

High-voltage tower failures in South Australia



The failure of 23 high voltage towers in South Australia on September 28 is unfortunately not an uncommon event. There have been at least 12 similar events in that state since 1962. The causes in nearly all of these are severe downdraft winds from thunderstorms also known as 'downbursts' or 'microbursts'; in the transmission line industry they are also known as 'high-intensity' winds. These can generate a storm front several kilometres wide that will envelope several transmission line spans, loading both the transmission lines and their supporting towers.

Such events have occurred frequently in other states of Australia, and in many other countries with similar climates such as the United States, Argentina, Brazil and South Africa.

The north-south running lines in South Australia, north of Adelaide, are particularly vulnerable as the strong winds approach from the west, thus applying the maximum load on the lines, which then are applied to the towers. A risk study carried out by wind engineering consultants, JDH Consulting, and meteorological consultants Weather Solutions, in 1998, found that the risk to north-south lines is about six times greater than that for east-west running lines in that part of South Australia.

Australian Standard 7000 published in 2010 provides design rules for new transmission line structures to resist downdrafts, and is a world first in recognizing the importance of such events to designers, but of course there are many legacy structures in Australia that have not yet been upgraded to resist the loadings applied.

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