

# The Peterboro project

A portable prototype-based layout that also works as a Free-mo module/**Trevor Marshall**



PHOTOGRAPHY BY THE AUTHOR

Sometimes in this hobby we all want to try something different. That was the case in the summer of 2006 when Pierre Oliver and I decided to build The Peterboro Project.

Pierre normally models the Canadian National Railways in Palmerston, Ontario, in 1950, while my home layout, as regular RMC readers know, is a freelanced O scale effort closely patterned on the Maine two-foot lines and set in the 1920's. But, Pierre and I were intrigued by the Free-mo modular standard (see sidebar) and we both had an interest in doing something more modern, so we decided to build a stand-alone exhibition layout that was also Free-mo compliant. This would allow us to demonstrate Free-mo at shows and encourage others to consider alternatives to the "giant oval" format of more traditional modular standards.

## Design criteria

Pierre and I agreed that we should pick a real place to model because we

The work done for the day, the Peterboro crew head for home (above). The SW1200RS and transfer caboose are about to cross the CN swing bridge over the Otonabee River. CN 7310, a caboose, and a short cut of cars emerge from beneath the Highway 7 overpass and enter the New Yard area (right).

felt Free-mo really shines when it is used to accurately portray a prototype location—something that's difficult to accomplish using other modular approaches. We accepted that this would require extra work to research the place, scratchbuild or kitbash accurate structures, and so on, but what prototype to pick? To answer this, we draft-

ed a list of a half-dozen desirable features to help us select a prototype.

- First on the list was a Southern Ontario location because that's where we would most often exhibit this new layout and a local theme would resonate more with our audience.

- Since I already owned some modern CN switch engines and vans (caboose),



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that suggested a mid-1980's to early 1990's era, and a Canadian National theme.

•We wanted a track arrangement that, from a physical perspective, was typical of prototype railroading but not often modeled on a home layout because of space constraints.

•We also wanted a track arrangement that, from an operational perspective, would create an entertaining stand-alone layout, but one that would also work well as part of a larger Free-mo layout.

•Another requirement was a prototype that would build into a fairly extensive module that was sure to attract attention at local shows. Fortunately, Pierre runs the set-building workshop for the Grand Theatre in London, Ontario, and this professional theater company graciously allowed us to use the shop during its summertime quiet period to work on Peterboro. With a 10,000 square-foot, fully equipped shop at our disposal, we simply had to build something big to act as an anchor module for any Free-mo community that developed in the Southern Ontario area. When we started Peterboro, we knew of no other modelers in the region working to the Free-mo standard and we wanted to inspire others to join us. This was an opportunity to show our fellow hobbyists what Free-mo could do that other standards could not.

•At the same time, we also wanted a prototype that was small enough and simple enough that two motivated people could build, maintain, store, set up and – most importantly – transport. We decided from the start that if we couldn't fit it into Pierre's minivan, it was too much layout. Fortunately, Pierre's



