History of the Module Design for Modules used
by the Saginaw River Valley Model Railroad Club
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This history was prepared in order to provide some insight into the module design and the thought process that went into the specifications for the SRV modules. Hopefully this history will answer many of the questions about the module design that we get from both new club members and the public. Also, for those new members or anyone using these specifications to form a new modular model railroad club this history might help explain how and why the SRV modules appear as they do today.

Formation of the SRV

Between the years 1975 and 1977 there were several attempts by Carl Goodman to get a new model railroad club formed in the Saginaw area. But there were never more than four or five people at these meetings. Then in 1977 just as Carl was about give up on the idea, thirteen people showed up for the meeting. (Some years later Carl told me that if no more than four or five people showed up at this meeting that he was giving up the idea of forming a RR club and that this meeting back in 1977 was going to be his last attempt.) We decided at that meeting that with this many people there was enough interest and that the formation of a new club was a workable idea.

Now that we had enough members to form a workable club we began meeting once a month. Within a couple of months of this first meeting the discussion turned to what type of RR club we were going to be. The round-robin style where each month the club members meet at a different members house to work on his railroad didn't seem to work out because most of us didn't have room for a home layout. The permanent layout with a club house and all the expense associated with it wasn't going to work. We didn't have enough members to support a club house and the financial burden on those thirteen members would have been too much. It was Ron Thompson that suggested a modular railroad.

I had some reservations about a modular RR club. It seemed like we would have the same problems about where we would find enough places set the railroad up to operate it with out incurring the cost of renting a building. Remember, this is a new club, there were no dues or bank account with money that we could work from. There was an even bigger problem, at that time there were no national standards for HO modules from the NMRA that we could use. The N-Scale modelers had developed a standardized modular system for many years by 1977. But modular HO scale railroads were kind of a new idea and each club was faced with either designing its own modules or using someone else's design and adapting for their use. A couple members had heard about other modular railroads in the area but didn't know any one that belonged to these clubs or how to contact them. One member took on the challenge finding some kind specifications that we could use. We figured that we could save a lot of unnecessary work trying to design modules from scratch. Also, we wanted to base our design on existing designs so that if we ever went a national convention that our modules could be joined with other modules wit a minimum of effort. This way the entire railroad wouldn't have go to the convention.

An individual could have their module included with other modules to form one large railroad (the way the N-scale modules do with their modules.)

In The Beginning

There was the word, and that word was HOTrack. Actually HOTrack was more of a proposal and not gospel. There were no national HO module standards to work from when we started this project. (Note: most people I know pronounce HOTrack as Hot Track, two words.)

At the next meeting someone showed up with a set of specifications and drawings that he had obtained after reading an article in one of the model railroad magazines. He had made copies for everyone and handed each member one. The top of the first page has the name E. A. Bishop, Dec. 8, 1976. The rest of the pages are simply marked HOTrack Proposed Specifications. The last page has a hand written note with the name of a person from Rockford Il. that was spearheading the HO track module concept. Since the HOTrack specifications were being proposed as a national standards for HO scale modules this seemed like as good as any place to start. Our thinking here was that when the NMRA finalized the national standards for HO scale modules that they would base their design the most common features used by existing clubs This would more likely make our modules compatible with other clubs modules from around the country. Other clubs could modify there modules to match our standards, and a national standard, not the other way around. The N-Scale modelers have had a national standard for years, why can't we do this in HO scale too?

With the decision to become a modular club and a set of proposed specifications in hand we set about the task of assembling the specifications and design for our own modules. Using the HOTrack specifications as a starting point we began debating the good and bad points of each of the HOTrack's design features. Always keeping in mind that any changes we made would not prevent the joining of our modules with modules built to the NMRA standards. Because we couldn't know what the final NMRA standards would actually be like, most of what we did do was more like pure speculation and guess work on our part. This whole processes took longer than any of us would have guessed. We spent two years of incredibly boring meetings and discussions on our design before we ever cut a board to begin building modules. I think there are two main reasons it took so long; 1. We were breaking new ground here, there wasn't very much information that we could draw on for ideas to help us over the rough spots. 2. Our own lack of experience. Although all thirteen of us were interested in model railroading, none of us had actually built a model railroad before. None of us knew what we were letting ourselves in for. Although the design for the modules were discussed by the entire membership, other sub committees (usually a sub committee of one) were busy with other projects relating to the club. One person took on the writing of the constitution and by-laws, another took on design for the paint scheme, lettering style and logo(s), we didn't what to use the HOTrack corners, so someone else took on the task designing new ones (I will discuss the corners in depth further on.) There were other people working other projects.

I hesitate to say that we ended up with a final design from all this discussion. It might be more accurate to say that what we ended up with was a good working beginning design. The design specifications have been changed somewhat over the years and I will deal with these changes later in this document.

