Q. Reference: CAN/CSA-C22.3 No. 60826-10, Design Criteria of Overhead Transmission Lines

The referenced standard CAN/CSA-C22.3 No. 60826-10 states in Section 7.3.3, on page CSA/15:

> *"The following default (simplified) values can be used for lattice steel towers in the majority of lines:*
>
> *(a) suspension towers: ϕ_R = 0.9 for intact loading cases and [illegible] 1.0 for failure loading cases; and*
>
> *(b) angle and dead-end towers: intact ϕ_R = 0.8 and failed system ϕ_R = 0.9*
>
> *where $\phi_R = \phi_N \phi_S \phi_Q \phi_C$"*

Were strength (reduction) factors applied in the assessment of whether or not the design of the Labrador Island Link met the CAN/CSA-C22.3 No. 60826-10 standard for 1:150 and 1:500 year return periods? If so, please provide the strength (reduction) factors. If not, why not?

A. Refer to Hydro's response to NP-NLH-038 for strength reduction factors. The same strength reduction factors were applied in all loading scenarios, whether for design or for structure utilization analysis. Strength reduction factors are not related to return period.

With respect to angle and deadend towers using failed system ϕ_R = 0.9, the Lower Churchill Project (LCP) used 0.8 instead to ensure the required longitudinal capacity for critical conductor tension related load cases. Angle Towers (C1, C2) were designed for unbalanced loading condition with strength factor 0.8. The generic longitudinal loading value derived from this condition is critical in designing associated longitudinal lattice members. Deadend towers (example D1, D2 & E1) were also designed with terminal condition (maximum loads on one side, and no load on the other) with strength factor 0.8. This approach provides much higher longitudinal capacity to the respective tower members to perform effectively as anti-cascade towers.