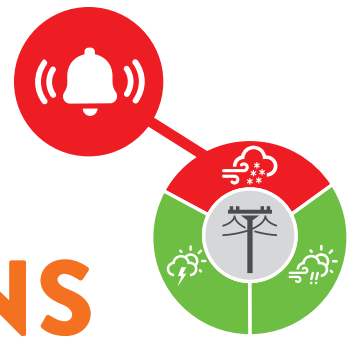


TYPES OF ICE ACCUMULATION AND RELATED WEATHER CONDITIONS



PRECIPITATION BASED ICING

A glaze type of icing that is generally clear in color and has the highest density of the icing types.



Freezing drizzle/Freezing rain

Occurs when supercooled water droplets freeze to the surface of an object such as an electric conductor, with a temperature below freezing.



Wet snow

Made up of partially melted snow crystals which can adhere to lines and freeze upon contact.

Rate of accumulation is dependent on the following:

- Wet bulb temperature
- Wind speed / stronger winds = more ice
- Rate of precipitation



FREEZING FOG/MIST

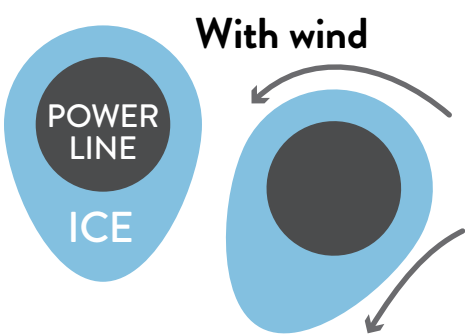
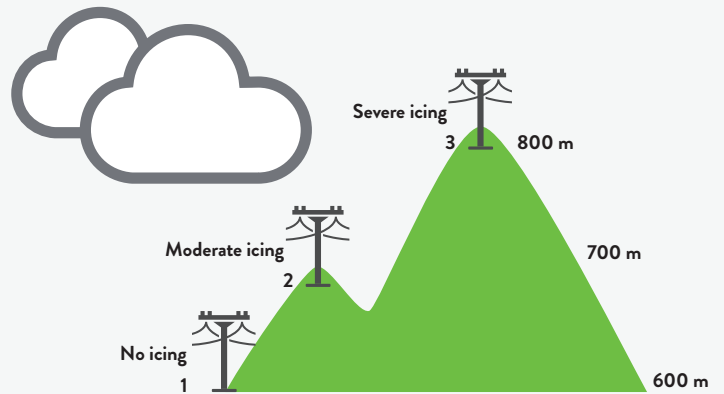
Super-cooled, tiny water droplets, come in contact with a surface that has a surface temperature below freezing.

- Usually results in light ice accumulation
- Often not well forecasted
- Prolonged events can occur causing bigger issues

IN-CLOUD ICING

Occurs when super-cooled water droplets in the cloud, come in contact with an object, such as a transmission structure, that has a temperature below freezing.

- Results in two icing types
 - **Glaze:** resulting from simultaneous In-Cloud and Precipitation Based Icing
 - **Hard rime:** dependent on water droplet size, wind speed and atmospheric moisture content
- Impacts transmission lines in mountainous terrain
- Most likely to cause long term, dense, ice load events
- Transmission structures susceptible to channeled high force winds



THE ROLE OF HIGH WIND SPEEDS, GALLOPING LINES AND TIME OF DAY

Wind speed

- Wind speeds above 10mph generate larger ice accumulation
- Dissipates surface heat and heat from UV radiation
- Lines oriented perpendicular to mean wind direction accumulate more ice in airfoil shape

Galloping lines

- Airfoil shape with high winds and heavy weight can promote lift leading to lines galloping
- May result in fault or prolonged power outages from recurring faults
- May cause cross-arms to break – bringing down power lines

Time of day

- Drop in ice accumulation from noon to 6pm due to solar radiation
- Events before noon or after 6pm more likely to be significant