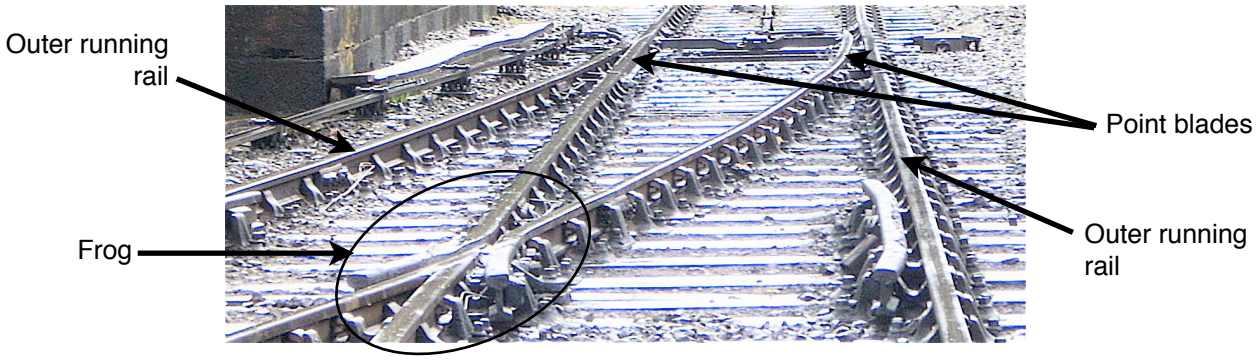
Frog Polarity Switching Explained

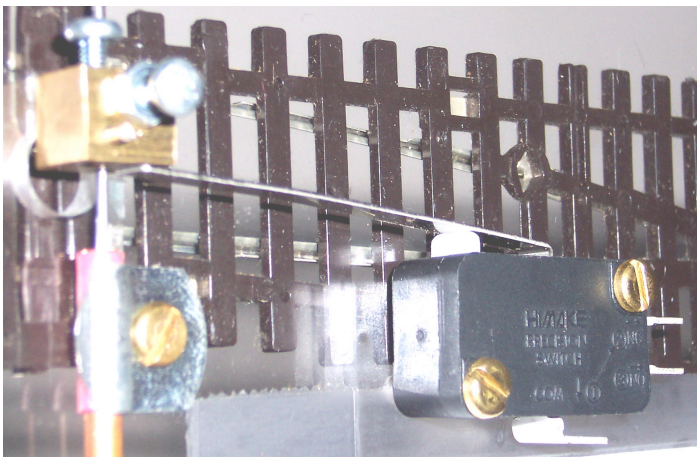
What is the frog? *Frog* is the colloquial term for the common crossing associated with a turnout. In model turnouts it may be constructed of moulded plastic (dead frog, insulfrog) or metal (live frog, electrofrog). Many modellers prefer live frogs because they provide more secure electrical continuity for vehicles traversing



pointwork. However, they also complicate wiring. A live frog turnout comprises three electrical elements. Two are the outer running rails. The third is everything else - the frog and the rails connected to it, as well as the point blades. As the points change, the frog becomes electrically connected to one or other of the outer running rails according to which one the blades touch. The *polarity* of the frog is said to change.

Why is a switch needed? With a brand new clean turnout, a switch is not needed because the inherent electrical switching of the point blades works perfectly well. However, over time, this can become unreliable and difficult to maintain as tarnish and dust build up, so an extra switch is often used to ensure reliability. The switch performs exactly the same electrical function as that expected of the point blades.

What sort of switch? A lever-actuated micro-switch works well. It is basically a push-button switch in which a long springy lever acts to press the button. The switch is typically single-pole double-throw (SPDT or single-pole changeover). That means that it has a common terminal which can switch between two others. These are known as the normally open (NO) and normally closed (NC) terminals. When the switch is in its released state, then the common is connected to the NC terminal and the NO terminal is isolated. When the switch is activated (pressed), then the NC terminal becomes isolated while the NO terminal is connected to the common.



Such a switch can be set up under the baseboard such that the end of the lever can be pressed by whatever operates the points. The photo shows it set up with a Point-wit mechanism for wire-in-tube operation. (Note that the baseboard is transparent.) It could be similarly set up for an electric point motor.

Timing is important. It is important that the switch changes state while the point blades are in the middle of their stroke. If the switch changes while the blades are still in contact with one of the running rails, then a short circuit will exist. This is particularly critical with DCC operation. The timing can be adjusted by gently flexing the switch's lever. It's designed with that in mind. You will hear the switch click at the changeover.

Connecting. The common terminal must be connected to the frog. The NC terminal must be connected to whichever outer running rail is touched by the point blade when the switch is in its released state. The NO terminal must be connected to whichever outer running rail is touched by the point blade when the switch is in its activated state.

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