How to build a garden railroad

Part 1: Envisioning and planning the Hoot 'n' Holler Railroad

by Don Parker | Oberlin, Ohio | Photos by the author

1. The afternoon passenger train thunders across the Big Holler Viaduct while a local freight consist, headed up by a 2-8-0 Consolidation road hog, emerges from the Makum Holler Tunnel on the return track of the lower loop.

Building a garden railway can be one of the most involving and fun experiences in the world of hobbies. It can also be one of the most challenging, with many lessons to learn. Unfortunately, you may never get started if you let the challenges intimidate you. It's okay to delay for a while, reading articles and how-to descriptions, collecting a few pieces of rolling stock, and trying to decide which scale to model, but sooner or later—and sooner is better—you've got to lay that first section of track.

It is toward this end, helping you get successfully started and avoiding common pitfalls, that I will be sharing practical advice and detailed descriptions of building my second garden railroad, the Hoot 'n' Holler Shortline. Thirteen years of practice, building, and maintaining my first garden railway, the Rustin & Decrepit, allowed me the opportunity to try different techniques and evaluate what worked best for me. The lessons I learned and successes experienced in creating both railroads will underlie the recommendations given in this series. For you readers who are well along in creating your own garden railways, I hope there will be an occasional bit of information for you to take away and some enjoyment to savor in the sharing.

As often happens when life situations change, there seems to be no consideration for the inability of moving a garden railroad intact. A year and a half ago we moved to a retirement community in northern Ohio (Kendal at Oberlin), where downsizing is considered "right sizing." I was able to take up all my existing track, bridges, trestles, and buildings, move all to storage, and pot up all my most valuable woody plants and some groundcovers. Then, after careful planning (and approval from the Horticulture Committee and neighbors), I laid out a compact garden railroad in an expanse of community lawn.

In this issue I will explain the design principles used to build the railroad and, in the next three issues, I will describe how the roadbed was laid and trackwork accomplished, and how the structures help tie it all together.

Vision and planning

Before putting pencil to graph paper to develop your trackplan, consider these few basic elements.

• What appeals to you that you'd want to see in your railroad: a simple or more complicated trackplan, little or more involved landscaping, few or many structures?

• Consider how you'd like your railroad to operate. There are two basic types of trackplans: loops (and their variations) and point-to-point (with or without return loops or turn-around wyes at each end). There are two basic types of running options: continuous running and, more prototypical, controlled train movements (stopping at stations, switching, making up trains, etc.). The latter can be done in real-time by an operator(s) or can be controlled by programmed electronic means. How many trains operating at one time would you like to see?

• Would you like to follow a specific theme for consistency and realism or do you prefer an eclectic collection of locomotives, rolling stock, and structures that appeal to you in their own right?

• Consider your budget: how much do you want to invest? (Often the process of accumulative momentum drives the budget, which may not fit well with your finances.) Consider ways to keep costs contained: fewer switches and lower-cost track; a less-expensive control system; more do-it-yourself, scratch-built structures.

• Consider building in stages, planning for future expansion when your budget allows.

• How much time do you want to invest? For instance, would you want ready-to-use commercial track and switches, plug-and-play systems, and everything as maintenance-free as possible or would you like to lay your own track, build your own switches, scratchbuild structures and rolling stock?

These considerations will determine how long it will take to get your railroad operational as well as the financial outlay you'll be making.

2. Here, the upper loop descends and the lower loop rises to interchange at Hog Waller Junction. The passenger train has been switched to the short connecting track and will descend to the outer (lower) loop; the freight is waiting on the long connecting track until the varnish clears the switches, before proceeding to the inner (upper) loop. The track on the far right (with the temporary bridge) is part of the lower loop.

Evaluating the location

Look at the space available for your railroad. How much pitch (change in elevation) is there across the area? How much fill or excavation will be required? How well drained is the area? How exposed to high wind will it be? How secure is the area from vandalism? How will the railroad be viewed? How easy will it be to access various areas for construction and maintenance? How accessible to your power source is the area?