The First Setup

With the specifications complete (at least the first draft was done and complete enough that we start building) it didn't take long for enough modules to be built that we had a good start on a modular railroad. The modules included the four corners of our own design. It should be noted here that that all the straight modules were 30 inches by 60 inches, our specifications didn't include any other size at that time. The annual hobby show at a local mall was coming up and we wanted to take part this year (I don't remember if this was 1980 or 1981.) This show was usually only radio control boats and airplanes. This time there would also be a model railroad. It was agreed among the members that it would be a good idea for us to put the railroad together first to make sure that we could actually run trains on it. We didn't want discover while we were setting up (or shortly after we had set up) at the mall that we had overlooked something that could take days or months to correct and nothing was going to work.

One member volunteered the use of his basement and on the Saturday before the hobby show all the modules were assembled there for the first time. We were about to find out if two years of boring discussions resulted in a working railroad. Two of the modules had minor wiring problems that were all corrected within about 30 minutes. We had more trouble with the track work, more time was spent fitting the dropins than anything else. Eventually the layout was finished and we could run trains. From this first running of the railroad we discovered two things; 1. The design worked. 2. How many people couldn't read a ruler.

On Thursday night the layout was taken down , moved to the mall and at 9:00 P.M. the process of reassembling the layout began. I got off work about midnight arrived at the mall about 12:20 P.M. expecting that there would still be much work left to do, but when I got there the layout was completed and two trains were running. The railroad run the whole weekend with very few problems. Not bad considering that we had never done this before and only the main line track was nailed down. Most of the track in Ron Thompson's yard was held down with masking tape folded over into a loop and the track pushed down on top. Also there wasn't a bit of scenery anywhere on the layout. The entire layout was painted in a dark green color. The mall required that all tables and displays have some type of skirting. We solved this problem by stapling 36 inch wide paper table cloth to the front of the modules.

Some months later a member from a modular club in Midland came to one of our regular meetings. He had seen us at the mall and was impressed with the way our layout worked. Not only could we pull very long trains, he watched as one member pushed five passenger cars with taglo couplers around the layout at a very high speed for twenty five minutes without a single derailment. He told us that the Midland club couldn't hardly pull fifteen cars three laps without having a problem. (We would discover later that track

problems were a common complaint voiced by other modular clubs in the area.) He was wondering what we had discovered that all the other clubs had overlooked. Most of the club members believed that our success where others had failed was due to our use of dropins. Personally, I felt that if we had succeeded where others have failed justified the time we spent on the specifications. I am going to deal in depth with these dropins in later on.

For years I believed that our layout was more of a technical achievement than an artistic one. It seemed like it took years for the scenery to be put down. Indeed, for the first few years there were more modules without scenery than with scenery. It started with one module, then two, then three, a very slow process. Whenever we were out in the public those first few years it was basically green paint with white table cloth. Some of our early modules had collected a couple of hundred staples in the front board from attaching all that white paper table cloth. The problem of no scenery was so bad that some other RR clubs began calling us the "Plywood Pacific." This didn't bother me, our layout worked, that's more than some others could say. It took many years work for our artistic achievement to match, and in most cases pass, what we had accomplished on a technical level.

After several years of work on the layout someone brought in some pictures of the layout that were taken during those first couple of years. People from other clubs and even our own club members that look at these usually have comment something along these lines: "I don't believe that you had the guts to actually take that out where the public could see it.", or, "I don't believe that we took this out to the mall with almost no scenery all those years." Well, like I said earlier, we were breaking new ground here. For most of us our technical skills were better than our artistic skills and we had to learn how to do scenery. For the publics part, there were very few comment about the lack of scenery, especially if they see trains running. However, they will make some comments if you can't seem to get a train around the layout.

The green paint and white table cloth lasted until about 1984 or 1985. The north central region of the NMRA was bringing railroad convention to this area and we wanted to take part in it. The green paint and paper table cloth was going to have to go, we felt that it wasn't suitable for even a regional convention and a replacement needed to be found. Also any module that was to be included in the convention layout must have scenery on it. This would be the first time that every module in the layout would have scenery on it. The color was changed to brown and the membership decided to use 36 inch wide burlap of a similar brown for the curtains. Specifications were drawn up for the curtains and added to the rest of the module specs. The club had some money to work with now and purchased a gallon of brown paint and three hundred linear feet of burlap and Velcro to attach the burlap to the modules. The paint was passed around to the different club members so they could repaint their modules. The burlap was purchased by each member from the club supply according to the amount that they needed to cover all their modules. Dies for cloth products can vary somewhat from batch to batch, using burlap from a single source insures consistency of color. The brown color and burlap is still in use today.

What we used from the HOTrack
And what we did not use

When I retrieved my copy of the HOTrack specs to write this history I was surprised at just how little we actually used. Maybe here's another reason it took us so long to complete our own specifications. Remember too that the HOTrack specs are a proposal for HO modules, not standards. We didn't want to built something that would be totally incompatible with any final national standard. I will start with what we did use, the list is much shorter.

Module Dimensions

Lets start with what is probably the most obvious and asked about feature of the layout, the size of the modules. The size comes directly from the HOTrack specs. HOTrack specified modules to be 30 inches, 60 inches, of 90 inches long. All modules were 30 inches wide. Using 30 inches as a measuring unit, the modules measure as; one unit by one unit, one unit by two units, and one unit by three units. We still use the 30" by 60" module as the basic module and the original SRV specs didn't even include 30" or 90" modules.

