Contents

1

CHAPTER THREE

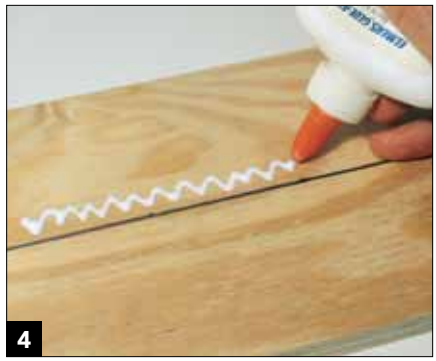
Roadbed

Popular roadbed choices include cork (the Midwest N scale sample shown at front) and foam (the Woodland Scenics Track-Bed shown under the Atlas HO concrete-tie flextrack). Roadbed elevates the track and makes it look more realistic. Its smooth surface provides reliable operation.

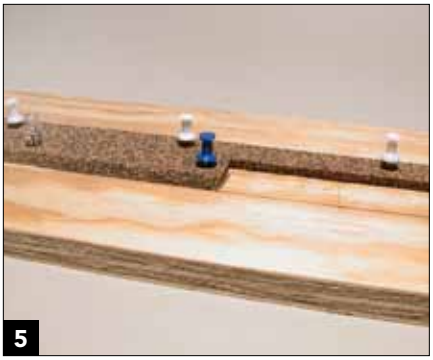
Once you've built the benchwork for your layout, with its plywood or foam subroadbed or table surface, you're ready to lay track, right? Well, not quite. Adding roadbed improves the appearance as well as the operation of model track, **1**. Although some modelers—especially beginners—are tempted to skip adding roadbed, experienced modelers will tell you that roadbed is more than worth the additional work and investment.

Cork roadbed comes in 3-foot-long strips that are perforated down the middle and must be separated.

Flopping the pieces so the bevel is toward the outside provides the proper roadbed shoulder.



Run a bead of white glue along one edge of the centerline and then press the cork into place.



Pushpins or wire nails (partially driven in) can be used to hold the cork until the glue dries.

One side of the cork usually has a rough burr along the top edge where it was connected to its mating piece.

Use a sanding block with coarse or medium sandpaper to remove the rough edge.

Real railroad tracks are elevated above the surrounding terrain, as chapter 1 explained. A layer of crushed-rock ballast sits atop a subgrade, which provides drainage and allows a smooth path and even transitions in grade. The exact profile varies among railroads, with heavy-traffic main lines having deeper ballast and a neater profile than secondary main lines, branch lines, or industrial spurs.

Model roadbed doesn't serve identical purposes, but it is still important in providing a smooth, even surface for the track, helping ensure reliable operation. It improves model track appearance by elevating the track and making it look like the real thing. It also helps deaden noise from operation, as track laid directly on wood or foam acts like a sounding board to amplify noise.

Several types of commercial roadbed are available. These include cork (made by Busch, IBL, Midwest Products, and others), foam (such as Woodland Scenics Track-Bed), fiber board (Homasote and Homabed), and composites (such as Hobby Innovations Flexxbed). Here's a look at the most common commercial products.

Cork

Cork is by far the most popular choice for roadbed, and for good reason. Widely available in all scales, cork is inexpensive and works well. It is also easy to cut, bend, and install. Most HO cork is 3⁄16" thick, and N scale is 1⁄8", with the top surface cut slightly wider than the length of a standard tie.

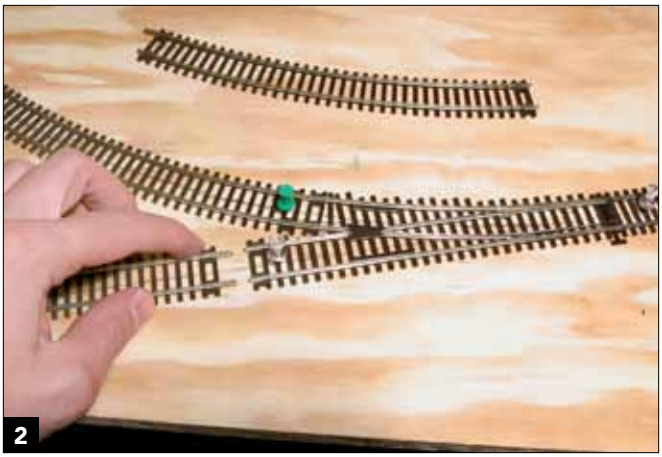
Most cork is sold in 3-foot-long strips with a diagonal perforation running down the middle, **2**. Peeling the two halves apart and arranging them so that the bevels are on the outside results in a correct roadbed profile, **3**.

