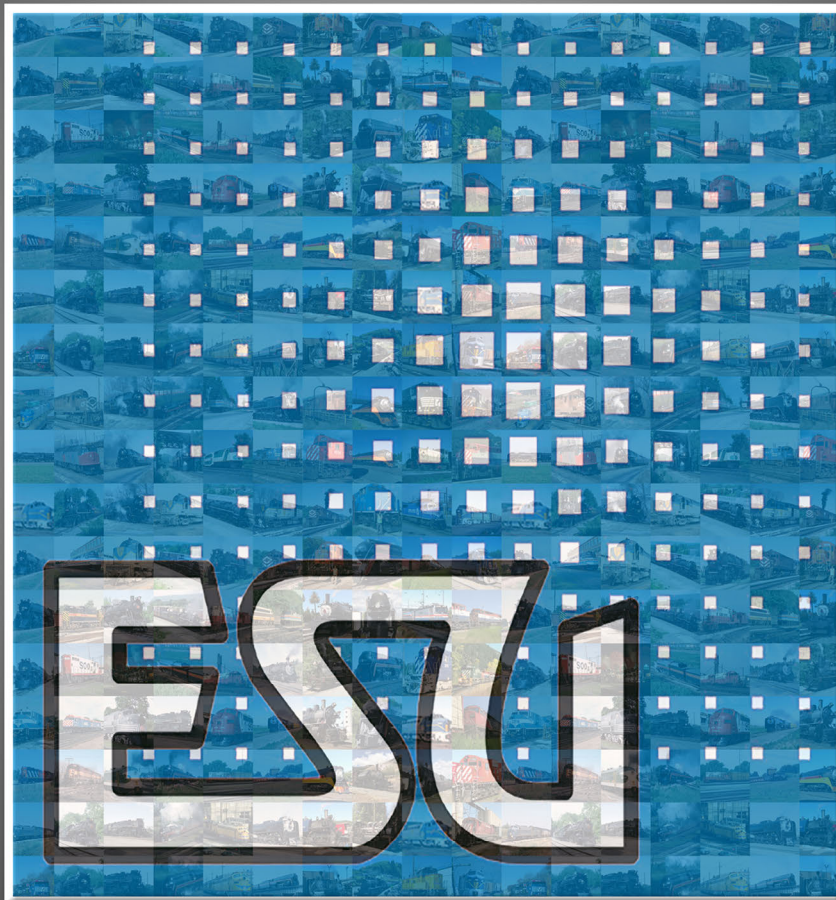


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Lighting effects using fiber optic strands



Electrical
Impulses

1. My industrial structure modeled using ITLA
[\[ITLAscaleModels.com\]](http://ITLAscaleModels.com) modular wall sections.

Model Railroad Hobbyist | September 2020

STEVE JURANICS EXPLORES USING FIBER OPTICS INSTEAD OF
LEDs TO LIGHT A STRUCTURE ...

**OVER THE LAST FEW MONTHS I'VE BEEN
WORKING ON AN** industrial structure [1]. The structure
uses ITLA industrial wall sections sold as individual four-story
sections – they're configurable in any way your imagination
can dream up.

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I wanted something substantial (30" long) that fits the "worn industrial" feel of my early '80s-era layout.

I traveled to Trainfest in Milwaukee as part of the NMRA Niagara Frontier Region group – we do an annual pilgrimage to take part in the Modeler's Corner. While there, I attended a clinic by Michael Groves from Dwarvin.com where he demonstrated his fiber optic lighting product, the Lamplighter 1, see [2].

Michael convinced me to try fiber optic strands instead of LEDs for my structure lighting after outlining the advantages:

- Cheaper: Can cost less than using commercial LED-based systems
- Faster: Add lighting to structures quickly
- Simpler: No rat's nest wiring
- Safer: No heat is dissipated in or near the buildings being illuminated
- More flexible: Lighting effects limited only by your imagination

So I decided to try the Lamplighter 1 to add lighting to my structure with fiber optic strands.

The Lamplighter Starter kit cost just under \$100 CDN at the show. A single 12V wall wart powers the Lamplighter.

Below, I discuss the three different techniques I used on my structure:

- Over-door lights
- Interior section lighting
- Adding a lit sign.

OVER-DOOR LIGHTING

While Dwarvin provides industrial building lamps using optical fiber, they're designed for an older era. I prefer something more modern, so I custom-built some lights [3] using little sections of plastic C-channel to hide the ends of the 1mm fibers.

I used a #60 bit to drill 1mm (0.040") holes through the 3mm (1/8") wall sections and pushed the fibers through the holes until they barely protruded. The C-channel with a styrene end cap shields the end of the fiber.



2. The Lamplighter 1 has the capacity for numerous fiber strands to be inserted into a single port for distributing light to 20 - 30 points, depending on the size of the fibers.

LIGHTING EFFECTS WITH FIBER OPTICS | 4



3. I added lighting over the doors as shown here.



4. Here are the lighted doors, effectively representing these industrial lights in HO.

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LIGHTING EFFECTS WITH FIBER OPTICS | 5

The width of each light is 4-5mm (0.15"-0.20"), representing a real-life 18"-wide industrial light in HO [4].