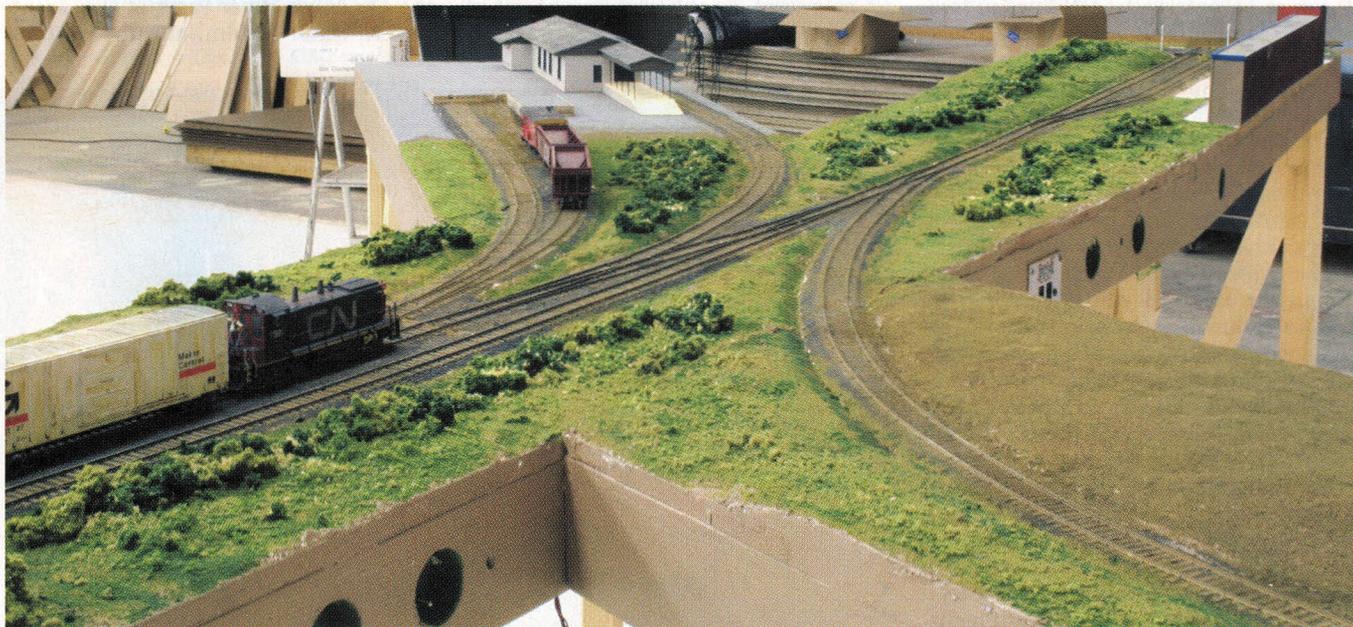
The Peterboro module drew crowds at the 2007 Toronto Christmas Train Show (above). One of the module's builders, Pierre Oliver (orange jacket), entertains kids large and small. Many people were excited by the Free-mo concept, proving that the best way to generate interest in a new aspect of the hobby is to build something and take it out to a show. This view (below) looks across New Yard from the southeast. The lower right spur serves Trent Timber Treating. Peterboro Cardboard is adjacent to Lansdowne Road in the upper right. Using short peninsulas off the main "spine" of the module allowed the benchwork to conform to the physical track arrangement of the prototype. Meantime, using straight-sided sections of equal width allowed the module to be tightly packed for transport and storage.

work experience means he's used to building large things that must also pack tightly and be easy to move, so we were able to build quite a bit of layout and still take it on the road. (More on that later.)

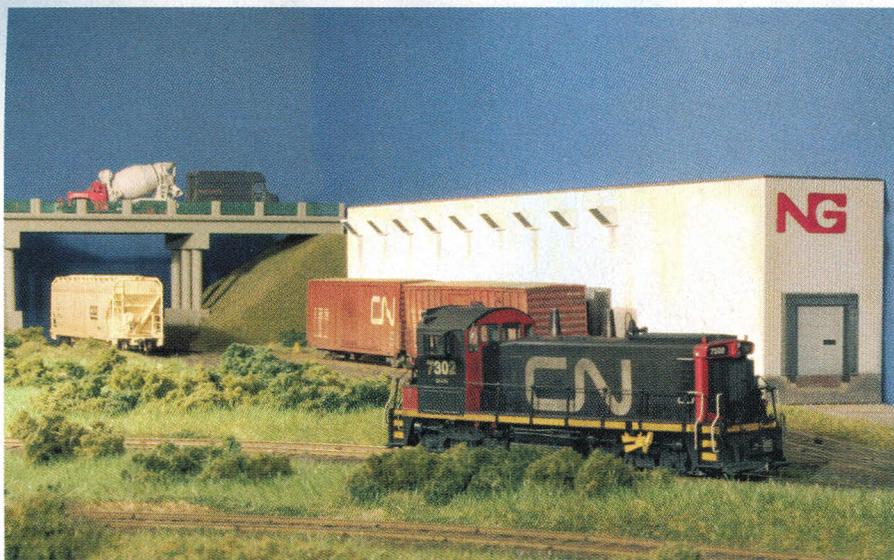
### Picking Peterboro

Pierre and I looked through a number of books and scoured web sites that

featured prototype track maps and assignment charts. We considered segments of Cambridge, Chatham and Thorold, Ontario, but in the end, we chose a part of CN's operations in Peterborough (or "Peterboro", as it was known on the railway), a small southern Ontario city about two hours north-east of Toronto on the Canadian National's Campbellford Subdivision.



