Structure Lighting

Why should I add lights to my structures?
If you like to add detailed interiors to your structures and want to share these with visitors then structure lighting is a must. The down side to this, however, is that once you start you have to keep going. One lit detailed building in a row of several buildings just doesn't look right. It also needs to be close to the viewer to see the detail. The flip side of this is the farther away from the viewer the less detail needed. You also need to keep the window size in mind. If the structure has small windows then just lighting the structure may be sufficient. Structures with large windows such as store fronts, when lit, need interior detail or window display detail at a minimum.

If you operate your railroad in a night time setting then lighting is needed. This opens up a whole new range of issues. How do you plan to light the layout? Will you operate this way very often thereby justifying the cost? And finally you will need to extend the lighting outside the structures to switching areas and yards. These are beyond the scope of this clinic but need to be considered if taking this route.

Probably the most common reason to light structures is that it adds another layer of realism to our layouts. Allowing some rooms to have lights and others dark conveys that used and lived in look. Walk down a street and you can see in home and store windows and they all have lights on. Then you can detail some rooms, use curtains in others, or simple window graphics and the task are complete.

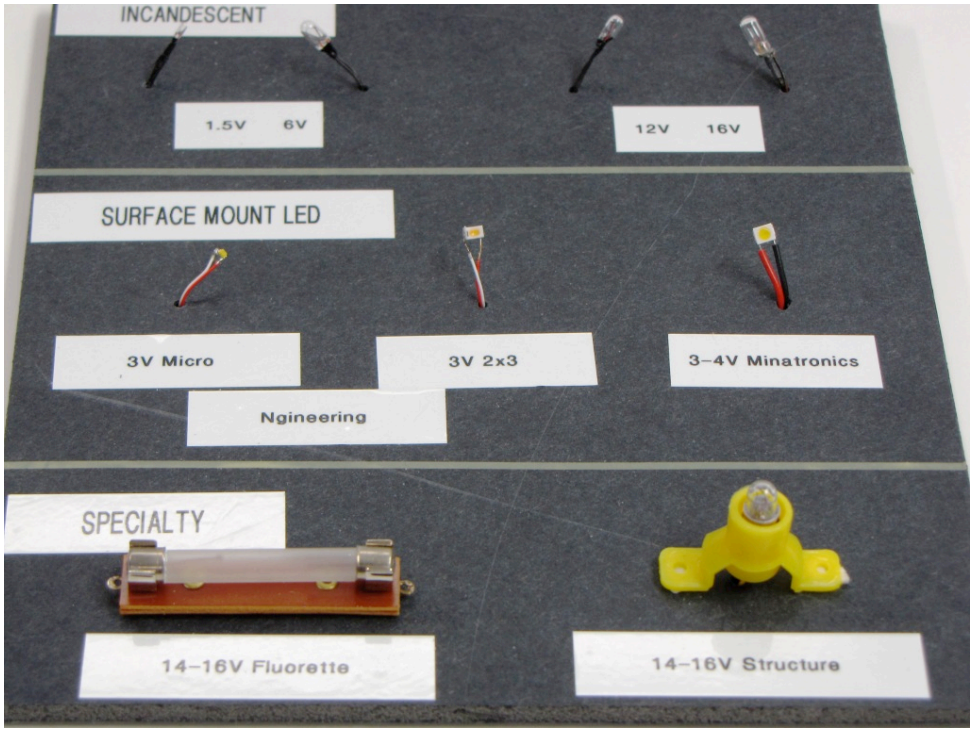
What tools do I need?
Adding lights to a structure require only basic modeling tools. One exception would be the recommended acquisition of a low temp (12V) soldering iron available from your local hobby shop or on-line from Ngineering.

What lights are available?
The latest Walther's catalogue has 26 pages of lighting, electrical, and motors. We cannot cover everything that is available but will provide a general overview of what there is. Incandescent bulbs probably provide the largest selection of bulbs available. They range in voltage from 1.5V to 16V. There is also a wide selection of colors and physical size. You do need to take into account that there is a heat factor and you have to make the bulbs accessible so they can be replaced.

Surface mount LEDs are the newest entry to the hobby. They are generally 3V, come in assorted colors, last a long time and are small so they are easy to conceal. The biggest downside is that they are small and can be hard to work with as some are not pre-wired. Soldering on the leads requires the low wattage iron mentioned above and in my case it also requires a magnifier on my workbench.

Flourettes are a relatively large fixture and bulb that resemble a fluorescent light. Distributed by Walthers and GRS these 14-16V lights are ideal for large structures with a big area to light. The bulb itself is easy to replace as it snaps into a wired fixture. Like an incandescent type it needs to be accessible and can be hard to conceal.

Interior building lights can be incandescent bulbs that screw into pre-wired bases. These are generally 16V bulbs made by several companies. They also cover a large area but can be hard to conceal due to their size.



Incandescent – small and pre-wired but need access to replace and generate heat.

Surface mount LED – small, lightweight, easy to conceal, long lasting but can be hard to work with due to size if not pre-wired.

Fluorettes & interior building lights – good for large areas, easy to replace but large and hard to hide.

