

Virtual Rail Gaps

On some sections of the negative rail, there are patches where arcing has occurred. They generally cover the width of the rail and are about 2 feet 6 inches long. For want of a better name, I will call these "Virtual Rail Gaps". Because the arcing has worn away some of the surface, these VRGs are mostly slightly below conductor rail level, or are non-conductive, meaning that most current shoes passing over the VRG will not pick up any current. There are often two of these VRGs together, or one VRG near a rail gap. The spacing of these VRGs or VRG and railgap, is such that when the two negative shoes on a car are passing over them, the car is "off juice".

As the car goes off current, the loss of current is detected and the motors are switched off. As soon as the shoes clear the gaps, the traction current is picked up again and the motors start.

When the car is moving slowly over the VRGs, the motors will usually switch off and switch on again.

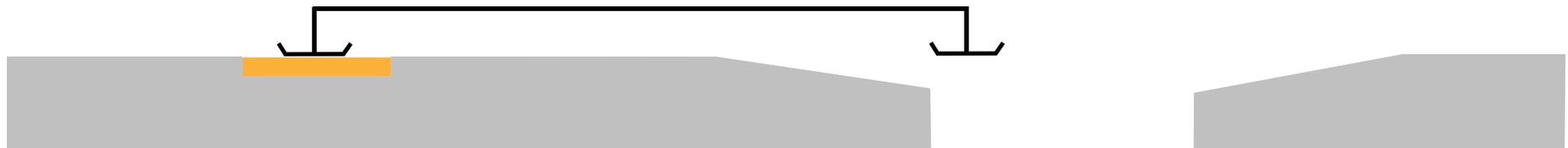
When the car is moving faster, the car may pass over the rail gap and be back on current before the motors have had a chance to switch off. This can cause a surge of current to the motors on that car, causing the car to jolt. The jolt is normally severe enough shake the doors on that car and briefly break the door proving circuit, causing a loss of doors closed visual for a split second and the train to stop motoring. The TBC has to then be returned to OFF and put back into a motoring position to carry on motoring.

Note - the jolt that you sometimes get when braking is for a different reason.



Two Virtual Rail Gaps on the negative rail - both shoes are off traction current

Virtual Rail Gap - an area of arcing on the Negative rail. It is usually non-conductive



One Virtual Rail Gap and a rail gap on the negative rail - both shoes are off traction current

Very often, the VRGs are in the vicinity of the platform, or just after leaving the platform. Sometimes the driver may only notice the motors dropping out and picking up on their car because the train is travelling slowly as it departs the platform. The actual loss of doors closed visual usually occurs as the front of the train reaches near the 6 car mark. This is because the last car is travelling faster over the VRG and the motors do not have time to cut out. If there are more than two VRGs, this jolt and shake up may also occur on the first and middle motor cars, with loss of the doors closed visual more than once. This often gives the “bucking bronco” effect. The effect of a VRG is felt even more if there is a negative shoe missing on the car, because this means that that car will be off current at every VRG.

Occasionally, the shoes of a car may still pick up current when passing over a VRG. This could be because the shoe is a fraction lower than normal, or in a slightly different position. Often it is less noticeable in wet weather, presumably the rain conducts the current from the VRG to the shoe.

Although VRGs have been around for a few years, they seem to be getting more frequent and more noticeable. There used to be many on the Edgware branch, but now they mostly seem to be on the High Barnet branch.

VRGs have only been noticeable since the 1995 stock arrived on the Northern Line and, although they can occur in tunnel sections, they are more frequent and more noticeable in the open sections.

Some places on the Barnet branch where they are easily seen, and are usually accompanied by loss of the doors closed visual and loss of motoring are:

Departing East Finchley NB (the two VRGs are in the middle of the platform, there are also two just north of the stopping mark), south of A227, departing Woodside Park SB, just before NQ3, middle of High Barnet platform 2 (which is why you often get a “Traction Supply Lost car 3” message, depending on exactly where the train is stopped) and leaving High Barnet, over the point work. There also seem to be quite a few developing between NQ3 and the points at Finchley Central, although their development is slower due to trains not normally motoring in that area. However, at least two can normally be felt if the train is motoring approaching the platform.

Some tunnel sections where they are: departing NB from Charing Cross (passing over the small rail gap), departing Archway NB



A VRG - arcing on the negative rail - most negative shoes will not pick up current when travelling over this.