It didn't take us long to figure out that a 60" module got used up pretty fast. Almost everybody that had one could use more room. They didn't need much more room, just about 30 inches more. Most of these people didn't want to build another five foot module. Sometime during the third or fourth year as a club the SRV specs were modified to include both 30" and 90" modules. It was about this same time that the maximum width for the modules was increased from 30" to 36". Now the maximum size for a module was 36" by 90". During the early years the layout was made entirely of five foot modules. These are almost all gone now, being replaced with 90" modules.

The final NMRA specs for HO modules uses even numbers for length and width. A basic module is two feet by four feet, or two feet by six feet. There is less waste from a 4 by 8 sheet of plywood. But these specs also have only two tracks. But the HOTrack specs call for three tracks and I think the extra width was to accommodate that third track. For every track on the module you lose a three inch wide strip of real estate. A 24 inch wide module with three tracks wouldn't have much area left for scenery or an industry that needs to be switched. Over the years I have talked to many people about the module dimensions. I don't ever recall talking to one person that didn't like the extra width, and their reason are almost always the same: you can do more with it. One of our members job was transferred to Lansing. When he moved he took our specs with him and used them as a starting point to from a new modular club in the Lansing area. They changed the length dimension to even numbers (4 and 6 feet) to more closely match the NMRA spec, but they kept the 30 inch width and the third track.

Height From the Floor

The second thing we kept was the height from the floor to the top of the module, 40

inches with at least 2 inches of adjustment so that the module top could be adjusted from 39 inches to 41 inches from the floor. (Note: I think that the HOTrack specified 40 inches to the top of the track. We thought that the top of the module was a much better reference point to measure from. The HOTrack also specifies 1 inch of adjustment. We felt that this wasn't nearly enough and history has proven us right. Extending this dimension was a matter of making hole deeper and putting in a longer bolt.)

The Top of the Module

The third thing we kept was construction of the top of the module. The HOTrack specs didn't say that the top had to be completely covered. It was only necessary to install wood under the areas were the track would be laid. (In the SRV specs this is called the sub-roadbed, it is the surface that the cork and track are laid on) We kept this feature but added 2 inches to the minimum width. The extra width provided an extra inch on each side of the track(s) to provide more room to attach the scenery to. This is not a cost saving measure but a weight saving device. Our original control panel for the SRV was a five foot module constructed using this method. This method of putting wood only where the track will be laid allows the scenery to be both above and below the level of the track without the need to cut holes in the plywood top. The HOTrack specs don't have any written specs for the thickness that should be used for the top. There is one reference on a drawing stating the that the sub-roadbed is made from 5/8" thick particle board. We specified 3/8 plywood for the SRV and this has served us well over the years. It has a good combination of strength and light weight. But the 3/8 dimension should be considered to be a minimum thickness. I purchased a module from another member that had a top made from ¼ inch thick plywood and even with 5 cross braces the top looked like a washboard. The trains hopped like a bunny when they crossed this module and you couldn't run any car over 60 feet across it without problems. There was no way to fix this problem and I ended up destroying the module. One quarter inch plywood is not a good choice for this application. Another member built his 5 foot module using a solid top made from 5/8" particle board. The top stayed flat alright, but all that glue added about 5 extra pounds to the module, and it made the top so dense that you couldn't hardly drive a nail into it. For every one nail that we drove in, we bent four of five. But, the top is still flat we are still using this module today.

Almost every module the SRV uses today has a solid 3/8 inch plywood top. It is more flexible when laying track. Any changes to the track plan is simply a mater of moving the track to the new location and nailing it down. The solid top also makes the module stronger and helps keep it square. In the few locations where the scenery extends below the top we just cut out the plywood in that area.

Track Placement

The fourth thing we kept were the three tracks The HOTrack placed all three tracks on 2" centers along the front of the module. This is the way the N-Scale modules are and at the time it seemed reasonable to us (and probably to the HOTrack designers) that HO modules would have this same setup. The original SRV specs included this feature and this is the way it appeared at that very first show. This was the one and only time that the SRV was shown this way. At the next meeting after that first show it was pointed out

that having all three tracks together gave the appearance that the railroad was running on a three track mainline. No real railroad had three track mainline over their entire system, in fact, most railroads don't have two track main. To remove the three track main appearance it was suggested that we move the third track to the back of the module. (This track is referred to as the Branch line in both the HOTrack and SRV specs.) The distance for the branch line was set at 26 inches on center from the front of the module. This distance provides about 4" from the track center to the back edge of the module, the same distance that the outside main is from the front of the module.

When designing the SRV specs we felt that the 4 inches between the track center and the edge of the modules specified in the HOTrack design would be enough distance to keep the cars and engines from falling off the layout when there was a wreck and this was included in the SRV specs (notice I said "when", not "if" there was a wreck.). We were only partially correct with this dimension. Although most of the rolling stock stays on the layout when there when where is a wreck, we do end up picking cars up off the floor now and then. Even the five inches specified in the NMRA specs won't keep all the rolling stock on the layout if you smash your trains together hard enough.

