



Layout Expansion on the Pittsburgh & Western RR-Part 9 Lighting the lower deck

by Paul Lapointe

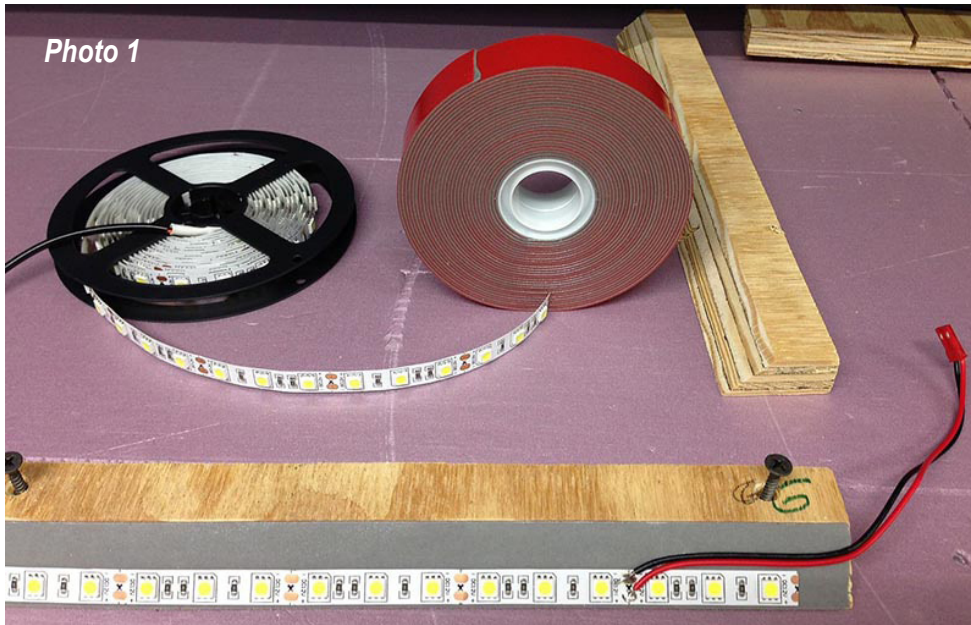


Photo 1

to work! Each repetition of the circuit contains multiple LEDs that are very bright and even come in colors. The strip only needs safe 12 volts DC. They are very flexible. The LED strips are very popular for home and business accent lighting. Thanks to this popularity, they have become very inexpensive.

My lighting solution.

After studying the needs of my layout, I came up with a method of easily mounting the strips.

Lighting the lower deck.

With multiple decks came the problem of the upper level blocking the room lighting and producing shadows on the lower level. In the past I've used rope lighting (tiny bulbs inside a clear tube) to remove the shadows. Rope lights barely did the job but were hard to work with. They're stiff, difficult to mount, need 120 volts, and are a fixed size – you can't cut it to length.

With new technology in lighting came the LED strip. It is a length of copper strip that has a circuit etched along its length. The circuit repeats every few inches allowing you to cut it to almost any length you need and the pieces continue

I wanted the light to be directed where it was needed and not simply straight down. I chose to mount them along the bottom edge of the upper deck but at a 45 degree angle.

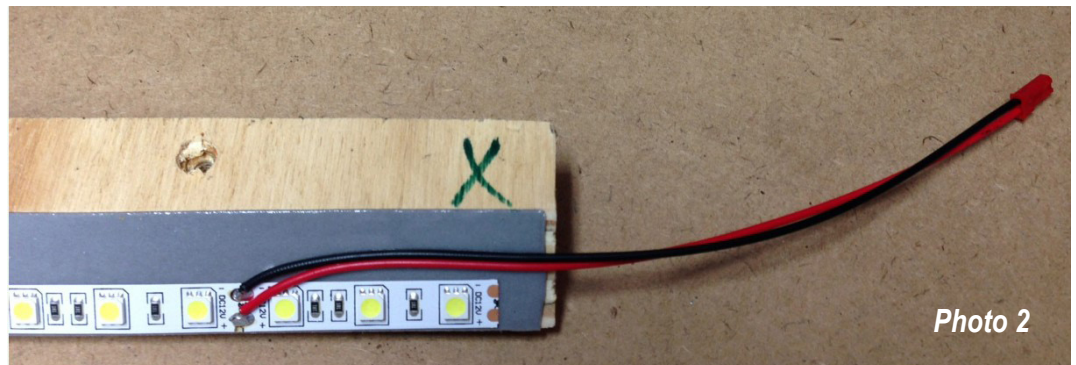


Photo 2

Photo 1 shows the supplies I used and the mounting method. Starting from the upper left side, you see the reel of LEDs. The reel comes 16.5 feet long. It contains 300 very bright LEDs wired in groups of three. You can cut it to any length as long as you don't cut into a group of three. I purchased it from Amazon (search for



part #4100066-DW-NF) for less than \$10. It is the “daylight white” color which

matches my room lighting. Next is a roll of “Scotch permanent outdoor mounting tape” (search 4011-LONG), double sided tape that is very strong. The wood strips beside it are cut from plywood, 2 inches wide with a 45 degree angle cut on one edge. The angle cut has a face 1 inch wide, the same as the tape. The bottom of *photo 2* shows the assembled light fixture.

