DCC Friendly Turnouts

Are they just Hype?

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Is the perfect turnout out there? Well yes … and no. Each year another manufacture announces a new "DCC Friendly" with both Peco and Walthers having made announcements this year.

This discussion will firstly look at why we need them, and then how we get them.

Why the need?

In the good old days with DCC and block control, we never needed "DC Friendly" turnouts. All we had was one rail insulated from the other. Why now? What is the difference? In one word, *technology.*

I can remember watching a DC train running around the track in the dark. Often as it went through a turnout there would be sparks. This would be caused by a wheel bridging a guard rail or a point blade. Well the technology in DCC is so good that those sparks shut down the DCC control unit.

Why you may ask, do we need to shut down this quickly if it wasn't an issue in DC? This is a simple calculation based on Ohm's Law. In DC we may have an amp flowing through the rails. In DCC, with track permanently powered, and more operators (I went from 3 to 8 on my old layout), we could have more than 8 amps of power on the track.

Stories abound of blown decoders, melted sleepers, severely scorched wheels and blades, even, apparently, fires. All caused by shorts and high current.

Because of the current drain, and the electronics in the decoders, short circuits are not desirable. Hence the drive for DCC friendlies is to overcome the effects of high current short circuits.

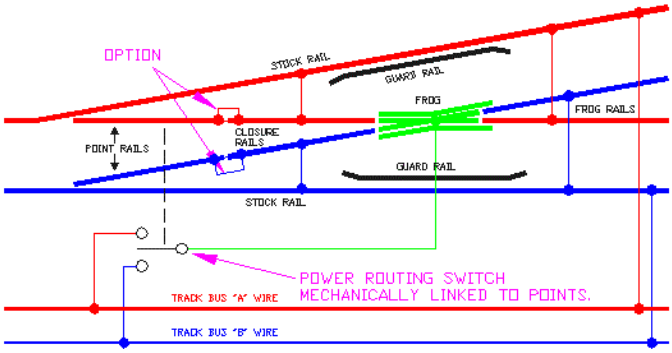
What makes a DCC Friendly Turnout?

In my opinion, there are really three main points to making a turnout DCC friendly:

1. Clearance distance between opposite polarities;
2. Frog polarity;
3. Locking of the point blades;

Various manufactures meet some of these points. Others meet all points with little effort.

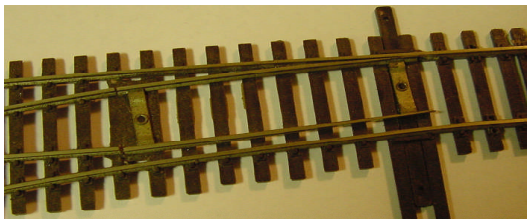
So what does a DCC Friendly turnout look like:



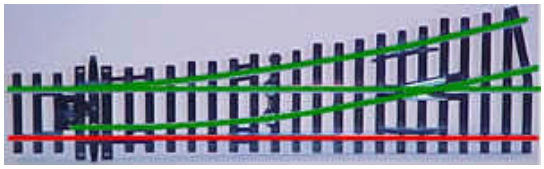
We will talk through this diagram over the next few points.

Clearance between opposite Polarities

Wheels should not have the opportunity to cause a short between opposite voltage polarities. The good old Shinohara's have one solid pivoting point blades. As follows:

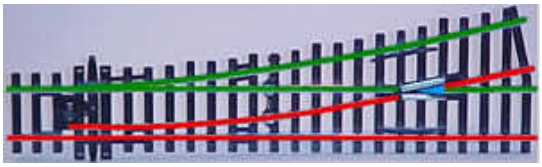


Electrically, most DC turnouts look like the following:



Wheels can bridge the gap between the points and the stock rail, especially long wheel base trucks causing shorts, shutting down a DCC controller.

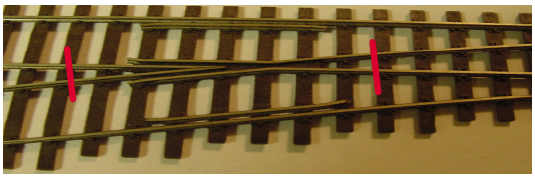
Electrically, a DCC friendly turnout would look like the following.