## The Peterboro project



The crew of CN 7302 (*above*) switch the Skyway Fertilizer lead. The National Grocers warehouse is just to the south of Highway 7. Ragù makes pasta sauce, and is an important customer in the Peterborough Industrial Park (*below*). Here, the CN switch crew carefully position a boxcar next to the building. The modest yard at the CN Express building (*page 75*) features two tracks ending at a TOFC ramp, but it never sees trailers today. Instead, the yard is used mostly for storing m.o.w. equipment when track work is being done in the area. Here, two CN hoppers bask in the sun as the Peterboro crew ties up to wait for the local freight from Lindsay to Belleville to pass through town.

Peterboro was once a reasonably busy place on the Canadian National and the railroad's presence in the city was too extensive to model in its entirety. However, in the southeast corner of the city we found a small yard and adjacent industrial park that met our design criteria.

Pierre and I first encountered CN's "New Yard" and the Peterborough Industrial Park (PIP) in Keith Hansen's *Last Trains from Lindsay* (Sandy Flats Publications, 1997: ISBN 0-9681215-0-0), which chronicles the CN lines in this part of Ontario. The pictures and track maps here were enough to get us started and convince us that a trip to Peterborough was in order.

The New Yard was so called because it was built in the mid-1970's to move CN out of downtown Peterborough. The city wanted the land and working the old yard tied up too many city streets.

The railway agreed to move its operations out of the downtown, along its line to Belleville, Ontario. New Yard was modest, consisting of a passing siding and three spurs. One spur served a freight house for the railway's CN Express business, while the other two ended at a piggyback ramp. The express building saw business for a few years and many photos show a CN baggage car spotted next to it, but eventually all of this type of traffic moved off the rails onto trucks and the former CN building became a farm equipment

dealer. The railway's hoped-for, local Trailer-On-Flat-Car (TOFC) business never materialized.

Still, New Yard was a useful place for sorting traffic for a couple of nearby industries with spurs off the mainline as well as for the few rail-served customers in the Peterborough Industrial Park just to the south. In addition, it was often used as a storage site for non-revenue equipment when CN's maintenance-of-way forces were in the area.

For a few years New Yard really did act as a yard, as the way freight out of Belleville would use it to drop a loco-

motive and all traffic for Peterboro. A yard crew would then come on duty and spot and lift cars at locations throughout the city while the road crew continued on to Lindsay. The next morning, the eastbound way freight out of Lindsay would collect the lifts and the Peterboro yard locomotive on its way to Belleville.

For a brief time in 1987—shortly before CN transferred its operations in the city to CP Rail—Peterboro was served out of Toronto via Lindsay, which created an interesting operating situation. Lindsay was a Toronto job, while Peterboro was assigned to a Belleville crew. When CN tried to amalgamate the two jobs, the union pushed back until a compromise was reached: The way freight out of Toronto was equipped with two locomotives and two vans (caboose). At Lindsay, the train was split in two. The Toronto crew would switch customers in Lindsay, while a Belleville crew taxied to Lindsay and ran their portion of the train to Peterboro to work the customers there. When the Peterboro job returned to Lindsay, the two trains were recombined into a single way freight. The Toronto crew worked the train back to their home yard, while the Belleville crew taxied home.

From a modeling perspective, New Yard and PIP had just twelve turnouts between them, which Pierre and I felt was a manageable number for two people to build and maintain. Physically, however, the spurs struck out from the main track at all kinds of odd angles, making this prototype ideal for us to show just how flexible the Free-mo standard could be. When we realized that we could incorporate a nearby swing bridge that carries the CN over the Otonabee River (part of the Trent-Severn water system), the die was cast.



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### Design for transport

We knew, however, that it didn't matter how interesting New Yard and PIP appeared. What really mattered was, "Can we get it into the minivan?" Pierre took tape measure to hand and reported that we could fit module sections up to five feet long in the back. We could also stack up to five sections, provided we made the sections fairly thin and could rack them fairly close together.