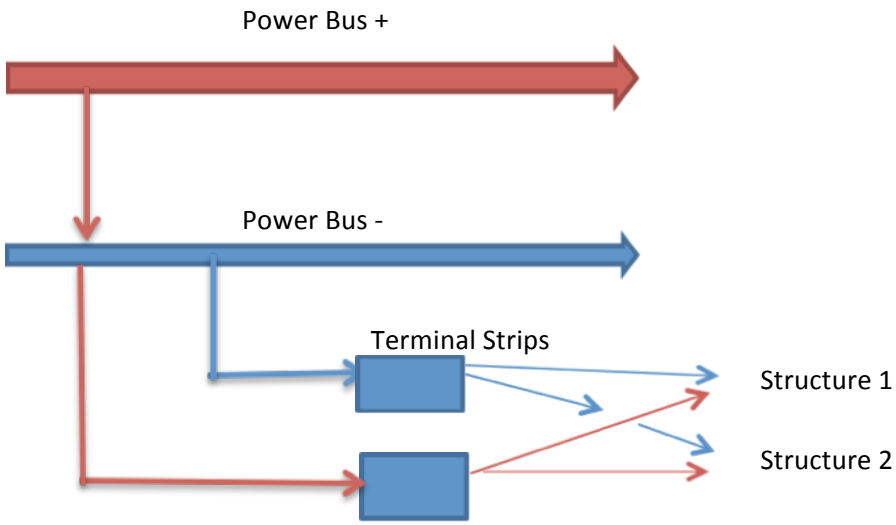
How do I power these lights?

If using DCC, it is possible to power lights directly from track power by using a bridge rectifier and appropriate resistors to vary the voltage supplied to the bulb. I would recommend this as a last resort as it introduces additional load on your track power as well as another source of potential electrical problems. You should also consider a using separate DCC booster.

Spare DC power packs can work if you have room under the layout for them and access to electrical outlets. Almost all power packs have an accessory outlet which is perfect for lighting in the 14-16V range. You can also use the track connection which will act as an adjustable resistor for those unique situations. As DCC becomes more popular these are showing up with increasing regularity at swap meets.

The power supply you get with many small electrical devices, commonly called a wall wort, will also work. Like a power pack it requires electrical outlets. It does however come in varying voltages from 1.5V to 16V. It is generally not a regulated power source which means that as you add additional bulbs they get dimmer. They also do not support a lot of lights but are a good option for unique voltage situation where a small number of lights are being supported.

The best method of powering your lights will be a separate regulated power source supplying a lighting bus under the layout just as you have a track power bus. I use a 12V plug in supply from Ngineering.Taps off the lighting power bus to terminal strips will allow power distribution to general areas under structures. This will provide a spot for the leads to be attached and allow for identification for removal as needed. A regulated power source will maintain all lights at the same voltage until you reach the power source limit. If you have a source equal to your highest voltage light you can power lower voltage lights by using resistors.



What are some other issues I may want to consider?

When lighting a multi story building you need to separate the floors if you do not want to light up the entire structure. You may also want to consider walls within the building to allow a room to appear empty. This can also help to avoid being able to look straight through a building where you do not want to. Don't forget to keep the bulbs hidden. Where this isn't possible try using styrene strips in front of them as a shield. Be careful to not overpower the structure with light as this can cause the structure to glow especially if the building is styrene. Painting the interior walls or using cardboard for interior walls will help here. Access to the bulbs will always be an issue when it is time to replace a bulb. This can be overcome by having removable roofs or consider a removable interior. I have had success with building the interior on a separate base then placing the building shell around it.

Once the buildings are lit then what?

There are many additional types of lighting that can be added to your layout. Just spend some time perusing the Walthers catalogue and you will see what I mean. Here are just a few examples of what's available.

The first obvious item would be street lights. There is a wide variety of eras available from many manufactures. The quality of the product you may choose is possibly only limited by your wallet. Consider, however, that street lights are generally only on at night and most modelers are working in a daylight scenario. This also applies to freight yard tower lights which are also available. Another thing to consider is the placement of lights near your tracks during track cleaning time.

Lighted signs on structures are very popular with a wide variety available from specific industries to generic businesses. Your small town may not need a large roof mounted Sherwin Williams Paint but could use a small Hotel or Diner sign. From a single color, always on sign to a flashing/motion multi-color advertisement sign there is a lot to choose from. Remember that when you mount these on a building there will probably need to be some modifications made to the structure that may be hard to repair if removed and many are only one sided limiting where they can be placed. Pre-planning here is a must and remember to check out the power needs as this may require some additional work.

After these two items we get into the world of situational lighting limited by your imagination. A work shop can have a welder, flashing lights on barricades, automobiles with head and tail lights, emergency lights on fire and police vehicles, chase lights on a movie marquee or campers around a fire pit. If you have a water scene you can have a light house or channel markers. You are pretty much limited only by your imagination, your wallet, and how much this adds to your enjoyment of our hobby.

Any final thoughts?

Based on my experiences I would recommend you consider the following things. Keep notes on what types of lighting each building has to facilitate repairs. Standardizing your wiring and color coding under the layout as well as labeling the wires will help with trouble shooting. If you are crawling under the layout you might as well disconnect the right wires the first time. Keep lighting within a building accessible and install the lighting as you build it. This is where note keeping will come in handy if you build it well before you install it. Pre-plan what you will need in the way of power busses or individual power supplies. And finally, enjoy what you are doing and build for yourself.