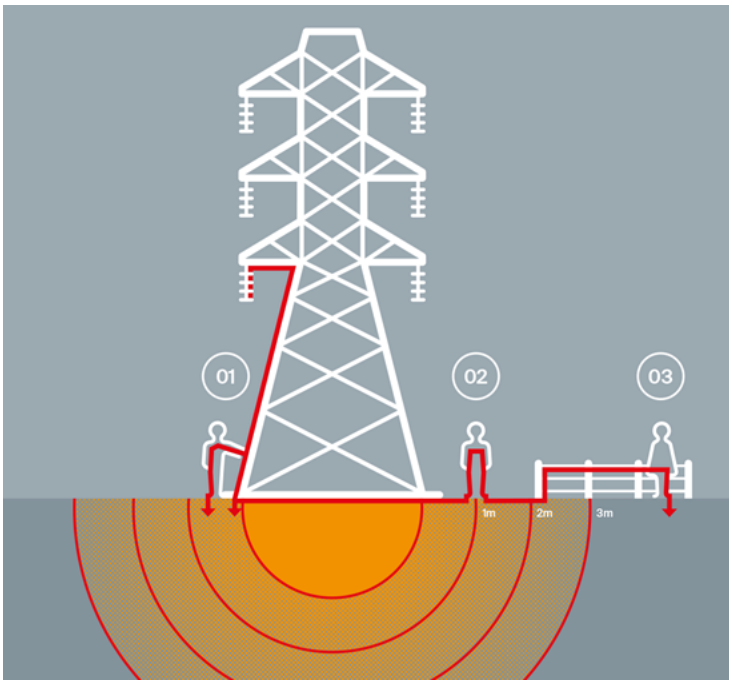
MAY 2020

EARTH POTENTIAL RISE (EPR) MITIGATIONS INFORMATION SHEET

What is 'earth potential rise'?

In the rare event of a lightning strike or fault on the transmission line, towers or poles may transfer high voltage and dangerous currents into the ground for a very short instant. This is known as 'Earth Potential Rise' (EPR). The voltages produced by this can potentially be hazardous if someone is standing close to, or touching, the tower or pole. Objects, such as metallic pipes or fences, set into the ground near the tower or pole with the fault may also transfer hazardous voltages to a person who is touching the object at the time of the fault.



Earth Potential Rise scenarios.

01 Touch potential

In the unlikely case of a fault or lightning strike, the current may go down the metal tower or pole and potentially pass through a person who is touching the tower or pole. Whether the current could be harmful depends on a number of things, including how long the fault is, what part of the body is touching the tower or pole, even what type of footwear the person is wearing or what they are standing on.

02 Step Potential

In the unlikely case of a fault or lightning strike, the current may go into the ground and potentially pass through the body if a person is standing or walking near the tower or pole. As with touch potential, the current may not be harmful and would depend on a number of things, for example what the person is standing on and the type of footwear they are wearing

03 Transferred voltage

This is a rare event where the current from a fault or lightning strike may go through the tower or pole to a nearby metal object set into the ground, such as an iron fence or metal washing line. There are other common backyard items like animal shelters, letter boxes, metal garden sheds, greenhouses and swimming pools that may also have transferred voltage potential. The voltages produced by transferred voltage, like Step and Touch, can be hazardous, particularly when someone is standing close to, or touching the tower or pole.

Am I safe?

Yes. There have been no recorded instances in New Zealand of people being hurt by a fault event or lightning strike on our transmission lines. We take safety seriously and have work underway to provide greater protection and effectively eliminate any potential issues where they may exist. Additionally, the grid's existing safety systems detect and act almost instantaneously to stop electricity flow when a fault occurs. We routinely inspect our towers or poles and undertake preventative maintenance to limit faults.

What is Transpower doing about earth potential rise?

Transpower has carried out a nationwide assessment to determine the structures that may be affected by EPR. We identified a small number of towers and poles with increased risk that require mitigation. A national programme of safety enhancements to those identified towers and poles is underway. This work will improve the present safety standards and bring them up to best industry practice, particularly in the event of a lightning strike or power system fault.

We will also be looking at those things that might have been attached or run close to the tower or pole. The best preventative measure is to remove anything conductive (metal) away from the tower or pole. However, we know that is not always possible, particularly if landowners already have existing items near our towers or poles, or the site is constrained or small. There are several simple and easy preventative measures that we can undertake like, improving the insulation of the object, or installing a non-conductive object as a replacement.

We will look to work with each landowner on appropriate mitigations. Landowners thinking of putting something new on their property near a tower or pole that is metallic should talk to us first.

What sort of work will Transpower need to do to carry out these changes?

The work on towers involves excavating the ground around the foundation, with the type of foundation determining the depth. The foundations will be extended by adding steel mesh encased in concrete and the site is then reinstated to its previous condition.

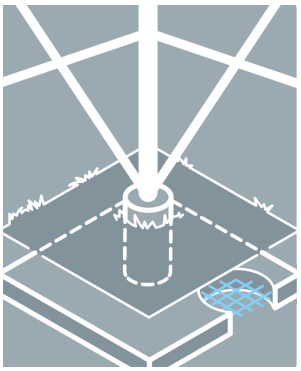
Work on those items around towers or poles (like clothes lines, metal fences, garden sheds, trampolines etc) will be discussed with the landowner to determine a solution. It might be that some items can be insulated where they meet the ground or have metal items replaced with non-conductive items (like changing parts of metal fences to wood)

Are there any regulations or standards covering EPR?

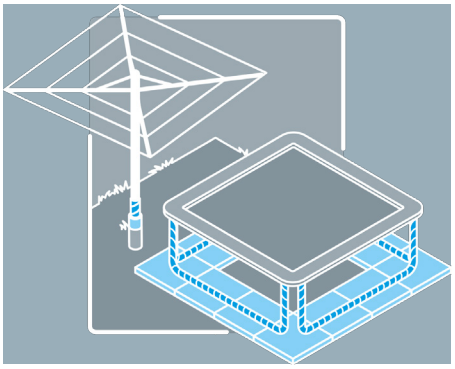
EPR standards and recommendations are outlined in the Electricity Engineers' Association (EEA) guide, which is recognised as industry best practice in the management of EPR.

Will the changes to your towers or poles make them look any different?

No. Once completed the changes made will be underground where the foundations meet the ground. The land around the tower will be reinstated to its original or better state. The images adjacent show examples of towers and poles 'before and after' remedial work. Note that Transpower has identified a small number of towers and poles that require this type of work and not all require this mitigation.



Foundations will be extended by adding steel mesh encased in concrete.



Some items can be insulation where they meet the ground.

Tower (before) – note steel wire fence through middle of tower.

Tower (after) with foundations completed and wooden fence replacement, prior to grass regrowth.

Pole (before) in a park reserve.

Pole (after) with wrap installed.

For more information, call Transpower on 0508 526 369 (0508 LANDOWNER)