To lay two-piece cork, start with a track centerline drawn on the layout table or subroadbed. Cork can be nailed in place, but glue is a much neater option. I prefer white glue for securing cork to plywood and Woodland Scenics Foam Tack Glue for adhering cork to foam.

Run a back-and-forth pattern of glue along one side of the centerline, **4**, and press the cork in place. You can use pushpins to hold the cork in place until the glue dries, **5**. If you use nails, don't drive them in all the way—remember, they're there only temporarily. Once the glue has dried, remove the nails or pushpins.

Stagger the joints of the roadbed halves, and don't locate roadbed joints above those in the subroadbed (and likewise don't later place track joints above joints in the roadbed). Staggering all joints results in much smoother track.

The top bevel of one side of the cork usually has a rough edge where it was separated from its mating piece, **6**. Remove this lip using a sanding block with coarse (120-grit) sandpaper to smooth the edge, **7**. This process makes it much easier to get a smooth shoulder when you ballast the track.



Test-fit track on the layout, even if you've copied track centerlines from a track plan in place.

Make sure rail joints are tight and square, with both rails pushed firmly into place.

If a rail joiner becomes bent or twisted, discard it and substitute a new one.

Joints on curves shouldn't kink, either to make the curve tighter (left) or broader (right). Make sure the rails butt together at both joints, making the joint square.

Good and bad

The biggest advantage of sectional track is that it's ready to use—just start connecting pieces and you'll soon be able to run trains. Especially in HO and N scales, there are hundreds of sections available, from pieces under 1" long to the standard full-length straight pieces of 9" in HO and 5" in N scale.

Sectional track's biggest disadvantage is its inflexibility, especially with curves. Most brands and types of sectional track feature fairly tight curves—18" and 22" are the most common in HO scale, and 9¾" and 11" in N scale. With some lines of track, you're also locked into wider than realistic track spacing to get turnouts to work for sidings and crossover tracks.

Nonetheless, sectional track is an easy, quick way to get trains running. Experimenting with arrangements of sectional track is a good way of testing potential track layouts, whether for a complete model railroad or a town or scene on a larger layout. Even if you opt for flextrack (see chapter 5) for the bulk of your trackwork, you'll still find sectional track handy for many situations.

Laying sectional track

The first step in laying sectional track is to test-fit all of the track sections in a given location to make sure they fit the space. Even if you're following a published track plan, understand that track sometimes won't fit exactly as shown. Sometimes track-plan designers are a bit hopeful in determining how much track will fit into an area. Track pieces such as turnouts must sometimes be trimmed to fit tight locations (more on that in chapter 6).

Even if you've sketched track centerlines in place, test-fit the track pieces, **2**. You can use pushpins or tape to temporarily hold the track in place.

When connecting the track sections, be sure that all pieces fit tightly, **3**. Use good rail joiners. If a joiner becomes bent, which often happens when reusing them, discard it, **4**. Bad rail joiners work loose, won't hold rail in alignment, and don't conduct electricity well.

Be sure that all track sections—especially curves—meet squarely and don't kink, as shown in photo **5**. Kinks are usually caused by trying to make a curve tighter than it should be. Although it's tempting to try to fit a bit more track in place, don't do it. Joints like these will lead to derailments and you'll end up reworking the troublesome areas.

Once the track is arranged the way you want it, adjust the track centerlines as necessary by marking between the ties every few inches, **6**. Remove the track, and then connect the dots as shown to mark the centerline. You're now ready to add your choice of roadbed, as described in chapter 3.