Assembly.

To put it together, the wood is first cut to the required size and length, the tape is mounted next (very sticky and very strong!) and the red cover plastic removed exposing the top adhesive of the tape. Then the LED strip is cut to the length needed to fit the wood (but only cut at the designated spots!). The LED strips have an adhesive backing covered by a protective plastic strip. Remove this and press the LED strip onto the tape. The connecting wires are then soldered to the strip. The wires are physically held in place by the adhesive. Mounting screw holes are drilled along the length of the wood.

Photo 2 is a close-up of the assembly. The wires are soldered to the two copper pads. I chose to use connectors, but you can use plain wires. The pads are marked + and -, so you have to wire correctly or it won't work. The copper pads repeat along the strip every three LEDs (those yellow looking squares) and you can use any of them since they are all in parallel. The pads are also the locations where you can safely cut the



Photo 3

strip. You can see another pair of pads at the end where I cut it. They cut with scissors.

Powering the LED strips.

The type of LED strip, and the brightness determines the power requirements. This information will be in the specifications. The LEDs I chose use 12 volts at 6 amps for a full length reel (300 LEDs). I used a total of three reels to light my lower deck. That's 18 amps. That's a lot of current even at 12 volts. To handle this, I used a commercial power supply designed to handle LED strip lighting. *Photo 3*. This one supplies up to 30 amps at 12 volts. Mine was about \$20. They come in many different capacities. Search for “switching power supplies for LED lighting”

In closing.

I'll close with some in-place photos, they are on the following page. *Photo 4* shows the LED assembly mounted under the upper deck, but not turned on. You can see the shadow problem created with the use of an upper deck with just the room lighting. *Photo 5* is the same scene with the LEDs powered up. As you can see, the lighting is much more even and the shadows are almost completely gone.

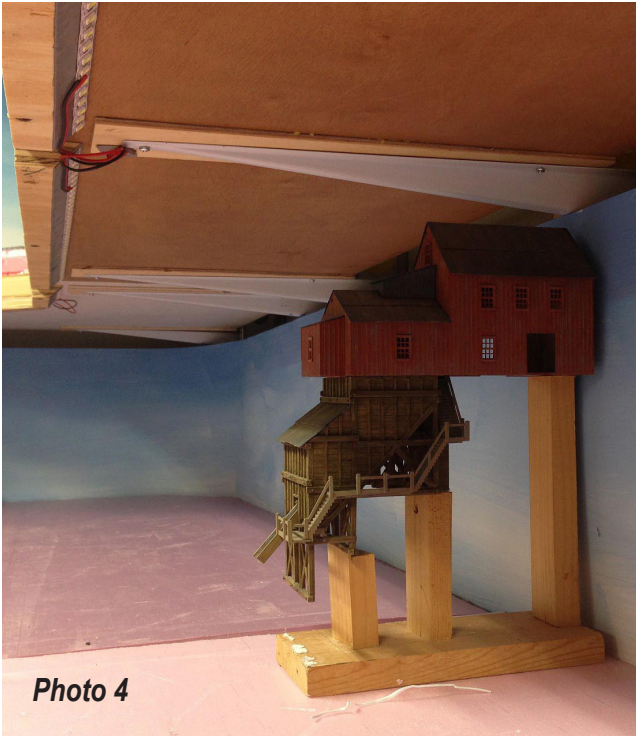


Photo 4

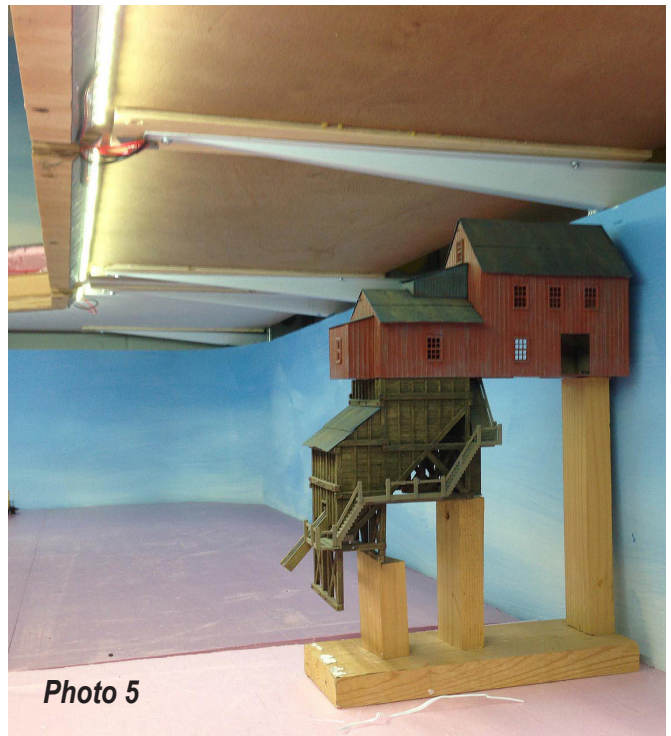


Photo 5