Developing your trackplan

Gather all the ideas you have accumulated—copies of trackplans from many sources, doodling, and rough drawings—and sketch the most realistic plan that will fit your budget and the space you've selected, incorporating the core vision of your garden railway. Then consider these questions. Will it look too crowded? Will there be enough variety of views to be interesting (e.g., straight runs alternating with curves and sections where the train will disappear from view and reappear elsewhere)? How much variation in elevation, if any, will there be, and how will this impact the types of trains you'll be running?

Think carefully about the radius of each curve and the grade of every change in elevation you will use. If, for example, your available space requires curves with 24" radii to accommodate your trackplan, you might want to choose between modifying your plan for more realistic, larger-radius curves or sticking with your trackplan and letting that determine the character of your railway. If the grade of any track in your tentative plan is 4% or higher, consider modifying your plan for shallower grades to allow for more realistic train movement and longer trains (unless you are modeling a steep, mountain, logging operation, for example).

Using graph paper, make a scale plan of your track layout. Use a drawing compass to lay out curves, making sure that the radius of the arc is at a right angle (90˚) to the straight section where your curve begins. If one curve abuts another, be sure the radius lies 90˚ to the tangent of the arc of the curve being met (see figure 1). This becomes most important when measuring for actual track placement, but these are good principles to practice when working on paper.

Draw switches (turnouts) in your plan according to the length of the entire switch unit (#4, 6, 8, etc.). Place them in straight sections of the plan (unless you are using special, curved switches) and, where the deviating track of the switch ends, continue your curve based on the degree of deviation of that switch.

If you have changes of elevation, especially where one track

Don't miss the rest of this series!

June: Preliminary construction
August: Choosing track
October: Laying track and ballasting
December: Accessories, structures, and lighting