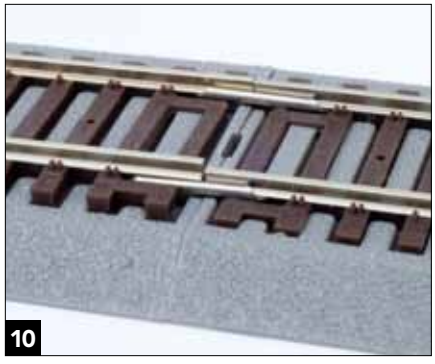
Once the roadbed is in place, you're ready to lay the track. Depending upon the type of turnout control you're planning, you may have to drill

Mark the track center between ties every few inches (left). Then remove the track and connect the dots to mark the centerline.

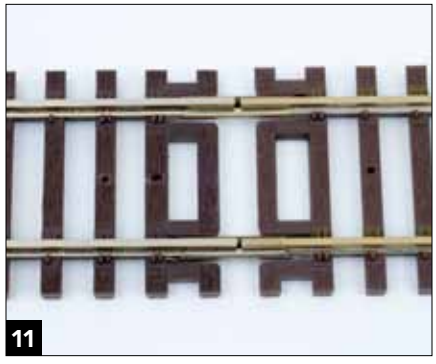
Place a nail in a hole in the tie and use a small hammer to drive it just above the railhead level.

Use a nail set to finish driving the track nail below the railhead level.

Leave a paper-thin gap between the nail head and the tie to avoid causing a kink in the tie.



Make sure both rails are in—and not on top of—their rail joiners. This can easily happen with combination track (shown) or standard track.



Leave small gaps between straight pieces every few sections to allow for expansion and contraction.

Wire cutters or rail nippers work well for grabbing track nails that need to be removed. Carefully work the jaws under the nail head.

access holes under the roadbed under the turnout throw bar (see chapter 7). When the track is positioned properly on the roadbed, you can begin securing it. Track nails are the most common option for laying track, especially with a plywood table or subroadbed.

Pieces of sectional track generally have small holes in the center of several ties (usually at each end and in the middle) to accept nails. Small black nails (such as Atlas no. 0540 track nails) do the job and aren't very visible when in place. Avoid larger wire nails, which are more noticeable. Wear safety goggles whenever you're driving nails or spikes.

Start with one end of a section. Press a track nail into place, pushing it into the roadbed, **7**. Use a small hammer to tack it in place. When the nail is still above railhead level, use a small nail set to finish driving the nail, **8**. Don't try to drive the nail all at once—instead, tap it lightly several times. Be sure to hold the nail set straight up and down, or you'll bend the nail.

Stop driving the nail when its head is just above the top of the tie, **9**. If you drive the nail too far, it will kink

CHAPTER SEVEN

Controlling turnouts

Just like the real thing, our model turnouts require some type of mechanism (manual or remote) to hold their points in place on the desired route, **1**. There are many ways to do this, with both commercial products and homemade solutions. I'll start with a look at what actual railroads do and then explain several methods of controlling model turnouts.

This HO turnout is controlled manually using a Caboose Industries ground throw. The scene is on a project layout built by the *Model Railroader* staff.

This modern intermediate switch stand on the Union Pacific leads from a main line to a grain elevator spur. A padlock protects the stand. The silver control box relays the switch indication to the signal system.

Ground throws are found along yard and industrial tracks.

This 1940s photo shows a ground throw in the Chicago & North Western Proviso yard topped by a kerosene lantern. *Library of Congress*

Prototype switch controls

The most common prototype switch control is the manual switch stand, **2**, a cast assembly mounted to the headblock ties. A crew member rotates the handle or lever on the stand, which moves the throw rod to change the route.

Switch stands come in low, intermediate, and tall versions. Low stands, or ground throws, are found in yards and on industrial tracks and other nonmainline tracks, **3**. Intermediate and tall stands operate the same way but have taller targets (four to eight feet above track level) for improved visibility on main lines and passing sidings.