Importantly, the stock rail and point blades have the same electrical polarity. This helps to minimise shorts.

Frog Polarity

Likewise, the frog is a haven for shorts. To me, the best solution is to completely isolate the frog, and switch the polarity with the point blades.



This way, power is managed throughout the turnout. This is what is often called “Power Routing”.

Dead Frogs

A valid option preferred by some modellers is “dead frogs”. By limiting the size of the frog, most locomotives will have a longer wheelbase and the need to switch the frog is removed.

This option can be used for existing DC layouts and can avoid the need to lift the track.

Point Blades

Tensioning the point blades can also prevent shorts. If the point blades are loose and vibrate when trains cross, they can cause shorts and electrical surges. These shorts can also cause a DCC system to shut down.

Must I use DCC Friendly Turnouts?

My last layout was built with the original Walthers Code 83 as a DC layout. When converted to DCC, there was only one track on the layout that caused shorts. That occurred when a #4 Y followed the curved leg of a #5 turnout. Pretty difficult alignment with S curves everywhere. After replacing the Y with another #5, no turnout shorts (except when someone ran the point!!!).

So no, it is not necessary, but is wise for a new layout.

Making a Peco Electrofrog DCC Friendly

There are plenty of turnouts in the marketplace that are very close, and many that can be made completely DCC friendly.

On my new layout (a small switching layout), I used Peco Code 75 Electrofrog turnouts. Besides the reliability and availability aspects, these turnouts were the easiest to make completely DCC Friendly.

The steps to follow (see the following diagram):

1. Remove the jumpers from the closure rails to the frogs;
2. Add the jumpers between the closure rail and the stock rail;
3. Use a Switchmaster or Tortoise to switch the points;
4. Isolate the frog with insulated rail joiners;
5. Power route the frog from the point motor (with optional lamp);
6. Optionally jumper across the point blade pivots;

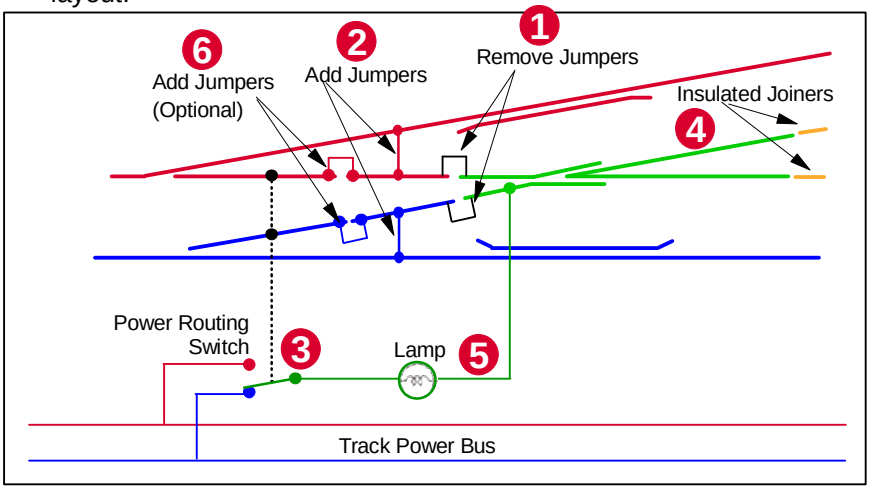
This makes a Peco Electrofrog completely DCC friendly turnout.

What’s the Lamp for?

The lamp is included for short circuit protection. This is to protect the DCC system when an engineer enters the frog when the route is not set.

The light bulb is optional. It is a standard 12volt car tail light bulb. Not only does it take the short circuit current, the lamp quickly identifies the location of the short.

Other short circuit protection can be achieved with electronic circuits available on the market. None are as cheap as the lamp.



Conclusions

For reliable options, it is important in DCC to manage and control potential short circuits. There are options available. If you understand the need, and the options, then reliable operations is readily achievable.

References:

Wiring for DCC, www.wiringfordcc.com

Peco Electrofrog Turnouts, www.loystoys.com/peco