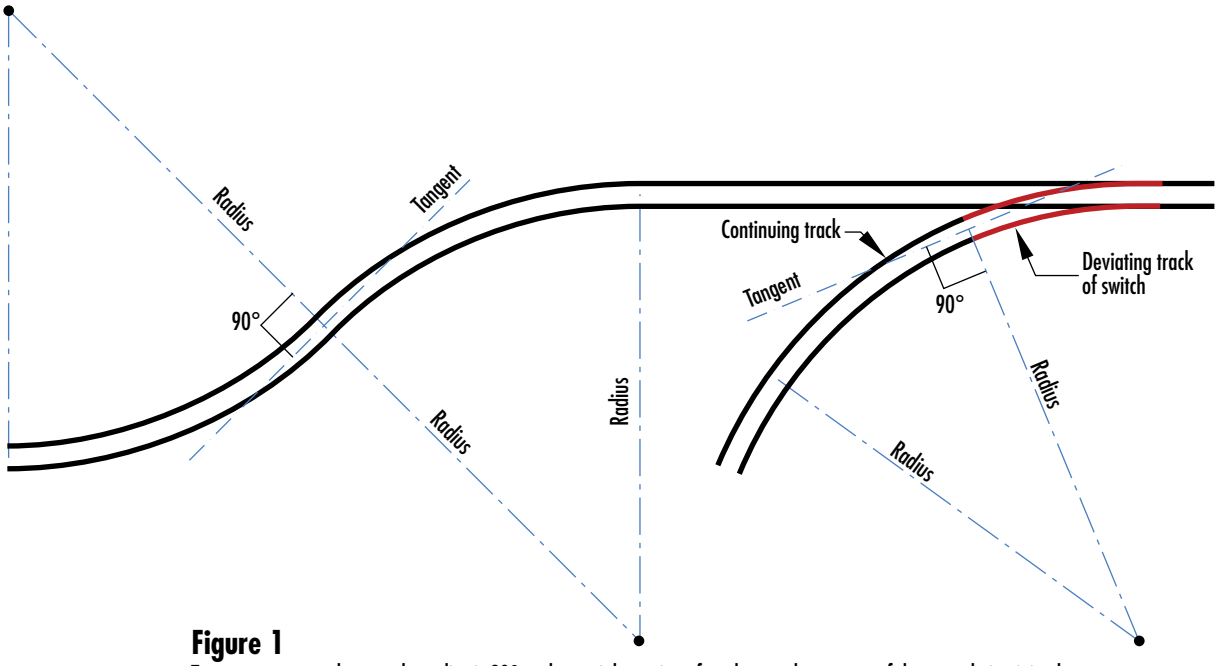


Figure 1
To start a curve, make sure the radius is 90° to the straight section of track or to the tangent of the curve being joined. (This basic illustration does not include transitions from straight to curved tracks or between opposite curves, which will be dealt with in another article.)

crosses another on a bridge or in a tunnel, calculate the grade by determining the number of inches in height between the highest point and the lowest, and divide that by the number of inches of track between the two, times 100. This will give you the percent of the grade. Minimal clearance from the top of the rail to the lowest point under a bridge, for instance, is 8"—although 9" would be better. Doing this planning on paper will save you having to modify your railroad during the construction phase or, worse, later, when things don't work as you had envisioned.

Designing the Hoot 'n' Holler

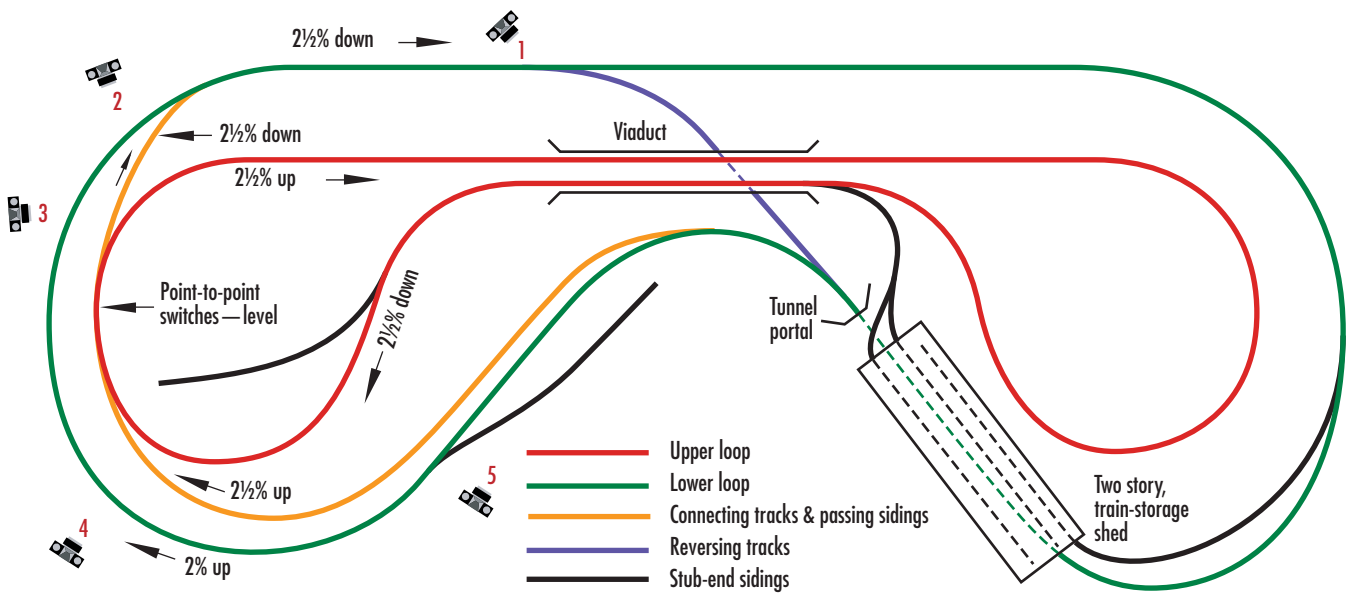
I prefer continuous running of trains with an occasional demonstration of spotting and picking up individual railroad cars. I like the challenge of developing automated systems for "hands off" train movements. For me, watching trains running through the landscape is more enjoyable than controlling activity to mimic prototype practices, so I developed my trackplan to maximize continuous-running options.