The Free-mo standard specifies a 24" wide interface point so our first inclination was to use that for our module sections, but we realized that would limit us to a single stack. If we made our sections 18" wide, we could do two stacks, or double our fun, although we would have to create short trapezoidal segments to bring Peterboro back out to the Free-mo spec at each end.

Of course, each of these segments would have to be straight-sided. To accommodate curves, we designed in angles at section ends. We also realized that not all sections had to be five feet long. For example, a shorter section could be used for a peninsula to support a spur that swings away from the main track. This allowed us to create paired sections that would be used in very different places on the module, but occupy a single level in the racks for storage and transport.

### Planning Peterboro

Measuring the minivan told us we could accommodate up to ten 60" x 18" sections, which represented 50 linear feet of module, plenty of real estate for a prototype with just twelve turnouts! The next challenge was to translate the prototype's track arrangement onto this 50 linear feet.

Pierre and I realized that as a stand-alone layout, we'd need some staging,

so we reserved one five-foot section for a sector plate. Using a sector plate instead of a traditional yard would give

us more storage for the space and reduce turnout maintenance. We're able to store more than 40 pieces of equip-

## What is Free-mo?

**R**eal railroads go from place to place and do real work along the way. Trains rarely chase their tails around large oval mainlines, but many modular standards were developed to do just that.

While thousands of hobbyists enjoy building modules to these conventional standards, others have looked for an alternative that would allow them to more accurately model the appearance and operation of real railroads.

In HO scale, Free-mo is one of the most successful solutions. It's a North American standard that was adapted in the mid-1990's from a European standard called FREMO. Since then, it has successfully been used to build hundreds of modules depicting single- or double-track railroading in the United States and Canada. Some groups have even adapted the Free-mo standard for use in other scales and gauges.

### How it's different

Most modular standards specify acceptable sizes and shapes for modules. These restrictions ensure that modules can be connected together to form large oval layouts with continuous mainline loops, but they also severely restrict layout design because track, structures and scenic features must be shoehorned into these rigid module frames.

With Free-mo, the modeler is able to build modules of any size and shape, broken into any number of sections for storage and transport. Only the interface points and aspects directly affecting the operation of trains—such as rail size, curve radii and turnout numbers, and wiring—

must conform to the standard.

This freedom means modelers can design their module frames to follow a prototype track arrangement, instead of the other way around. The only limits are what an individual or group can build, maintain, transport, set-up, and store.

### Putting it all together

People build Free-mo modules with operation in mind, and groups of Free-mo enthusiasts gather to join their modules into layouts to run trains. Since modules can be any shape or size, Free-mo gatherings take a bit more planning than setting up a traditional, oval-type modular layout.