What we Did not keep From the HOTrack.

Frame Dimensions for the Wood

The HOTrack specified 1" by 4" (finished dimension ¾" by 3 ½ ".) For the SRV we specified 1" by 6" (finished dimension ¾" by 5 ½".) This wasn't done for strength but to better hide switch machines or anything else that night be installed under the module. Our thinking was that no mater how carefully you plan your track work and nodule design, it seem like there is always one switch machine that needs to be mounted vertically. This leaves them extending out from the bottom of the module exposed to potential damage. An unattended module left standing on edge could fall damaging anything sticking out below the frame. We would be moving the layout through doors, a sudden gust of wind could cause a door to slam into a module acting like a big scraper breaking off any exposed items. Even carefully setting the module down on anything sticking out the bottom exposes those parts to potential damage. Even storing the modules in a trailer left these parts exposed to potential damage. Our biggest fear was that this damage would occur when we were setting up at a show somewhere. This could leave a large part of the module, or the entire module unusable during the show. This would be no time to have that kind of damage because repairing it would be difficult at best. If we didn't have a module to replace it with it could mean setup time lost rearranging the layout. If the damage occurred in a yard, the entire yard could be unusable.

A member from a modular club in Lapeer that used our specs to build their modules asked me why we used 1 by 6 instead of 1 by 4. He said that he didn't think we did it for strength. I explained to him our concerns about possible damage I set out above. Here again, history has proven our choice of lumber to be the right one. I can't ever remember a single time when there was damage to anything mounted under a module. During our

discussions about lumber dimensions some members voiced concerns about the extra cost of using 1 by 6. But when I pointed out the difference in cost would be about $2.00 more per module their concerns were dropped. Members of other modular clubs have told me that many of their modules (made from 1 by 4 lumber) needed rebuilding after just a few years of use. Many of our modules have been in use more than twenty five years without any need to repair the module. In the last few years many of our modules have had holes cut in the outer frame so we can mount connections for DCC. We can do this without any concerns about weakening the frame work of the module. I think that our durability and flexibility has more than justified the extra cost of using 1 by 6 lumber.

Legs for the Modules

While we are on the subject of lumber, I will discuss a related topic, the legs. The HOTrack specs recommended the use of 2 by 2 lumber for the legs. A bolt was inserted into the bottom for the height adjuster. These legs were attached to the frame and braced in all four directions with X braces. We thought this method flimsy at best and time consuming to set up. We figured that while you were buying lumber for the frame, you could buy two extra pieces for the legs. This way you didn't need to buy one size lumber for the frame, and another size for the legs. One size lumber could be used for the module and the legs. These would be cut to the required length, cut in half lengthwise, and the pieces used to form an L- girder. The top of each leg had two holes for ¼ " carriage bolts and a block of wood at the bottom for an adjuster bolt. The legs were attached to the frame using carriage bolts and wing nuts. This is where having a 1 by 6 frame really paid off. The frame allowed the holes for the bolts to be placed further apart making the whole assembly more rigid when standing up. This was much more ridged than 2 by 2, although still time consuming. It could take 8 or 9 people an hour just to install legs on the modules.

The design for the legs was never part of the SRV specifications. We had a general design recommendation, but basically each member was left to his own innovation to work out the final details. We knew that there was room for improvement in our design for the legs and figured that we could select the best design from what the various members had worked up and include that design in the specs. The basic design served the SRV for many years in spite of the fact that many of the bolt holes became slightly enlarged, and we spent considerable time looking for lost washers and wing nuts (although these enlarged holes made the legs easier to install.) By including the design for the legs in the specs might have given the impression to anyone building a module that this design was the only acceptable method and thereby discourage innovation and the search for a better leg design. In the late 1980's Ron Picardi worked up a design using 3 inch diameter schedule 40 PVC pipe. After using some modules with PVC legs the saving in setup time for these modules was obvious. The time saved putting up the entire layout could be considerable. It didn't take long for us to realize that the PVC legs were a considerable improvement over the old design and within four years all the modules were converted to PVC.

Although better than the original design, there are some special considerations when using PVC legs. The legs are not bolted to the frame, the potential for breaking the

legs off at the bolts is a real concern. They need to be fit into a pocket attached to the module. The leg pockets need to have a hole in both the top and bottom so that the pipe can slip through and is supported at two places. This prevents the bottom of the pipe from moving in a large circle and becoming a lever that could break the leg off in the pocket. Making these holes is easy. Three inch schedule 40 PVC has an outside diameter of 3 ½ inches. A hole drill of this size is available at most well equipped hardware stores. These drills provide snug slip fit for the pipe. The holes for the legs should be drilled in the end pieces before installing them on the pocket frame. It is possible to get these holes slightly off center and this offset should be lined up when they are installed on the pocket frame. This insures that the legs will be straight and not have an odd angle when installed on the module. Building the pockets is a one time event , setting up the layout is a many time event. A little extra care when building the pockets can save time when setting up. When installing the pockets on the module they are simply screwed through the side and end frame, or through the side and a cross brace.

