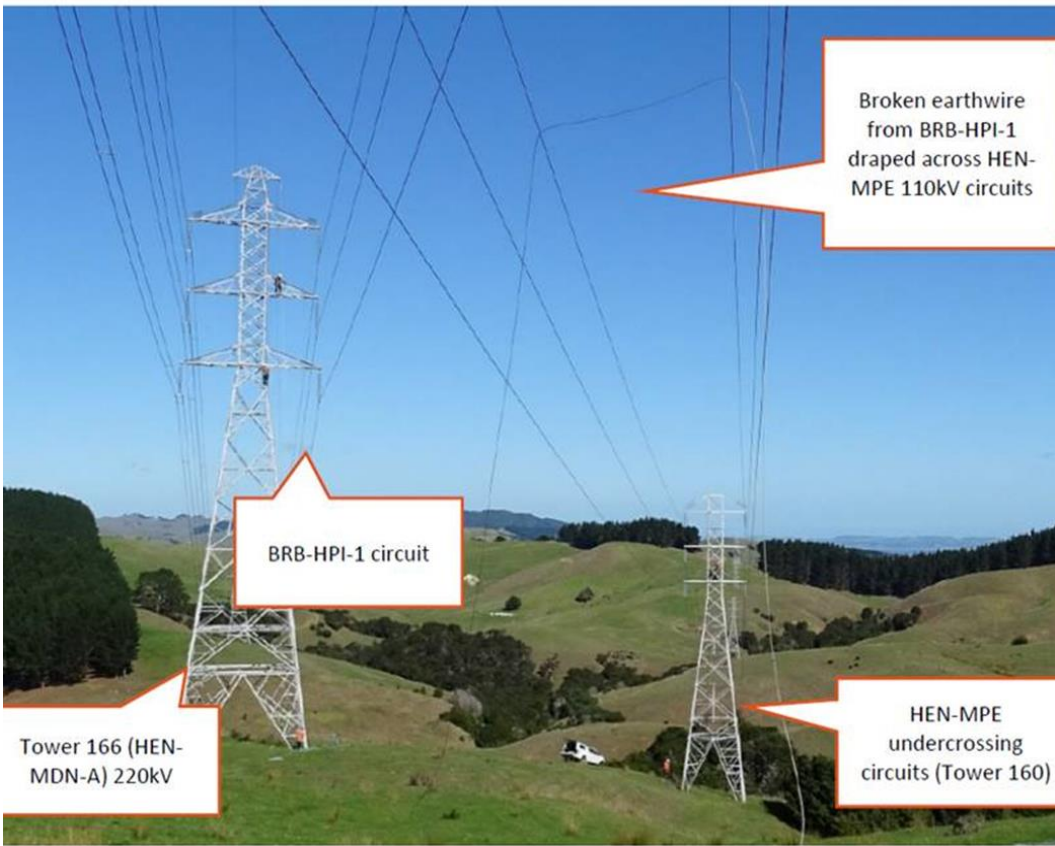


Lessons Learnt – LL149

HEN-MDN A - Earthwire Drop



be mindful
be present
be safe

Incident		Description	
Event Date: 01/05/2019	Time: 09:20	Location: HEN-MDN A, Span 167-166	NP Ref.: INV3448 External Ref.: Maximo #120651
What Happened:	Earthwire failed during preparation work for earthwire replacement project works, between Towers 166 and 167, on the 220kV BRB-HPI-1 Circuit (HEN-MDN-A). The earth wire fell coming to rest across an energised undercrossing, the 110kV Circuits (HEN-MPE-1 and HEN-MPE-2).  Figure 1 Earthwire from BRB-HPI-1 draped across HEN-MPE 110kV circuits (photo taken in front of Tower 167)		
Why it Happened:	HEN-MDN-A Skunk earth wire failed due to the tensioning of the conductor beyond its remaining mechanical strength. Significant contributing factors were: • Earth wire was compromised due to an existing defect/damage at the point of failure. The previous damage was caused by clamping of the conductor with Kito Grips (or similar)		



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	• Poor rigging practice (distance between, resulting in excessive tension required to disconnect earth wire). • No means of monitoring tension.
The important things you should remember about this:	1. There is limited industry information on the remaining mechanical strength of Skunk ACSR conductor, when held by a grip. The reduction in safe working load (SWL) is not common industry knowledge and was not considered as a factor when rigging and tensioning the BRB-HPI-1 earth wire. 2. The practice of double rigging (i.e. applying primary and secondary clamps) an earthwire conductor is not an effective control against the risk of mechanical failure due to over-tensioning. 3. Site specific hazards were not well considered or documented. Failure to consider the limitation and risks associated with aged conductor and the possible reduction in mechanical strength due to existing damage/defects. 4. 'Procedure Creep' – a gradual process of normalising an unacceptable practice without consideration of the deviation from procedure is apparent. The earth wire should never have been rigged and tensioned without appropriate access permits in place for the related circuit and the undercrossing circuit assets. 5. Lessons learned from previous industry incidents, spanning back over 20 years, were not identified or considered by Northpower, and quite possibly the wider electricity industry.
What you must do in the future OR What will happen next:	1. Rigging calculations and information must be made available to site crews, outlining everyday tension and importantly, the maximum tension that can safely be applied to any tension rigging systems. This should apply to all conductors. 2. Tension rigging systems should be placed in line with the conductor. In most cases, this can be achieved by rigging off a working point. If no working point is available, rigging shall be placed as close to the conductor attachment point as possible. 3. Any changes to rigging procedures / instructions must be approved by an qualified engineer. 4. Consideration to conductor grip selection should be applied and any conductor grip must be used in accordance with the manufactures instruction. 5. Dynos will be used in all conductor tension rigging systems to monitor actual tension against maximum tension.
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