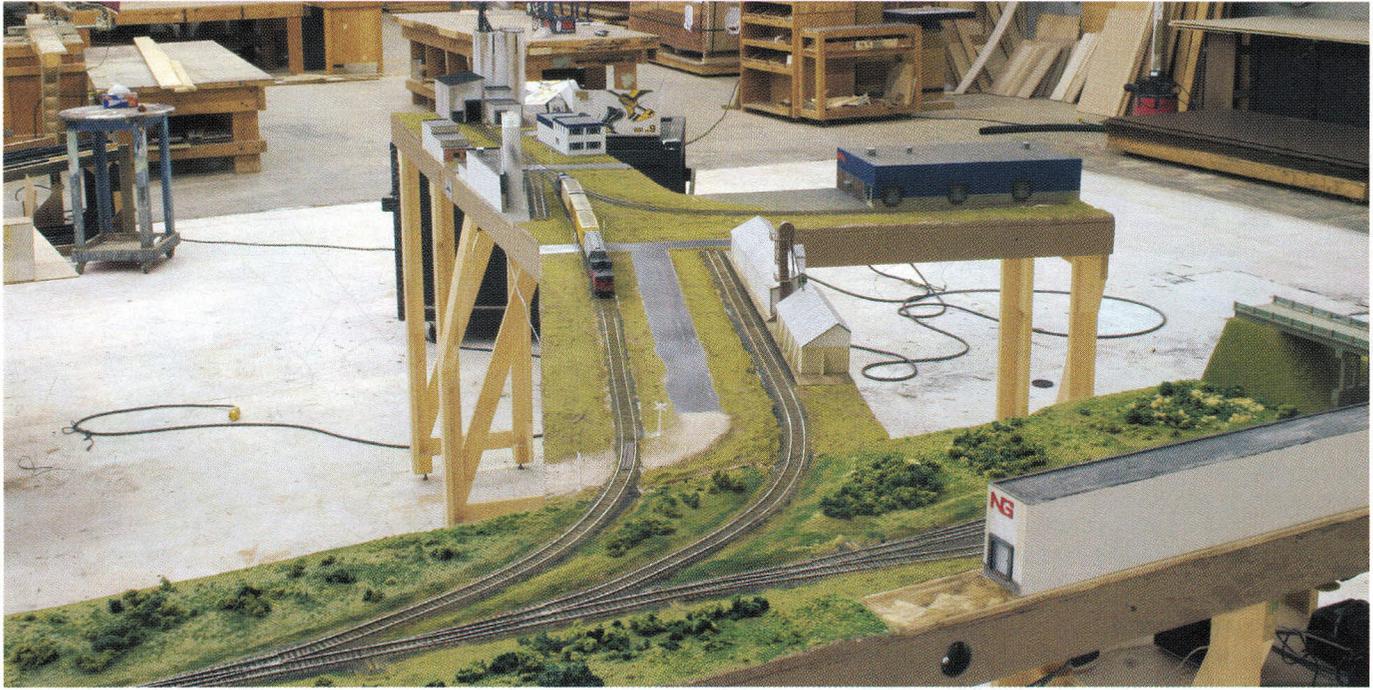
A person called the Run Chief organizes and coordinates a Free-mo meet. The Run Chief measures the venue and determines how the modules will be linked together to fit the available space. This task is made easier if those contributing modules to the event can provide, ahead of time, an accurate and scaled drawing of their modules. This allows the Run Chief to plan with confidence.

### Want to know more?

The full Free-mo standard explains how to build a module, and is available online at the Free-mo home page: <http://www.free-mo.org>. This site also has many articles, links to Free-mo groups across North America, reports on past Free-mo meets and other useful information.

Those looking for more information can join the Free-mo Yahoo group, which is the online meeting place for hundreds of Free-mo enthusiasts: <http://groups.yahoo.com/group/Free-mo>. —TREVOR MARSHALL

## The Peterboro project



This bird's eye view of the Peterborough Industrial Park from above the mainline (top) shows the National Grocers warehouse in the lower right, while Skyway Fertilizers is in the center. The blue building to the right is Ragù. To the left of the train is Domex while the tall building in front of the train is the Peterborough Co-op. Looking east across New Yard (below) the CN Express building is visible to the lower right, while the future home of Trent Timber Treating is on the short peninsula on the opposite side of

the mainline. The Highway 7 overpass and industrial park can be seen in the distance. Despite the many peninsulas and unusual overall shape, this is all considered a single module and was designed to showcase one of the key capabilities of Free-mo: the ability to let a prototype track arrangement dictate benchwork design, instead of being forced to hammer a prototype into a predetermined shape. Free-mo modules and layouts are intended to be enjoyed from both sides, so no backdrops are used.

ment on our five-track sector plate. Each track can accommodate a train of a half-dozen cars, a four-axle diesel and a van, which is a perfectly reasonable train length for operating Peterboro as a switching layout.

Pierre also suggested, and I agreed, that placing the prototype's straight mainline on a very large radius curve would add some visual interest and also some much-needed stability when setting up Peterboro. (Remember, the sections are only 18" wide, and Free-mo specifies a rail height of 50" above the floor.) We accomplished this by designing trapezoids for most of the sections used between the north end of the module and the swing bridge. From one end of the mainline to the other, the module deflects about 20 degrees. When it came time to transfer the trackplan from graph paper to the module, we simply grabbed a 20-foot length of thin steel bar from the supplies in Pierre's workshop and used it as a giant easement tool, securing the ends perpendicular to and centered on the Lansdowne Street and Swing Bridge sections and allowing the bar to find its own natural resting point across the intermediate sections that make up New Yard. We estimate the radius is more than 80 feet, and a train looks fantastic tra-

versing this cosmetic curve.

