

Adapting Modular Standards and Concepts for Home Layouts  
January 8, 2019

This is not a 'How-to' about building bench work, but instead a discussion of various methods and concepts which can be used when building a home layout, in place of traditional bench work construction methods.

The first question is: Why consider this?

This presentation is the result of comments by two of our club members at recent meetings. Mike remarked about how as we age working on our layouts becomes more difficult and if a person were to become confined to a wheelchair, for example, it would become even more difficult to enjoy a home layout let along work on it. He wrote an article discussing this in the current (January issue) of the Flimsy.

Additionally, Dick suggested a clinic about bench work for home layouts. I assume he is considering various traditional construction methods.

In the past several months I have been personally involved with the disposal of three home layouts. Just last Saturday, I took possession of 5 boxes of materials and kits. In two cases the owner had passed on and the family wanted to dispose of the layout. In the third case, the owner's wife had passed on and the husband was moving from his house into retirement housing.

I once had a very modest layout, built using typical bench work methods, in my home in California. When I sold the house to move up here, I had to dismantle the layout which, as you may know, is not very kind to the bench work when built using the traditional methods.

For the past eleven years I have been building modules following the Free-mo standard in N scale for my home layout.

So my presentation tonight will suggest various methods and standards you might draw upon when building a home layout. The goal of using these techniques is to build a layout which is simple and relatively easy to move when the need to do so inevitably occurs. A layout built using these methods would also result in one where the height above the floor could be lowered e.g. to accommodate a person in a wheel chair. In your reference handout are links to a video, PDF files, and other information you may find useful. Also is my email address if you have questions later.

Modular standards were developed to allow layouts to be built in pieces, by different individuals, in different locations, and then brought together in one location to be jointed into a layout that can reliably run trains for a short period of time, e.g. a weekend show. Modular layouts may be formed in almost infinite configurations. The configuration can be loops, dog bones, point-to-point, or combinations of these.

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That is different than a sectional layout such as the club's HO scale Kitsap Western. Typically, sectional layouts are joined together in only one or two configurations.

There are several modular standards but the two most widely used are NTRAK and Free-mo. The NMRA website also has a listing of Standards and Recommended Practices for modules.

In the past few years the Model Railroad Hobbyist online magazine has run several articles about what it terms TOMA, 'The One Module Approach', to building a home layout. In fact the publisher, Joe Fugate, is using the concept to build a new layout after moving to a new home. His last layout was built using traditional bench work and thus he has firsthand experience with layout dismantling.

The TOMA concept is very similar to the domino concept described in Model Railroad some years ago.

Here are some of the specific concepts we can take from module standards to use to construct a home layout.

1. Relatively small sections of bench work that can be lifted and moved by one person.
2. These pieces of bench work can be placed on a workbench to facilitate working on.
3. The sections can be placed on their sides or upside down, using a rotisserie, for easy access to the underside. I can provide a PDF for one rotisserie example.
4. Wiring can be fitted with inexpensive connectors that allow the sections to be easily disconnected for moving and also are a tremendous aid when troubleshooting electrical problems such as short or open circuits.
5. The sections can be free-standing on legs and, if desired, attached to the wall with removable fasteners or use of a ledger board and clamping device.
6. The wall fasteners can be removed and the legs shortened or lengthened, thus the height can be modified to meet the needs of a person with limited mobility or to adjust height for children as they grow.
7. Tracks can be connected across section joints using joiner track sections as used in the NTRAK standards or with simple butt joints as used by Free-mo. Both methods work satisfactorily for both single track and multiple tracks if attention to detail is applied during construction.

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8. In the event it becomes desirable to change the track or scenery on a section, it is relatively easy to remove a section for modification. This is also a simple way to swap out sections to relieve boredom.

The two parts of a module or section that benefit from existing module standards are the wiring and endplates i.e. the mating surfaces of the bench work.

I covered wiring, connectors, and associated tools for modules in a presentation given last year. I have a few copies of the handout available tonight or I will email a copy to you.

The most important aspect of the endplate mating surface is that it must be as close to square/vertical as possible so that adjoining sections are not forced into a distorted position. In the module world, joining of module is accomplished using either clamps or nuts & bolts. Sometimes alignment pins or dowels are also used. I have tried all of these methods on my modules and find each has pros and cons. For a home layout I would recommend nuts & bolts.