My overall theme is a narrow gauge, mountain railroad set in the Appalachian region during the early 1920s. I run short freight consists (lumber, coal, general freight) and short passenger or mixed passenger/freight trains. The name I chose, "Hoot 'n' Holler," has a double meaning: having a good time and also the sound of a locomotive whistle combined with the name given to narrow valleys (called hollows or hollers) in Appalachia.

My budget is eased by being able to reuse track and switches from my previous railroad. I planned the layout to use most of my bridges and trestles, and my buildings have all found a place in the new setting. The scope of this garden and railroad is considerably smaller than the last, with about half the square footage and about three-quarters the length of track. Consequently, there was less strain on my pocketbook and most of the construction went faster. The one exception was the need to take the old track apart, straighten and/or rebend the rails, and put the ties back on.

3. This view shows trains on both return tracks—the passenger train on the upper loop and the freight on the lower.

4. In this view of Hog Waller Junction, the origin of the long connecting track can be seen at the switch near the viaduct, beyond the brick factory building. The two connecting tracks together constitute a long passing siding for the lower loop.



Hoot 'n' Holler Railroad

5. In this view of Flat Rock, the track closest to the station is the passing siding (a.k.a. the long connecting track) and the outer track is the main. A Mogul is getting its water tank topped off on the service track while a maintenance-of-way detail makes repairs in front of the engine house.

The site of my railroad garden has a gradual pitch that drains into a storm-runoff channel. I built a 12-14"-high retaining wall along the length of the area to give the railroad a better viewing angle and for easier access for maintenance. To raise the level behind the wall required bringing in a couple of dump-truck loads of fill dirt to build a "hill" and a "mountain," between which runs a nine-foot bridge-and-trestle viaduct.

Gravel, rocks, and top soil were all moved by wheel barrow and grunt work. Electric power for lighting, automatic switch controls, and water pumps is 12V DC, supplied by buried cable running from a 10 amp AC-to-DC converter in my sun room. (Locomotives are battery powered and radio controlled.) Compressed air for pneumatic switch operation is supplied by buried tubing from a compressor (120V AC) located in a waterproof box next to the house. Both of the above are contained in a plastic conduit to prevent damage from shovels, lawn equipment, etc. Drip-irrigation tubing is also buried along with the conduit. Many aspects of the preliminary work have been described in my "Miniscaping" column as "garden railway infrastructure" (see *GR*, August, October, and December 2009, and February, 2010).

The trackplan of the Hoot 'n' Holler Shortline might best be described as a modified, folded figure-eight, with return loops allowing repeated change of direction. The inside loop of the folded figure-eight is elevated so that the return track of the outer (lower) loop can run under it at the viaduct.

There is a combination of three possible continuous-running options with this plan (see the trackplan). The simplest pattern, for which all switches are set to their default mode, is two separate loops—upper and lower. Two trains can run simultaneously in this pattern. The second option is a continuous-running pattern from upper loop to lower and back to the upper (through the point-to-point switches on the left-hand side of the plan that connect the two loops). The third option is a run from the return loop on the lower level (through the tunnel and under the viaduct) to the return loop of the upper level. In this last pattern, the direction of the train is always changing, as opposed to running in the same direction as in the second option. Sensors (reed switches) in the track control the turnouts that determine the running options that the trains will follow. The control panel is set up to facilitate the selection of the turnout positions and the automatic-sensor patterns for each running option. Developing this complex control system is something I enjoy doing (with help from my son, who builds the electronic parts), but certainly you can have a very functional railroad and interesting running patterns without electronic wizardry.

Online Extra

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