The next two considerations are sort of related, installing the legs and keeping them in place. When installing the legs into the pockets care must be taken to insure that the leg passes through both the top and bottom holes. As I mentioned above making sure that the holes are lined up will make this process easier. Then once they are installed, keeping the legs in place so that module can be stood up, this turned out to be the tricky part. As more and more modules became equipped with PVC, more and more legs fell out when standing the modules up. One member used a flat head wood screw and inserted it in the narrow gap between the pipe and the wood pocket. This worked really well and all that is required are some wood screws and a screw driver (Phillip head works best for this.) The legs on other modules are held in place with thumb screws. The thumb screws pass through a tee nut inside the pocket and have self locking nuts installed on the end. This prevents the thumb screws from backing out and getting lost. The thumb screws were also the prime cause of legs falling out. It seemed like no mater how careful we were tightening the screws, legs still fell out. We solved the problem by using a table saw to cut a flat area in the PVC where the thumb screw would contact the pipe. The thicker wall on the schedule 40 pipe allowed us to do this without weakening the pipe.

The last consideration had to do with the height adjusters used. Because of the outside diameter of the pipe some of the adjusting screws could be extremely difficult to reach when they were turned almost all the way in. We solved this problem by cutting a little off the top of the leg and installed a longer adjusting screw on the bottom. Like the wooden L-girder legs there is no written specification suggesting how the adjusters should be installed in the bottom of the legs. And just like the wooden legs, each member is left to their own innovation to design their own method of installing adjusters. We can always take the best design and include it in the specs.

The PVC legs have worked out well over the years. They reduced the time needed to install legs by about half. In spite of the number of times that we have had legs fall out of a module, or simply dropped one of them, we have not had a single broken leg. Here the extra money spent on schedule 40 PVC instead of schedule 30 might be part of the reason. I am reluctant to say that we have found the perfect final design for the legs. I am

equally reluctant to include the PVC legs into the specs for the same reason we didn't include the design for the wooden legs. I don't want to reduce any incentive to look for a better way. Who knows what someone might come up with in the future?

The Design for the Corners

The HOTrack specs did include a design for the corners. These were fairly large diamond shaped modules built in two pieces in order to make them easy to handle. The problem we had was that when working with that many angles it would be difficult to insure that the final product was square. With four corners out of square the layout would never fit together. The longer the layout, the more pronounced the problem would be. One of our members that had access to a computer that could produce fairly complicated drawings took on the task of the new corner design. He told me that he plugged in some design specs like the 30 inch minimum radius for the main line, distance from the edge to the first track, and the 4 ½ in set back for the track and a couple of other things and he let the computer decide how big the module needed to be. The computer said the module needed to be 44 ½ inches square. So we built them 44 ½ inches square. The original design was also a diamond shape but the much smaller size meant that they could be built in one piece. And keeping them square would be less of a problem. The problem with the diamond shape was that there was no way to put the legs on and still be stable. There was always some corner sticking out and any pressure could cause the module to tip over. At that time all four corners were owned by individual club members. Another member and I were building corners and we thought we could improve on the original diamond design. What we designed was basically a square with the inside corner cut off. These were stronger and were easier to build and keep square, and the way the legs were put on made them much more stable when set up. Remember too that all this design work was being done with the idea that all three tracks would be running along the outside of the module. When we moved the branch line to the inside of the module that created a whole new set of problems.

When we moved the branch line to the inside we could still use the original corner design. But, this also meant that the radius for the branch line was going to be 22 inches. This was only achieved by extending the radius on to the dropins. For the dropins we used readily available 22 inch radius snap track. All this worked fine until we started adding scenery to the modules. That's when those curved dropins started interfering with the scenery and became difficult to fit. Like always we struggled along with this making adjustments when necessary. Some of these adjustments involved removing some of that scenery, mostly it meant modifying the dropins. Some of the members objected when you started to remove too much scenery. Although there were few derailments, that 22 inch radius limited how many cars could be pulled on the branch line. Some years later the designer of the corners confessed that when he saw that 44 inch dimension he should have made the corners 48 inches and let it go at that. Those extra 3 ½ inches would have made putting those curved dropins in place much easier.

In the middle 1980's the club split in two. Two of the four corners went to the other club with the people that owned them. The search was on for replacement corners.

Having dealt with the problems of the original corners for years we figured that if we were going to build new corners maybe we should have a new design. Two of the member said they would research the design options and come back with a recommendation. It took about two months for them to come back with a new design. This was a boomerang shaped module that had an outside dimension of six feet each way. Like the diamond shaped module from HOTrack this module was made in two pieces to make handling easier. Also, like the HOTrack design all those angles could (and did) make the module difficult to make square. We decided to go ahead with this design and build two new corners. This time the club would own the corners. The same people that found the design also volunteered to build the new corners. The two main lines had a radius of about 54 and 56 inches. The branch line had a radius of about 36 inches. All the tracks were connected using standard 9 inch snap track. No more curved dropins, no more modifying scenery with a hammer and screwdriver. Now we had two old and two new corners. We ran the layout by placing the new corners on opposite ends and opposite sides from each other. The same was done with the old corners. It didn't take us long to figure out that the new design was superior to the old design.

