North Raleigh Model Railroad Club

Educational Activities

Junior Engineer Layout

Introduction

The North Raleigh Model Railroad Club (NRMRC) is involved in educational activities related to railroads and the hobby of model railroading which are intended to educate individuals in the various facets of railroads and the hobby of model railroading. Often these clinics may be held as part of a model train show in which the NRMRC is participating.

One of our members, Joe Peacock, recognized a need when he heard children at train shows voicing the request "Please, please, I want to run a train", they would ask of Mom and/or Dad. This led Joe to conceptualize, construct and then operate a small portable layout — the Junior Engineer Layout (JEL) — that can easily be setup and used by non-club affiliated children at public train show events.

Below is the story of the Junior Engineer Layout in Joe's own words.

Background

What better way to engage a child and their parents than a layout on which they can operate a train (and their parents to photograph them operating) under the supervision of a Club member, and learn about railroading at the same time? The wheels were turning. I wanted to build a "real" layout for the kids not provide a board with track as some do. Often at public shows, there are opportunities for kids to do some things, quite often more related to racing a train, blowing a horn, or pushing a button, but not to really operating a train on a "real" layout. At the same time, it wasn't reasonable to involve children on the club's NTRAK or T-TRAK layouts.

Items Available to Use for Construction
I already had a number of items available to do the JEL I planned:

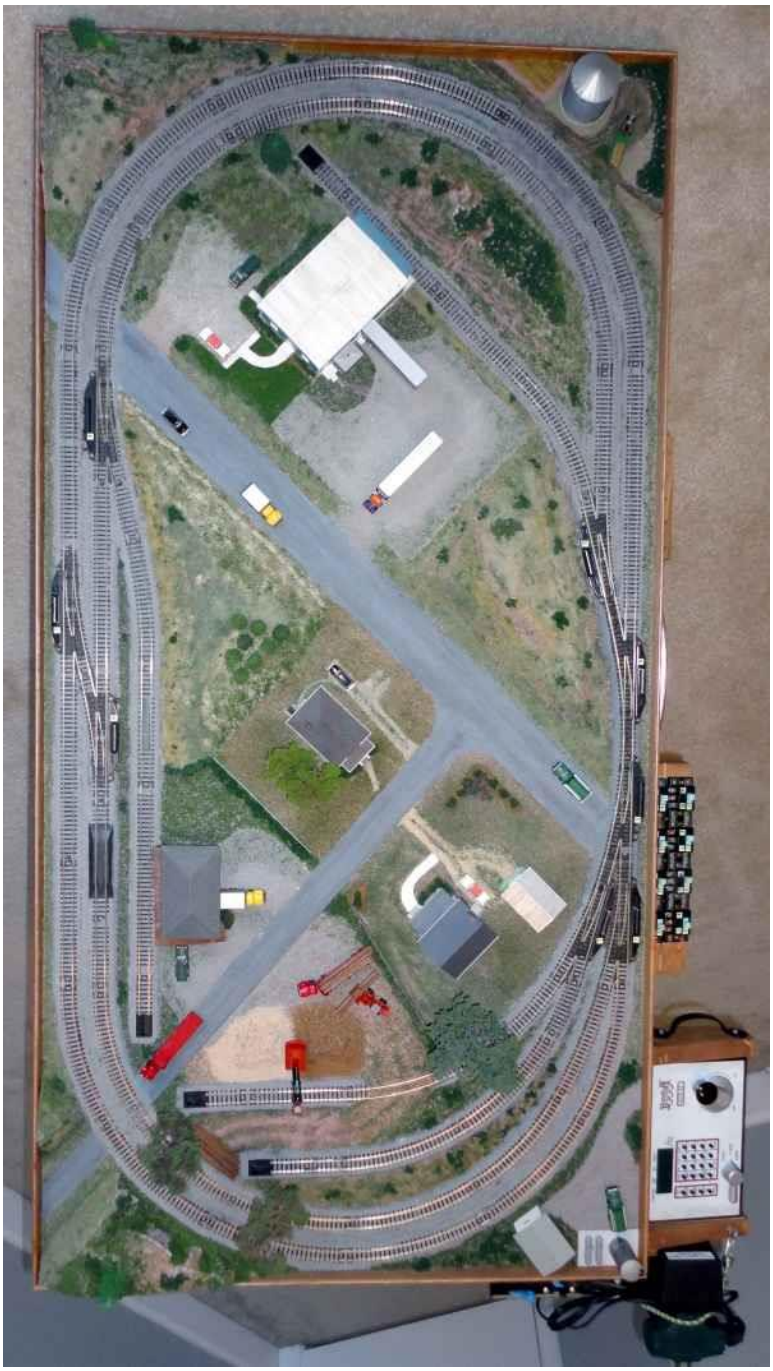
1. A complete light-weight NTRAK 2' x 4' frame with folding legs (David Thompson design), with my own added touches.