We made a number of other changes to the prototype as well:

- We restored the spur into a factory at the Lansdowne Street end of New Yard. We were not sure whether this served Peterborough Cardboard or another, adjacent factory but the cardboard company was a more interesting building, so that's the one we picked.

- The National Grocers spur should be on the west side of the main track, but we moved it to the east side because it fit better on an already track-heavy section.

- We restored a spur into PIP that used to serve the Outboard Marine com-

pany, but was lifted sometime in the 1960's. As well, during the planning of the module Pierre and I discovered some wonderful sulfuric acid tank car kits that we just had to have, so we transplanted Skyway Fertilizers a few hundred miles from Smithville in Ontario's Niagara Peninsula. (See the June and July, 2005, issues of RMC for more on Smithville.) The Toronto Hamilton & Buffalo Railway served Skyway and, as a fan of the TH&B, I'd always wanted to model this industry. In addition, fertilizer companies are the largest consumers of sulfuric acid and there are a number of other agriculture-based businesses in





An overview of the Peterboro Project Free-mo module, from south to north shows the pivoting sector plate used as a staging yard. Note the gentle curve through the mainline from staging yard to New Yard. The prototype's mainline was straight here, but this gentle curve helps greatly with stability when the tall, narrow module sections are set up.

Peterborough, so this was a reasonable substitution.

- We moved the Otonabee River two miles southeast of where it is in real life, to put the swing bridge to the south of New Yard. This gave us a longer lead between PIP and the sector plate, making it easier to switch the industrial park.

We adhered to the Free-mo spec for everything that mattered. That means

we set our rail height at 50" above the floor, made our interface plates 24" x 6", used code 83 rail on the mainline and double-ended sidings and Number 8 turnouts for any tracks that mainline trains might use, adopted Digitrax as our DCC standard, and fitted our interface points with Cinch-Jones electrical connectors.

Elsewhere, we had no issues with ad-

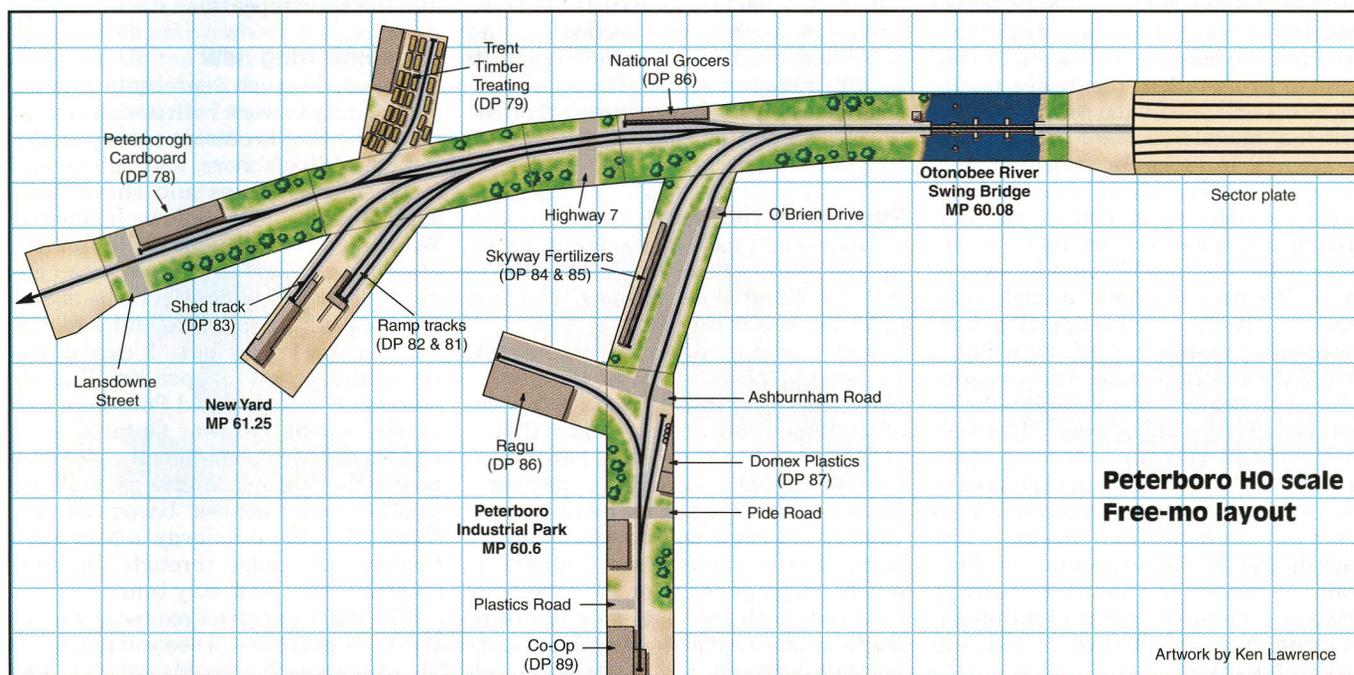
justing the standards to suit our tastes. For example, we wanted lighter rail on secondary tracks, so we used code 70 for spurs. We also wanted tighter curves in PIP to give it more of an industrial park feel, so we squeezed the radius to as little as 24" – tight indeed, but fine for a four-axle switcher shoving one or two 50-foot cars at a realistic crawl. And, our wiring within the module is all done using Anderson PowerPole connectors, which we like better than the Cinch-Jones style. With the PowerPoles, we were able to gang together several sets of wires into a single block, and make each pair of connectors unique so that cables cannot be accidentally plugged together incorrectly.