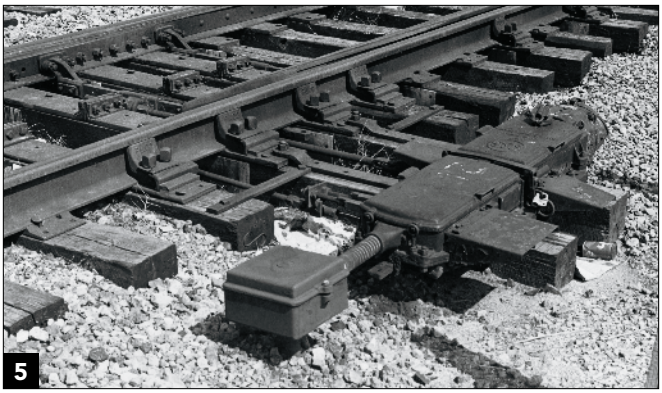
Targets indicate whether the switch is aligned for the main or diverging route. A large variety of target designs have been used over the years, with many unique to particular railroads. Today, targets are typically green and red (or yellow) reflectorized panels. Through the steam and early diesel eras, switch stands in high-traffic areas were often topped by illuminated kerosene lanterns with green and red lenses, **4**. Switch stands can be on either side of the turnout, depending upon clearance.

Manual switches may have electrical controls on them, including electric locks (controlled by the dispatcher) and electric relays that send information to the signal system that a switch has been thrown, **2**.

The coming of Centralized Traffic Control (CTC) and other systems in the late steam era led to dispatchers remotely controlling switches. Electric machines are most common, **5**. They can be found at ends of passing sidings, at junctions, and at crossovers on double-track lines. Pneumatic switch machines and rod-control linkage were often used on tracks controlled locally by interlocking towers.

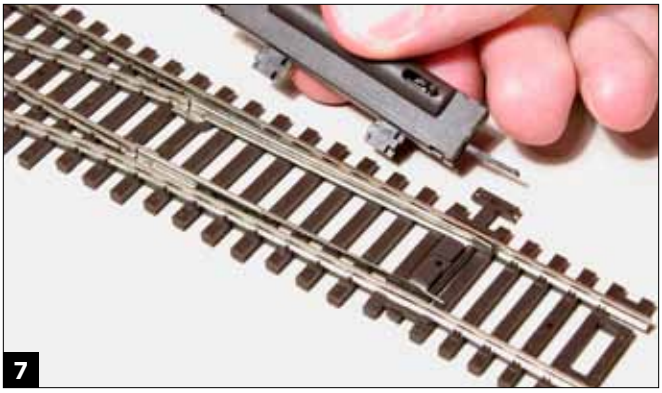
Model turnout controls

Turnouts require some type of mechanism—manual or remote—to hold their points in place on the desired route. Let's start with a look at manual controls. Manual controls are inexpensive, require no wiring, and are handy if you have a small layout or if



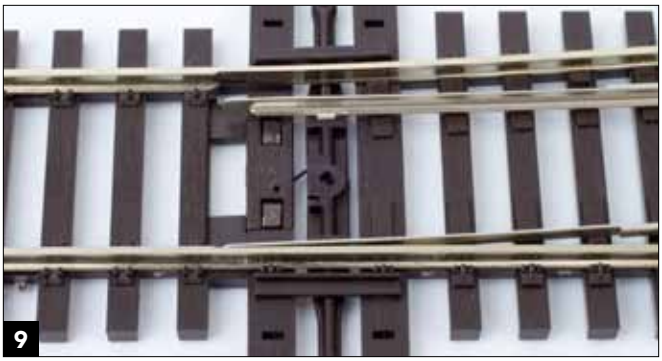
Electric switch machines control many prototype turnouts, especially at passing sidings, junctions, and other control points.

Manual controls attached to the side of a turnout aren't very realistic. These are N and HO scale Atlas turnouts.



Some manual controls are held by screws, while others, like this Atlas HO code 83 model, snap in place.

Removing the control on this Atlas N scale code 80 turnout also removes several tie ends.



Peco and some other brands of turnouts have a hidden spring connected to the throw bar that positively holds the points into place.

Caboose Industries ground throws work well and are closer to scale than side-mounted controls. This one is mounted on an HO Atlas turnout.

you use a handheld throttle and follow your train around a layout.

Many train-set quality turnouts have manual controls attached to the side of the turnout, **6**. Although these generally work well, they are large, quite unsightly, and resemble nothing found on a real track switch. I recommend removing them, **7**. Some snap in place; others are held by screws.