There are many different methods of constructing the module legs, some are very simple e.g. I use 1 1/8" wooden dowels. Module standards require some amount of vertical adjustment in the legs usually +/- 1 inch. This is to account for uneven floors in setup venues. I use T-nuts in the bottom of the legs with feet made from carriage bolts to make the adjustments. Additionally, some legs are made to have a longer adjustment range to allow setup with modules built to different standards. Module height for NTRAK is 40 inches while it is 50 inches for Free-mo. Free-mo N scale modules can be joined with oNeTRAK modules when the module heights are matched.

The two important things about legs are that they must support the weight and be stable. You can search the internet to find a variety of leg construction methods.

*Building A Sectional Layout* (Pelle [pay-L sew-borg] Søbørg, Kalmbach books) is not quite what the title implies. It only touches on the bench work over 4 pages, but gives a very good description about how he built this layout. He supported his bench work sections with brackets attached to the walls (photo on page 23). This support method provides for good access to the layout underside and easily access storage under the layout.

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Pros and Cons of a sectional layout:

Pros:

- Easy to dismantle for moving or disposal.
- Ability to work on sections at the workbench or on a rotisserie.
- Wiring is easy to disconnect between sections for troubleshooting or moving.
- Height can be changed relatively easily.
- You can use one or more NTRAK or Free-mo modules in your home layout and take them to shows to participate with a module group.

Cons:

- Unless attached to the wall, the bench work may not be as stable as traditional construction.
- Mountain scenery and elevation changes might be a challenge depending upon your track plan due to weight and section size. These make handling more difficult.
- Joints between sections will be obvious unless some sort of technique to hide them is used. Removable scenery, buildings, and roads are different ways to achieve this.

In summary:

- There are good reasons to consider the use of module concepts in building a home layout that will eventually make moving or disassembly much easier. Changes to the layout can be made that make it easier to enjoy the hobby as a person ages or becomes affected with limited physical abilities.
- Sections can be removed to a workbench for repairs or alterations. Wiring installed using module techniques can ease electrical troubleshooting.
- Modules built to an established standard can be used as part of a home layout and taken to a module group show thus providing further enjoyment of the hobby.
- Standards documentation files are readily available on the internet and free to download. The resources handout will point you to several internet sites of interest.

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Resources:

Compiled by Bert Cripe, email: [bert@wavecable.com](mailto:bert@wavecable.com)

Bremerton Northern Model Railroad Club: <http://www.bnmrr.org>

NTRAK manual: <http://www.ntrak.org/documents/Manual.pdf>

NTRAK Data Sheet #4.3, Box Beam Module Frame Construction:

[http://www.ntrak.org/documents/NTK\\_DS4.3-BoxBeam.pdf](http://www.ntrak.org/documents/NTK_DS4.3-BoxBeam.pdf)

Free-mo: <http://www.free-mo.org/>

NMRA: <https://www.nmra.org/index-nmra-standards-and-recommended-practices>

NMRA handout: [https://www.nmra.org/sites/default/files/sr201808\\_benchwork.pdf](https://www.nmra.org/sites/default/files/sr201808_benchwork.pdf)

TOMA index: <http://mrhpub.com/2017-08-aug/online/?page=22>

YouTube modular bench work info video:

[https://www.youtube.com/watch?v=IsFJD\\_Mv-PY&index=54&list=PLBfdQkX57PXzvHde6X95ItThXjvpwiv\\_B](https://www.youtube.com/watch?v=IsFJD_Mv-PY&index=54&list=PLBfdQkX57PXzvHde6X95ItThXjvpwiv_B)

Segment begins at time = ~10:27

A variety of Model Railroad Hobbyist videos of interest:

<https://www.youtube.com/channel/UCSqUkqVT9Vh-4Sy5wRtZqwg>

Northern Virginia NTRAK How-to files, look under module construction:

<http://www.nvntrak.org/how-to>

*NTRAK Module Frame*, July 13, 2015, by Jim Davis

North Raleigh Model RR Club: Lightweight NTRAK Module Construction:

[https://nrmrc.org/sites/default/files/publications//lightweight\\_ntrak\\_module\\_construction.pdf](https://nrmrc.org/sites/default/files/publications//lightweight_ntrak_module_construction.pdf)

This club's website is a good source of practical and proven information about DCC use.

Wiring, Connectors, and Tools handout, contact Bert for a PDF file at email address above.