LIGHTING THE BUILDING

I used a mixture of end fiber light as well as nicks in the fiber. Nicking the fiber allows light to leak out of the side. While this never provides the same intensity of light as light from the end of an "end-glow fiber" it does allow a single fiber to light various objects along its way.

For this I used mainly 1.5mm (0.060") fiber. In order to obscure any unwanted light from the fibers, I sprayed Dullcote on the window interiors, and covered some strands with heat-shrink tubing. The shrink tubing hides the strands where I don't want any light - and it serves to bundle the fibers together for easier routing [5, 6].



5. I routed the fibers throughout the structure, adding shrink tubing in places to block unwanted light.

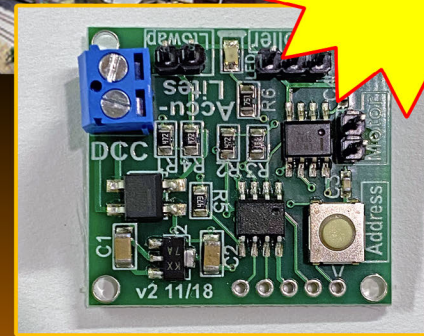
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LIGHTING EFFECTS WITH FIBER OPTICS | 6

LIGHTING THE SIGN

As a big experiment, I elected to light a sign on the front of the building. I am not sure how well this would have worked using traditional LEDs.

I used 1/8" clear Lexan, then printed the logo on basic printer paper and glued it to the front of the Lexan [7]. Next, I glued five strands of 1.5mm (0.060") fiber to the back of the Lexan, nicking the fibers in a number of places.

Finally, I put some black backing on the sign. The final effect was very acceptable and did a good job of replicating a sign with fluorescent tubes for illumination. I would have liked the printing on the sign to be more saturated. Also, I think if I had used a reflective foil backing, the illumination may have been more even.

When putting these techniques together, I found the final result to be quite satisfying.



6. By not covering and selectively “nicking” the fibers, I got the effect of several lights from a single fiber, as can be seen along the top floor illuminating the windows.

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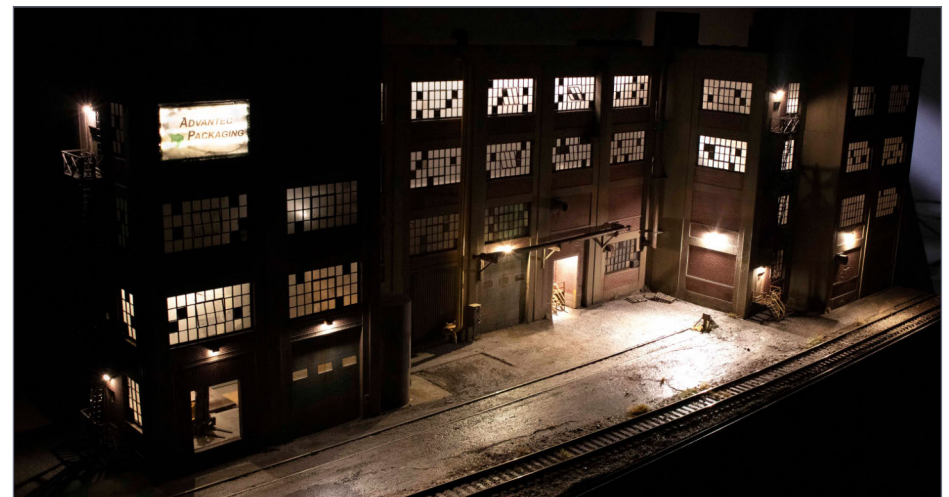
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7. I glued a paper sign to 1/8" clear Lexan, then ran five rows of fibers behind the sign to light it. Before gluing the fibers behind the Lexan, I nicked the fibers in several places to simulate florescent tubes behind the sign; also see [8].



8. The lighted sign.



9, 10. Here's how my fiber optics lighting project turned out. I'm quite happy with the results!

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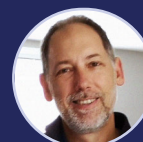
CONCLUSION

I found the fibers quite easy to route, and very effective at distributing the light throughout the structure. I also could change the color of the light by dabbing a marker or paint on the end or along the fiber.

One caveat: watch out for the glow that comes from the fibers along their run, and mitigate that using black shrink tubing. It's also not a good idea to kink the fibers or try to bend them at a sharp angle.

I reached the system's capacity with the amount of fibers I inserted into the unit for this one structure. But the alternative would have been to use about 25 - 30 LEDs and route a whole lot of wiring. That's over \$300 worth of LEDs and hubs on something like a Just Plug lighting system.

I have found fiber optics to be an effective way to light my structure interiors. ✓



S. Juranics

MORE MODELING TECHNIQUES

You can find more of my modeling techniques on my YouTube channel under "Muskoka Steve". Now that I'm getting back to the basement after a couple years of constructing my 1:1 scale residence, I hope to be posting some new videos soon.

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