The other owner of one of the corners was leaving the club which would leave us with one corner. We were either had to find a new volunteer to build a replacement corner using the old design, or build two new corners using the new design. I proposed to the club the discontinuation of all the old corner modules and the building of two new larger corners that the club would also own. Approval was given to build two of the larger corners. There wasn't any other choice, since we would soon only have one of the old corners left. I volunteered to build the two new corners. Personally, I never did like the old corners and was glad to be rid of it. I never saw any of the plans that the first two modules were built from, so, left to my own innovation I created my own design. I knew what the dimensions were and went from there. My design was a rounded one piece module using some building techniques that I had never tried before. That's how we ended up with two different designs for the corners.

Part of the layout was set up in an empty store at a local mall. We had been using all of the new corners for a couple of years now. There were only two of us at the layout and we both noticed that there were gaps between the ends of some of the modules. The gaps weren't causing any derailments but they do create excess strain in the modules. These gaps weren't anything new and could usually be closed by shifting one side of the layout slightly. Nothing we tried worked and the gaps remained. Finally we separated the two boomerang corners from the rest of the modules. We stretched a string across the ends of the modules and discovered that the two end modules were out of square a total of ¾ inch. This caused the layout to be formed into a large "V" shape. We haven't had to separate the modules for years but fortunately they still could be. That night I cut wedges 30 inches long and tapered from 0 to 3/8 inch. I cut enough to completely fill the separation space on each of the corners. I took the modules apart and installed the wedges. I place the wedges at the separation point in order to prevent damage to the thinnest parts of the wood. In here there would no possible way to damage or lose the wedges. Also at this location it wasn't possible for part of the wedge to stick out and tear clothing. With the wedges installed we checked the ends again with the string, this time it

was almost perfect. The corners were reattached to the layout and the gaps could be closed up with very little effort. Those wedges are still in place today. We haven't had the need to separate the modules for years and have attached wood over the separation point on the outside and inside of the module. This reinforces the entire module.

Connecting the Modules Electrically

The original HOTrack specs called for a single 6 pin connecter (one male, one female) intended for connection the modules together electrically. More than one of those boring meetings was spent discussing the pros and cons of this proposed method. Our greatest concern was the availability the these plugs five years into the future. At the time we were designing these specs many of the plugs that many of us were familiar with were already becoming obsolete and getting harder and harder to find. Production of some styles of plugs had already been discontinued. We could try to find a plug that we could buy in large quantities and keep a supply on hand. But there was no way to predict how many we would need in the future and they could still go out of production leaving us with same problem. We would still end up looking for a new type of plug some time in the future, except now we would be we would have a lot more modules that needed to be modified and the specs rewritten to specify the new style plug. History has proved us right again. Within six years of completing the first set of specifications all of the alternative plugs we had considered were out of production.

We ended up using the one thing that had been around for years and probably would be around for the foreseeable future, alligator clips. Although there are several styles of alligator clips, almost all styles could be connected together. At the time, and for many years after, Radio Shack offered a pack of twelve alligator clips. The pack contained six with red covers and six with black covers, exactly what we needed. Because alligator clips are spring loaded we didn't have to worry about lose connections. In fact they worked so well enough that we could power 180 feet of modules with little line loss. The springs in the alligator clips insured that there was always a tight connection. The biggest problem was working with all those red and black covers under the layout, sometimes with poor lighting. It seemed like no mater how careful we were when connecting the layout, there were crossed wires somewhere. We could set up an entire layout consisting of 180 feet of module in about three hours, then spend another hour looking for a pair of crossed wires. I can recall only a few times when we didn't spend at least 30 minutes trouble shooting the electrical system.

Around 2007 we began experimenting with the flat four pin trailer plugs. These plugs are used by the thousands on boat trailers, snowmobile trailers, and hundreds of different types of small trailers not requiring breaks. They are sold by any place that sells trailer accessories and at a reasonable cost. They have been around for many years and we don't see any reason for production to stop now. I had some reservations about using these plugs, but they have worked out well. They reduce setup time and trouble shooting is much easier. These plugs can be purchased in male/female sets with 12 inch wire leads. Each module requires two sets of plugs. They are attached to the modules using screw type terminal strips. Ron Picardi who initiated the use of these plugs also drew up the wiring specs for installing them on the modules and these will be included in new

versions of the specifications.

