

1 Q. What is the fault rate of lower voltage transmission lines using wood poles, as
2 compared to the 230kV transmission lines and how do the repair times for both
3 compare?
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7 A. Please refer to PUB-NLH-549, Attachment 1 for the transmission line performance
8 data and the definition used for each parameter. This data compares
9 Newfoundland & Labrador Hydro transmission lines by voltages level and structure
10 type from 1996 to 2015. This data is then compared to the Canadian Electricity
11 Association (CEA) transmission line performance for all Canadian Utilities for the
last reporting period 2010 to 2014.

Newfoundland & Labrador Hydro Transmssion Line Equipment Failures from 1996 to 2015

Transmission Line Structure Type	Number of Outages	Average Outage Duration (hrs)	Unavailability (%)	Frequency (per 100 km a)
Up to 109 kV, Wood, Single Pole	1097	0.591	0.046	12.410
Up to 109 kV, Wood, Double Pole	47	1.850	0.010	1.218
110-149 kV, Wood, Single Pole	592	0.653	0.010	3.030
110-149 kV, Aluminum, Guyed	287	0.924	0.076	5.519
200-299 kV, Wood, Double Pole	147	4.605	0.028	1.870
200-299 kV, Steel, Self Support	1	0.000	0.000	2.500
200-299 kV, Steel, Guyed	274	2.682	0.014	1.274

Newfoundland & Labrador Hydro Transmssion Line Equipment Failures from 2011 to 2015

Transmission Line Structure Type	Number of Outages	Average Outage Duration (hrs)	Unavailability (%)	Frequency (per 100 km a)
Up to 109 kV, Wood, Single Pole	258	3.000	0.221	11.674
Up to 109 kV, Wood, Double Pole	7	0.464	0.001	0.725
110-149 kV, Wood, Single Pole	145	1.262	0.019	2.968
110-149 kV, Aluminum, Guyed	41	2.313	0.108	3.154
200-299 kV, Wood, Double Pole	45	8.937	0.066	2.290
200-299 kV, Steel, Self Support	0	0.000	0.000	0.000
200-299 kV, Steel, Guyed	73	0.435	0.003	1.358

Canadian Electricity Association Transmission Line Equipment Failures from 2010 to 2014

Transmission Line Structure Type	Number of Outages	Average Outage Duration (hrs)	Unavailability (%)	Frequency (per 100 km a)
Up to 109 kV, Wood, Single Pole	1140	18.997	0.663	3.055
Up to 109 kV, Wood, Double Pole	323	52.913	1.352	2.238
110-149 kV, Wood, Single Pole	661	11.186	0.143	1.123
110-149 kV, Aluminum, Guyed	14	6.857	0.085	1.077
200-299 kV, Wood, Double Pole	194	57.938	0.377	0.570
200-299 kV, Steel, Self Support	460	25.500	0.113	0.387
200-299 kV, Steel, Guyed	53	33.415	0.274	0.718

Outage Frequency (per 100 kilometre-years for transmission lines) - is the number of forced outages divided by the number of kilometre-years and which is in turn divided by 100.

Unavailability (%) - is the product of the outage frequency and average outage duration, in years.