### Construction tips

Building Peterboro was pretty straightforward so there's no need to provide a blow-by-blow description of how we did it. That said, Pierre has more than three decades of experience as a builder of theater sets, so he has some good tips for building portable benchwork.

- Materials are important. We framed each section with a premium 3/4" plywood known as D-3, which has a poplar plywood core and paint-grade birch face veneers. This provided the best combination of strength, weight and dimensional stability. We incorporated leg sockets into each frame to simplify set-up, and topped our frames with 1/2" good-one-side poplar plywood.

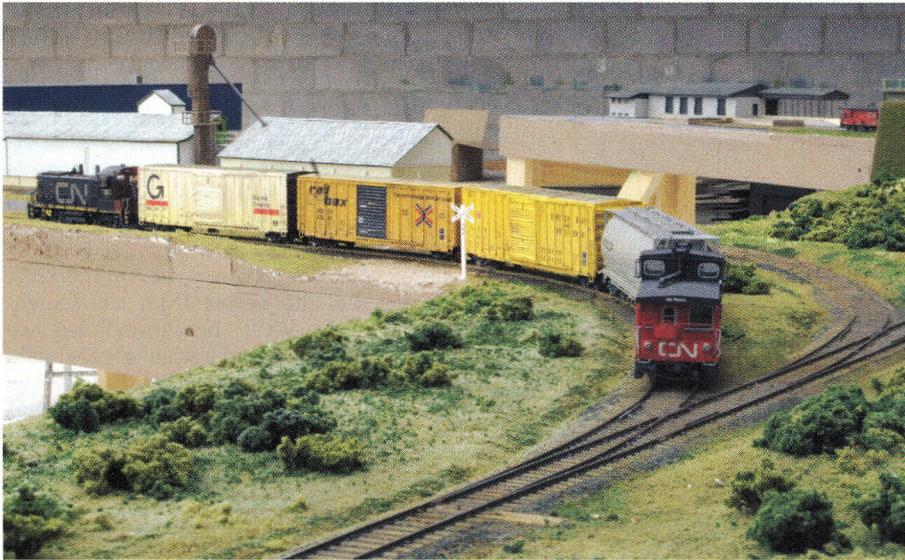
- To speed construction, use good quality glue and hold components together using a power brad nailer. These "oversized staplers" are a good investment if you're building a lot of



**Peterboro HO scale Free-mo layout**

Artwork by Ken Lawrence

## The Peterboro project



A train swings off the mainline and into the Peterborough Industrial Park. The white building above the locomotive is Skyway Fertilizer, while the blue building beyond it is Ragù. In the upper right, New Yard and the CN Express building can be seen in the distance.

benchwork (whether for a permanent or portable layout). Round robin groups or clubs may want to purchase one to spread the cost among several people. The brads will hold everything together while the glue dries, and building benchwork with a power nailer is much faster than using clamps.