Backdrops

Backdrops were a integral part of the HOTrack module proposal. These backdrops were extended part way along the ends of the module. Sometimes these backdrops are also called scenic dividers. Many of the HO module club formed in the early 1980's included this feature. Their purpose is to focus your attention on one scene. Also when photographing a module these help eliminate unwanted scenery from the photograph. I don't remember why we did not require that these be part of every module. They were included in the specs as an option and left it to the module owner as to whether he wanted to include a backdrop. We may have been waiting to see if there would be some kind national standard for backdrops. We then could include that design into our specs. We had a backdrop that could be installed on our original 5 foot power module. This could be connected to another 7 ½ foot module that had a lumber camp on it and it also included a backdrop. There was only one other five foot module that contained a backdrop. These backdrops served their intended purpose. For the most part we found them to be a nuisance and in the way. The reason for this has to with the way the three tracks are arraigned. When we moved the branch line to the inside of the module, this made it really convenient to switch the industries that were almost all located on the branch line. Because most of the turnouts were (and still are) operated by hand this allowed easy access to the ground throws. It was also easier to handle any derailments or other problems that arise while switching. Trying to reach over the backdrop every time to move a handle on a ground throw was really troublesome. Especially where the turnout was located near the back of the module. Because you can't see through the backdrop, even trying to handle a simple derailment was a chore. All these things in our design combine to make the backdrops a considerable inconvenience. Any club considering the use of backdrops should keep in mind that they seem to work out best when: 1. The layout can be operated from both the inside and outside, and/or 2. All the turnouts have switch machines connected to them. This will eliminate the need to reach over the backdrop to throw a turnout. 3. One side of the layout is never placed up against a wall. There might not be any place to plug in a throttle making the whole side unusable. And handling any problems would be difficult at best.

Most modular railroads that include backdrops as part of their design also have provisions for operating from both the inside and out side of the layout. The backdrops also mean that even when someone is standing on the corner of the layout, you can only see two sides of the layout. Any problems where that develop where they can't be seen must be commutated to the operator by someone else. We could also operate our layout from the outside, making provisions to do this wouldn't be a big chore. But, because almost all of our industry is switched from the branch line, there is no advantage to working from the outside. The other problem is that many of our setups have one side of the layout up against a wall and those modules couldn't be operated from the outside anyway. Although backdrops are still an option included in the SRV specs, we haven't used a module with a backdrop in years. I don't think anyone misses them.

Track Work

I dealt with the track center line placement earlier. Here I will deal with the dropins that we use to connect the track between the modules (I said I would get back to this topic earlier.) I think that this was both one of our best ideas and one of our biggest source of problems. The HOTrack proposal specified that the track would extend to the ends of the modules. I have seem many modular railroads that do this. Many of these railroads have fixed track plans and are set up the same way every time. The SRV layout is usually different each time. The problem that we had with this is that it would be too easy for this track to get caught on something and become damaged. We would be moving the layout during cold weather and those heavy coats could snag a track and tear it lose from the roadbed. Or. Someone walking between the modules could catch the track on a piece of clothing and tear the track up. Our solution to this problem was taken right from the N-Scale modules. They use a standard 6 inch piece of track to bridge the modules. We felt that if this worked in N-Scale why wouldn't it work in HO scale? We decided that a standard 9 inch piece of snap track would be the answer to this problem. I should clarify that these dropins were required only on the three main lines. What each module owner did for yard or industrial track was strictly up to the owner. Our reasoning for this was simple enough. If one yard track was damaged, only that track couldn't be used. If one industrial track got damaged, only that part of the industry couldn't be used. If a main line track got damaged, the entire main line would be unusable, until the track was fixed. The last thing we wanted was the need to fix track at a setup. There is already enough to do without the added problem of fixing track. Yard and industrial track didn't need to be fixed right away, the main lines needed to run. Here again history has proven our decision to use dropins to be the right one. In all the years that we have been setting up modules, we have never had to repair main line track because it got caught on something an was torn up. Any damage to main line track was usually caused by something else and usually minor.

The SRV specs stated that the track and roadbed would end 4 ½ inches from the end of the module. The 9 inch snap track would be attached to some type of roadbed and this assembly would placed as a unit. Most of the roadbed pieces were made either from ¼ inch plywood, or true scale roadbed made from basswood. All these wood pieces had a section of the bottom about 6 inches long and about 1/16 deep removed in order to prevent rocking and having the ends stick up resulting in a jump in the track Remember what I said about how many people couldn't read a ruler, or maybe they just thought that close was good enough. The old adage that "close only counts in horseshoes" should be remembered when it comes to measuring track. This is another place where a little extra time spent here will save a lot more time when setting up. The first time the railroad was set up in that basement about two hours was spent with a Dremel equipped with a cutoff wheel making adjustments to the track length. At every setup for the first four or five years Dremel tools could be heard in three or four locations as adjustments were being made to track length. While we are on the subject of dimensions, there is one place where the 9 inch dropins really pay off. That is where there is horizontal misalignment of the track centers. To give an example: one module has a 4 inch centerline distance, the module next to it has a 3 7/8 centerline distance. When the 9 inch dropin is in place the misalignment isn't noticeable. This offset doesn't affect the running of trains and isn't noticeable as the trains pass over this offset. This lets us get away with a little careless

measuring. It would be possible to use 3 inch or 6 inch track for the dropins, but the shorter distance from the end of the module to the track means that the track center line measurement would be more critical. An offset of 1/8 would be noticeable with shorter dropins and the trains could have a noticeable shift as they crossed over the dropin. Also, the 9 inch snap track could be purchase almost anywhere, this is not true of 3 and 6 inch track sections. The distance from the end of the module to the end of the track is more critical.