2’ x 4’ Lightweight NTRAK Module Frame used as Layout Base

2. Lots of old Atlas sectional track, Atlas powered turnouts, DC throttle/transformer, etc., all in good condition. All from the 1970s!
3. A Digitrax Zephyr DCC command station. The Zephyr (DCS50) would be perfect for the JEL because of the large rotating throttle knob it has. Great for young hands.
4. Various scenicking materials and assorted "stuff" gathered awaiting the time I would actually attempt to do scenicking.
5. Lots of energy, desire to learn, and desire to do.

Simple Track Plan

A track plan was needed for the 2' by 4' NTRAK module. The idea met with club interest and Mr. Gerry Foster, Director of Education for NRMRC, offered to assist me with a track plan. The track plan needed to meet several objectives. It needed to be simple enough to be operated by a young child, about 4–5 years, yet complex enough to engage an older child (10–12 years), even those having some home operating experience. There are many track plans which can meet these two objectives, but I also wished to do the build with materials I had available. With the assistance of Gerry, we chose a double loop (inner & outer) track arrangement, with cross-overs, and four dead end spurs. This plan changed slightly in implementation to accommodate materials and space, but has worked quite well in meeting the objectives.



Operational Plan

The operational plan for a younger child is to run only the outer loop, using the throttle alone, under "Senior Engineer" supervision. This allows the child the "thrill" of operating a "real" train without it being too confusing for the child. Older or more experienced children will be given supervised latitude to do whatever they wish (operationally), including operation of eight Atlas electric turnouts. A four-axle DCC diesel and 7–9 cars will be used on the layout. Children must always be accompanied by their parents (or a guardian), but also are always under the supervision of a Senior Engineer (NRMRC club member) present. The DCC locomotive(s) will be speed limited to N-scale 60 MPH.

The Senior Engineer is responsible for operational instruction of the child. The child remains the responsibility of the parent (or guardian) during operation.

Since the layout is built on an NTRAK module, it can be operated either free-standing or, with legs folded under, laying on a banquet-type table. The table placement works better for small children, due to the height of the base NTRAK module.

Scenery Plan

The JEL wouldn't be "real" if no scenery is present. A board with track will not do. The kids know the difference. The plan was tough as I had zero scenicking (or planning of scenes) experience. So winging it, I knew I wanted a "mixed" scene with some commercial and residential elements mixed together. Maybe a bit of farming too. Also, I thought this to be easiest on me, plus offering a variety of learning tools. Plus, a mixed scene offers variety for parents and children viewing while in line to operate (and there are often lines of excited children!). Not wishing a "flatlandia" either, I needed some relief (hills) built into the scene if possible. Chronological era: indeterminate, but say 1950+, as all of locomotives are diesel.

Since the track plan was two loops with spurs, I knew there should be room inside the loops to do roads, buildings, houses, etc. That's really as defined as the scenicking plan was at this point. Many sage modelers insist on a defined plan, but I was charging forward anyhow, hoping for serendipity to bail me out.

Construction

Basic Track Work

As I stated earlier, I had available a complete lightweight NTRAK module frame with "foam on luan" surface existing, so I had a big head start! I first started putting together available (1970's purchase) Atlas sectional curves in the appropriate radii (standard 9.75" and 11"radii) to accomplish the two 180 degree turns at both ends. I then "pinned" these radii in place. Then I moved Atlas turnouts (1970's purchase) here and there to get the fit and the operational plan desired. I ended with eight turnouts (all I had), six of which were close to the child operator to allow better vision of actuation. I pinned the turnouts in place, then used old Atlas (1970's) flex track and various sectional track to fill the gaps and construct the spurs. We had originally planned two full loops for the track plan, but in actually doing, the inside loop became incomplete, re-joining the outer loop through two turnouts. In hindsight, I don't know there is any real difference as it meets our objectives of both simple and more complex operation. And all track/turnouts were available. The newer Atlas turnouts are somewhat different now, but I believe could still be used in a similar design.

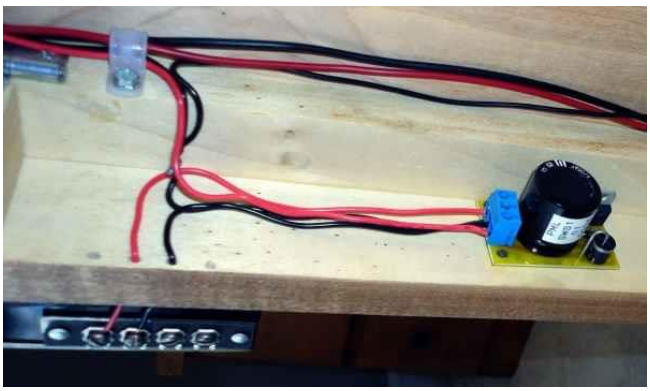
Electrical

Electrical feed to the track is provided by 20 gauge feeders from 12 gauge bus wire, every two feet along the track.

Sectional track joiners were soldered every other joint, staggered side to side, to aid in conductivity, yet be easily removable.

