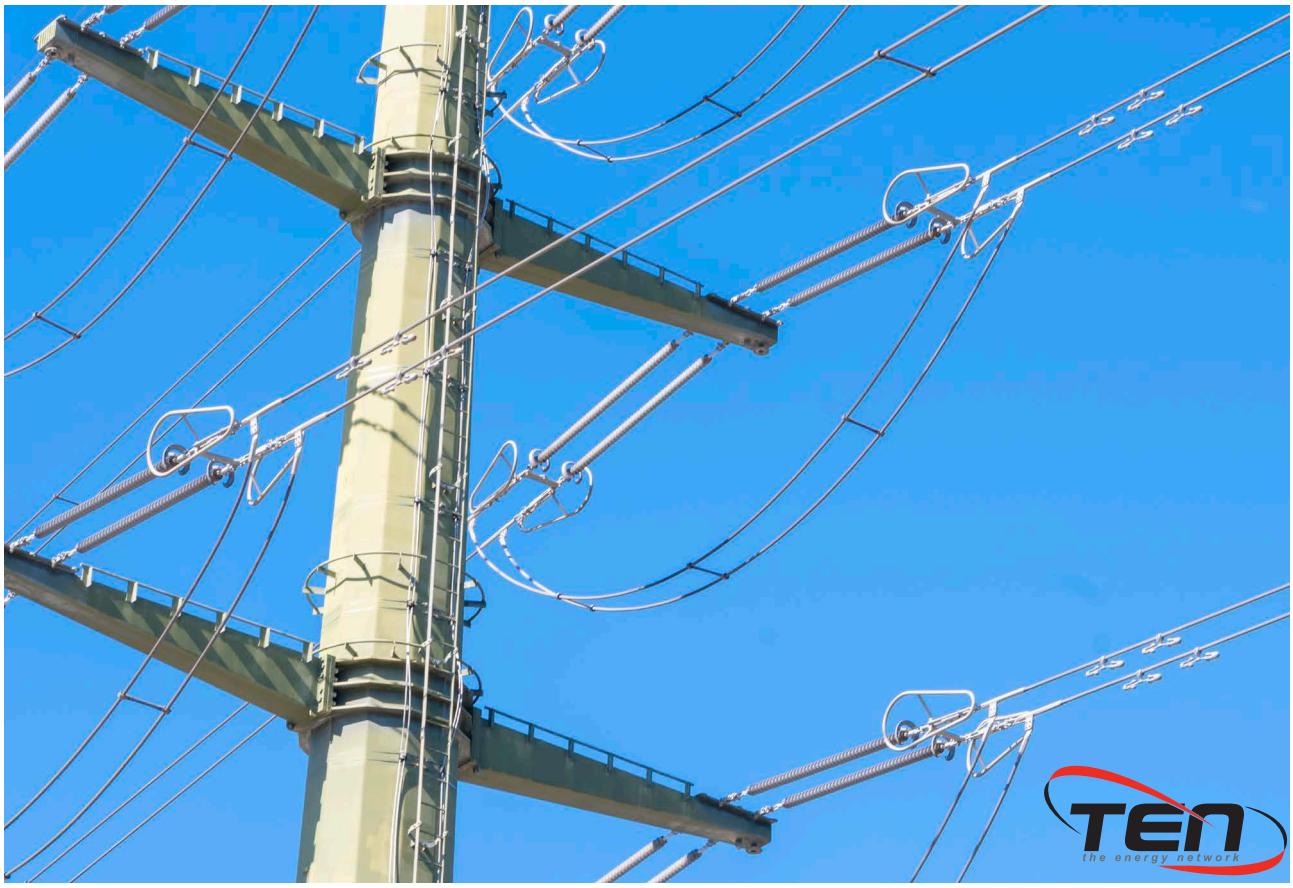
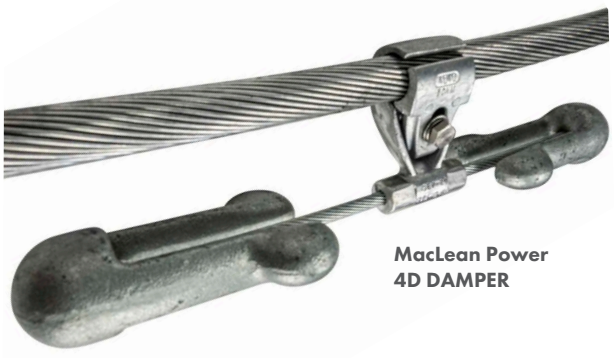


Transmission Line Vibration Control "A Brief Insight"

Electrical utilities use vibration dampers on their overhead transmission network to reduce the effects of wind-induced vibration on the conductors.