This doesn't work for all turnouts, as some, such as the Atlas N scale code 80 turnout, take the place of tie ends along the stock rail, and have unrealistic mounting tabs or slots, **8**. Keep this in mind when buying turnouts.

Many manual turnouts don't include a separate side-mounted mechanism. Of these, some (notably Micro Engineering and Peco) have hidden built-in springs that hold points in place, **9**. Simply pushing the points from side to side snaps them in place.

If a turnout doesn't have some type of mechanism, you'll need to add a switch stand or other device to hold the points in place.

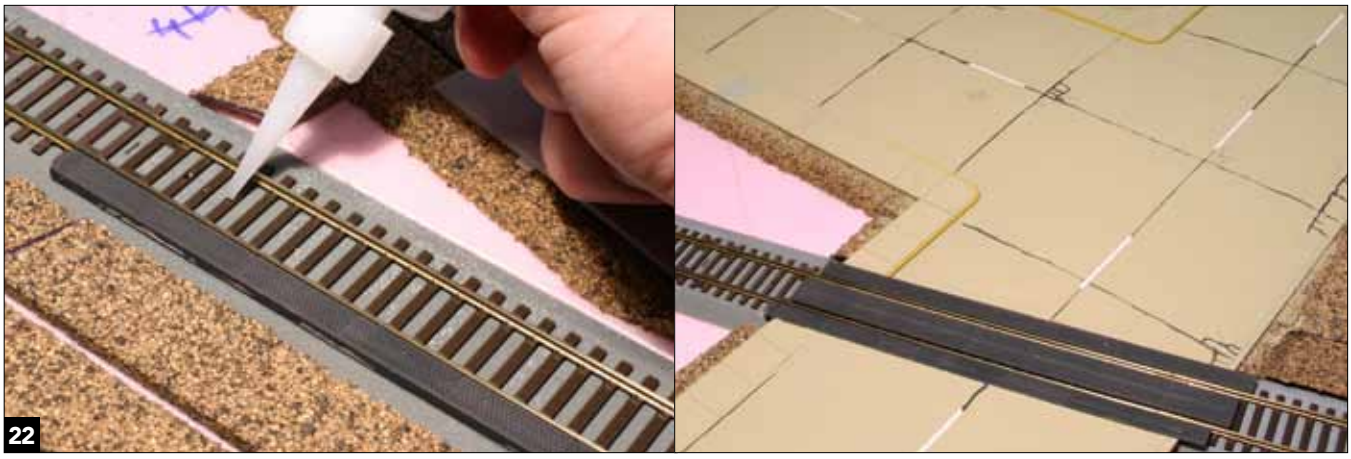
Several companies make working manual switch stands, most notably Caboose Industries, which offers a line of several N and HO models. The Caboose HO ground throw in photo **10** is a bit larger than scale size, but it looks better than stock manual controls do, and it works well.

Highway crossings made from timber planks bolted to ties were the most common type through the 1960s. *Gordon Odegard*

Rubber-pad crossings became popular in the 1970s, and they remain common today.

Crossings of concrete pads bolted to ties can be found in many modern installations.

Blair Line makes wood crossings in HO (shown) and N scales.



Crossings have sections that need to be glued inside and outside of the rails. This is a Walthers HO rubber crossing glued in place with super glue and matched with Walthers street sections.

by Walthers (no. 933-3140), **24**. The inserts can be combined with the company's street sections or used with other roadway material. In N scale, Kato offers a line of track called Unitram, which includes track in concrete streets.

Other options include lining the inner and outer sides of the rails with stripwood (as with a grade crossing) and filling the remaining area with street material, or using a series of commercial rubber, timber, or concrete grade crossings. You can also cut pieces of sheet styrene to fit and paint them to resemble asphalt or concrete.

Next, we'll look at how to handlay your own track.