Turnouts are electrically activated by old Atlas push/slide buttons. The kids love to push buttons and these certainly meet that need. The buttons and the corresponding turnout are numbered 1 through 8 to allow operator to determine which button to push/slide. The buttons are mounted on the side of the module in close proximity to the throttle control.

Power for turnouts is provided by an old Bachmann throttle acquired in 1972. The turnouts are actuated by DC power, augmented by a DC storage capacitor designed specifically for this application (designed by Jim Kalenowski, another club member) to provide a powerful DC "zap" to switch the turnout. The capacitor is mounted under the layout module.



An existing Digitrax Zephyr Command Station/Booster was used for DCC power, mounted in a custom box which is mounted to the side of the module. The necessary "wall wart" and wires are bundled and bungied to fit in a minimal bracket on the side of the Zephyr box.

Scenicking

I had no real plan for scenery (a cardinal sin according to many) for the Junior Engineer Layout. I did know:

1. I didn't desire everything to be parallel, and
2. I didn't desire "flatlandia"

So my first scenery effort was to do an angled "T" for the highways. The highways were done with Woodland Scenics Smooth-It using the foam boarder method. The "T" was placed to provide sufficient areas on all sides to allow placement of buildings, etc. I made an early decision not to attempt to do paved cross-overs.

Most of the scenery is fairly ordinary, using available kits, but are nicely constructed.

The elevations have some interest. Most are done by laying plaster cloth over bubble wrap which was included in train products from on-line vendors! The bubble wrap was layered in basic shape and held by blue painters tape.

My favorite scene is the wood-yard operation. There was no attempt to make it "technically" accurate, just an attractive view for the kids and parents. The whole scene started by accident! A large hole had been created by the spilling of Super-glue on the foam surface of the module. Most know that Super-glue is very aggressive in dissolving EPS. After filling the whole with Woodland Scenics Mold-A-Scene plaster, some plaster was left over. My mentor on this project, club member Paul Ohegyi, said "don't waste it". Not knowing what to do with the plaster, I made two "blobs" of the stuff on the layout. By serendipity, these blobs ended up being in exactly the right place to do the "chip" piles of the wood-yard! The chip-effect is accomplished by sprinkling two "wood chipped colored" ballasts on the plaster piles after cutting the necessary groves for the shovel tracks. The bucket shovel is a Railway Express kit. The log loader is GHQ (kit). The truck is Classic Metal Works. The fence located between the wood yard and the neighboring house is also of note. The fence was hand-built by Mr. Ohegyi and is technically the most accurate item on the Junior Engineer Layout.

Wood Yard

Trucking Depot

Freight Depot

Transportation

The JEL is a normal 2' by 4' module and is transported as any other module would be. A carrying handle is attached for convenience. The layout is light enough to carry like a big briefcase.

Carrying Handle

Other Important Items

Some of us dislike the Atlas turnout, partly because of the non-prototypical appearance. In this use though, they actually work well because they allow a train to run through an improperly set turnout without derailing the train. With eight turnouts, they occasionally are set wrong, even with the most observant Senior Engineer. Too many derailments are not a good thing (as we all know), and the Atlas turnouts limit some derailments. We have had minimal derailments using the JEL.

Because the track-work must come close to edges, a stained wooden 1" high guard rail is incorporated to encircle the entire layout. The 1" guard rail is high enough to prevent locomotive-to-floor engagement (not a good thing!), but not high enough to obstruct vision or manipulation (by hand) of rolling stock. The locomotives which are run on the JEL have their max speed set by CV to be approximately 60 MPH. This will not allow children too much speed, should the Senior Engineer become distracted talking with parents. Of course, most children wish to go faster. An explanation they are going "60 mph" and that 60mph was as fast as the locomotive would go (GP7 or RS2-3), quiets the desire to go fast.

Using the Junior Engineer Layout at Train Shows

The Junior Engineer Layout has been used at multiple train shows, has been operated by several hundred children to date, and has been a hit with the kids. A great majority of the children had never operated a train and did very well, even ones as young as five years old. Several times, at other shows where the JEL is not present, parents have asked "Where is the train the kids can operate?" referring to the JEL.

Joe Peacock with Junior Engineers at National Train Day, Durham NC Station

As a way to involve children and their parents, the JEL has been very effective. And fun for all.

Mr. Gerry Foster, who was involved in the original track design, created a "Certificate" to be given to each child who operates the train. The first name of the child is placed in a blank along with the date. The certificate states they have successfully operated the train. The

certificate has North Raleigh Model Railroad Club logo and ID incorporated. The kids and parents love receiving a "Certificate". Simple, low cost, effective way of fun and club promotion.

Children are always supervised by a club member (Senior Engineer) while operating the train. Children are always with their parents while operating on the JEL. The JEL is placed to allow parents to photograph their child "face on" from the opposite side of the layout while operating with the Senior Engineer.

Last updated: April 8, 2020