When wind blows across overhead transmission lines, it can cause them to vibrate or oscillate, which can lead to fatigue and even failure of the conductors over time.



MacLean Power
4D DAMPER

Vibration dampers are typically installed along the length of the transmission line at regular intervals. They work by absorbing some of the energy of the oscillations, which reduces the amplitude of the vibrations and the stress on the conductors. This helps to prevent damage to the conductors and ensures the safe and reliable operation of the transmission line.

In addition to improving the safety and reliability of the transmission line, vibration dampers can also help to reduce the noise generated by the conductors as they vibrate in the wind. This can be especially important in urban areas where transmission lines are located close to homes and businesses.

Selecting the correct size and quantity of dampers for a transmission line section depends on several factors, including the length of the conductor between two supports (Tower or Pole), the type of conductors used, the anticipated wind conditions, and the desired level of vibration reduction.

Guide to Damper Selection

Here are some general guidelines that can help in selecting the correct size and quantity of dampers required for a line between two supporting structures:

Length of the transmission line section
The length of the section will determine the number of dampers needed. As a rule, two dampers should be installed on each span (one either end) with further dampers added for longer or tightly tensioned spans.

The type and size of conductors
The type and size of conductors used will determine the appropriate size of damper needed. The damper should be sized to fit the diameter of the conductor and should be rated for the appropriate load capacity.

Anticipated wind conditions
Wind conditions can vary greatly depending on location and time of year. The wind speed, direction, and frequency of gusts should be considered when selecting the appropriate damper. Some dampers are designed to work better in specific wind conditions, particularly at 0.5m/s to 7m/s laminar flow in a direction transverse to the line.

The desired level of vibration reduction
The amount of vibration reduction needed will depend on the specific transmission line and its operating conditions. The desired level of vibration reduction should be balanced with other factors, however a conservative approach is recommended at design and construction stage as the cost of dampers provide relatively cheap insurance for longevity of the line.

In general, it is recommended to consult with a vibration damper manufacturer or a professional engineer with experience in transmission line design to determine the correct size and quantity of dampers needed for a specific transmission line section. They consider all the factors listed above and provide a customised solution for your specific needs.

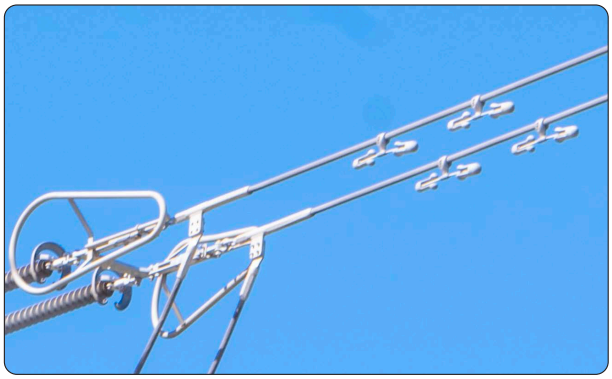
Maclean Power has developed special recommendation software for the type and installation of 4D series vibration dampers. The software is preloaded with over 400 hundred conductors with default line tension calculated at 20% CBL.

As manufacturers of the dampers, they have collected information from a multitude of tests made on the dampers and from field tests they carried-out on lines where the dampers are installed. Vibration analysis has been performed in consequence of these tests and the effectiveness of damping has been determined. Wind power, damper power and self-damping of the conductor are all considered.

The MacLean Power 4D range of Vibration Dampers have been designed to provide the best possible protection from Aeolian vibration for conductors, earth wires (ground or shield wires including OPGW) used for electric power transmission and distribution.

The 4D dampers are designed to dissipate the maximum amount of vibration energy to prevent fatigue damage to the strands of the conductors.

The 4D damper has an asymmetric design that features 4 resonant frequencies, allowing the dampers to be effective across a much wider frequency range than standard Stockbridge dampers.



4D dampers are suitable for use on all conductor and earth wire constructions including ACSR, AAC, AAAC, AAAC 1120, HDC, galvanized steel (SC/GZ), Aluminium clad steel (SC/AC) construction, and Optical fibre ground wire (OPGW); sizes are available to cover the range of sizes from 7.5mm to 45mm.

For installation on bare Copper conductor, MacLean Power 4D dampers are supplied with a Brass clamp.

For Damper selection, installation, and placement recommendations, please contact TEN and request a "Damping Proposal Form" or download a copy at the following link. - https://www.tengroup.com.au/catalogues/downloads
To discuss any aspect of your Transmission Project contact Shane Burke - shane.burke@tengroup.com.au

MacLean™ POWER SYSTEMS

TEN the energy network

Information source: Maclean Power & Shane Burke - National Line Materials Sales Manager