- Instead of building legs using 2" x 2" stock, we glued up L-girder style legs from finger-jointed pine, which has had all knots and other blemishes cut out. This puts wood grain in two directions and helps keep legs from warping over time.

- Any portable layout will have a number of components that must be assembled when setting up. Legs will need braces, power supply shelves will need to be installed, removable building bases will need to be secured to the sections, module sections will need to be secured in racks for transport—the list goes on. For all of these components, standardize on a single fastener system. For Peterboro, we used No. 10 stove bolts and blind T-nuts for everything. We drilled a hole through both pieces to be fastened, slipped a bolt through, spun the nut on, then hammered the nut into place. This ensures the nut is properly aligned in the hole. The benefit of using a single fastener comes when setting up or tearing down at a show. Pierre and I can each grab a fistful of bolts and one screwdriver to set up Peterboro—from opening the back door of the van to running our first train—in under 90 minutes. Tearing down is even faster, taking just under an hour. Not bad for two people and fifty feet of layout.

- One thing to which we could have paid more attention during benchwork construction was the clamping surfaces between sections. We have been able to address this subsequently, and it helps that we're using good quality quick-release clamps. It pays to think about this at the design stage.

- Label everything. Don't rely on remembering where things go from module rally to module rally. Even items that are supposed to be identical, such as the leg assemblies on Peterboro, have been fitted to specific modules. We used a permanent marker on the underside of each module section, all leg sections, all braces, structure bases, and so on. Each module section was labeled with an A or a B to help orient it in the transport racks. The labels on the racks help us determine what order to pack up sections when it's time to tear down Peterboro.

### Putting on the show

Pierre and I have had a chance to set up and operate Peterboro in both Free-mo and stand-alone formats, and it's great fun either way.

When used as an exhibition layout we set up three trains on the sector plate, representing three days' worth of westbound way freights out of Belleville. Each train consists of four to six cars each plus a locomotive and van. We use a fourth track for extra power, vans or unusual equipment (such as maintenance-of-way gravel hoppers or a CN baggage car for the express building), while we set aside the fifth track as an arrival track. Meantime, another dozen or so cars are scattered

about New Yard and PIP.

We run one train at a time, stopping at New Yard to sort the way freight's consist and plan our moves. We haven't yet introduced a car-forwarding system although it would be fairly easy to set up Peterboro for car card and waybill operation. Instead, somebody (Pierre, me, or even a spectator at the show) plays freight agent, designating four to six cars to pick up, figuring out where cars in the train should be set out (some cars, like the sulfuric acid tank cars, have only one possible consignee, but boxcars can go anywhere) and we go from there.

When a crew is finished its work in Peterboro, the train is reassembled heading east and taken back to the Belleville sector plate. We repeat this with the other trains, then take a quick break from operations to re-set the sector plate. We usually only have to do this once or twice during a day-long show, and spectators are fascinated by how we use the five-track sector plate to re-stage the trains.

When Peterboro takes part in a Free-mo module rally, we start a switch engine and van on the express track in New Yard, and scatter a dozen or so cars around the various spurs. We then pull industries until we have five or six cars, which we place on the runaround track in New Yard. The next way freight through Peterboro will lift these cars and drop a similar number boxcars, tank cars and covered hoppers. The Peterboro yard crew then delivers to customers, coordinating with the dispatcher for use of the main track. Another set of cars is pulled from industries, set in the runaround track, and the cycle repeats.

### Try something new

For us, Free-mo represents a great opportunity to work with a scale, era or prototype that is outside one's primary interest. What's more, it's a great way to model real places and share them with friends and fellow hobbyists. While my main focus will remain Maine two-footers in O scale, I can envision the space under the home layout filling up with Free-mo modules of various sizes and themes. I expect the same thing will happen in Pierre's basement. We have sold Peterboro to a person in the Ottawa, Ontario, area and we are both planning new places to tackle in Free-mo. Pierre is building double-track modules based on the Canada Southern Railway (a New York Central subsidiary through southern Ontario). Me? Well, stay tuned.

Why don't you give Free-mo a try too? If you do, maybe we'll see you at a module rally sometime soon!