1

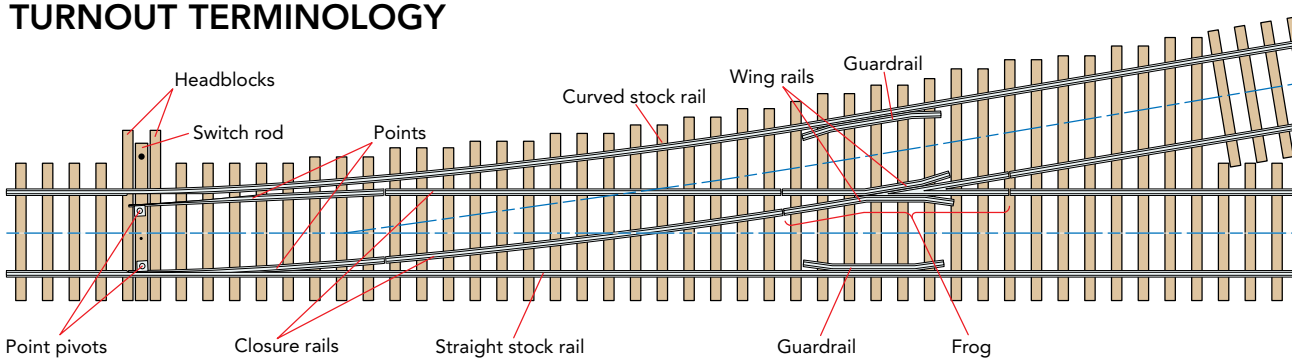
CHAPTER NINE

Handlaying track

The handlaid track on Tony Koester's HO Allegheny Midland layout flows nicely among turnouts, curves, and straight sections. *Tony Koester*

Some advanced modelers choose to handlay track—that is, laying track in a prototypical manner using individual ties, rails, and spikes. Proponents of the technique say that handlaying results in the most realistic track possible, since the track can follow any pattern you choose without any of the constraints of sectional track or flextrack. The finished results can be very impressive, **1**.

TURNOUT TERMINOLOGY



2 The components needed for handlaying track are rail, ties, and spikes.

3 Mark the outside edges of the ties and spread a thin coat of white glue on the roadbed.

Handlaying track does require a certain level of skill and patience, which can take some time to learn and master. Special trackwork—especially turnouts—must be laid within strict tolerances for trains to operate smoothly.

Practice is the key to success with handlaying. Try a few test sections to get the hang of it, then—if you're up to it—try a turnout. If your initial results aren't what you were looking for, try again. We'll take a look at handlaying basics with wood ties and spikes, **2,** and then go through the steps of handlaying a turnout.

Track supplies are available from several sources. Precut wood ties are available from Fast Tracks, Kappler, Micro Engineering, and Northeastern. Some companies make long (turnout) ties, and some offer prestained ties.

Thickness is another option in selecting ties. You can get ties full size (around a scale 9 x 9 inches), or you can use profile ties, which are about half the thickness of the real thing. Once ballast is applied, the low profile isn't noticeable.

Rail is made by Micro Engineering in code 40, 55, 70, 83, and 100, and by Peco in Code 60, 75, 80, and 100. Spikes are available from Micro Engineering, Shinohara, and Walthers.

Roadbed and ties

To handlay track, a firm roadbed is needed—preferably one that will hold spikes securely. Many modelers choose cork, Homasote, or Homabed as a base. Preparation through the roadbed phase is identical to that of laying sectional or flextrack. Make sure the roadbed surface is smooth. You can sand it with medium-grit sandpaper on a sanding block to get rid of any burrs or ridges.

Once the roadbed is ready, prepare the ties. You can buy prestained ties or natural-wood ties. If you buy natural-wood ties, stain them before installing, since any glue that gets on the ties during installation will act as a mask and keep the color off the ties.

You can use a number of colors and techniques. I mix water with various shades of brown and black artist's acrylic tube paint, including burnt umber, raw umber, and black. Paints can be mixed to get different colors, and you can adjust the intensity of the colors by adding more paint to the mixture.

Brush the mix onto the ties or soak the ties in cups of the paint mix. Then spread them out on paper towels or newspaper to dry, making sure the ties are completely dry before installing them.

Use a permanent marker to draw a line along one edge of the roadbed to show where the edges of the ties go. The distance from the tie end to the edge of the roadbed should be the same on both ends of the ties.

You can lay ties singly or in a group using a jig. Either way, be sure that your tie spacing is consistent. The heavier the main line, the closer and more consistent the tie spacing should be.