For the most part the dropins worked fairly well. There were some minor problems with the wood warping. It was when we tried to put ballast on the dropins that the more serious problems showed up. We used the same white glue and water mix that we used for the track ballast. The water caused serious warping of the wood. Almost all of the wood bowed upward about 1/8 of an inch. And they stayed that way. You would think that as the water evaporated that the wood would return to its flat plane. But none of them did. We used them because we had to. But the bow in the dropins caused problems with long engines and cars. While all this was going on, the company that made the cork roadbed we were using changed their dimension for the thickness. It was no longer ¼ inch, but 5 millimeters. Five mm is slightly less than ¼ inch. All of the new modules were being built with this new cork. This meant that when we placed a ¼ inch thick drop next to the new 5 mm cork there was a slight step where the track came together. We solved the thickness problem by sanding the wood down the bottom of the dropins. We used paper shims where needed to bring the thickness up to ¼ inch. This way we could mix modules with old cork and new cork and still run trains because the difference in height wasn‘t noticeable over the 9 inches..

The warping of the dropins was still an issue that we were trying to solve. One member suggest that we try Plexiglas for the dropins. The theory being that these wouldn’t be subject to changes in humidity affected by glue like the wood ones. We had about a dozen of these made up to try them before we switched over to them completely. They worked fine. That is to say they worked fine until we tried to put ballast on them. All these were not ballasted, just a few to try out They warped just like the wood ones. Here again we think that the problem was the glue that we used. The white glue and water that we used to ballast the track wasn’t going to stick to the Plexiglas. The glue that was tried warped the plastic and they looked just like the wood ones after they dried. The Plexiglas was no better than the wood for this application. At this point we didn’t know what to try next and we continued to use the wooden dropins.

With all these problems you are probably wondering why we were still using the dropins. In spite of these problems we could still run trains, although some of the longer engines and cars didn’t like the dropins. Some problems were easily solved, like sanding a little off the bottom to better fit the 5 mm cork. Their advantages far out weighted their disadvantages.

The solution to the problem came from the Lansing club that I mentioned earlier. They were having the same problems with the 5 mm cork that we were. What they came up with was so simple that I wonder why none of us had thought of it. They extended the

roadbed to the end of the module, but left the track cut back the 4 ½ inches. What they explained was now it doesn't matter how thick the road bed is. When setting up the modules they are adjusted so that the roadbed is level and don't worry about whether the modules match up. The track was then placed on the roadbed. Gone are all the warped wooden dropins and the problems associated with them. Their whole railroad worked beautifully using this method. When we saw how well this worked we adopted this idea without hesitation. Within a year almost every module used in the SRV was modified to this new dropin system. This was a considerable improvement over our original method and we use this idea today.

One last thing we didn't keep from HOTrack was the number cross over tracks on the three main lines. I think this was done to provide access to any industry that might be on a module. But the HOTrack specs were unclear whether the crossover would be for all three tracks, or any two tracks. We thought that this was unnecessary and un-prototypical. No railroad has that many crossovers. Crossovers also work best when there are both right and left crossovers. Crossovers are also handy when there are industries that are switched off the main line, or anyplace there is a yard that trains need access to. A few crossovers can service the whole layout. Having crossovers all one way means that you can cross over in one direction, but there is no way to cross back unless you back the entire train through the crossover. A railroad needs to have both facing point and trailing point crossovers if they are to be of any value.

The SRV Control Panel

One thing not covered in either the HOTrack or the SRV specs is anything about the mainline control panel. The SRV control panel is another change that we made that was a considerable improvement over the original design. It is not really necessary to cover a control panel in the specs, many modules are needed to build a railroad, but only one mainline control is needed. This control panel can be built into almost any module. The original SRV control panel was built into the back of a five foot module. This module could be used as a stand alone module, or connected another 7 ½ foot module with a 1900's era logging camp and the two modules together forms a 12 ½ foot logging camp. The scenery was done in such a way that it wasn't too noticeable that part of it was missing when using only the five footer. There were two problems with using a module as a control panel. First, there was no way to expand it, there wasn't any room. As the layout grew in size we wanted to be able to divide it in two. This way we could have two trains on each track, each running on its own control. It would much easier to space the trains if each train had its own control. This would require six places to plug in throttles, we only had three and there was no room on the module to add anything else. The second problem was that when planning the layout we always tried to place the control panel near the middle. The reason was that if there was a problem you only needed to walk half the length of the layout to reach the throttles. But it also meant that we were always planning the layout around the control panel.

The time came when the person that owned the log camp was no longer a member

of the SRV. We still continued the use of the old control panel for a while, but we still wanted to have the capability of dividing the layout into two pieces. After some discussion with a couple of other members and a hand drawn sketch one of the members took on the task of building a new control panel. What he came back with was exactly what I had in mind for the new panel, and it included a couple of ideas of his own. The new control panel would be built into its own table. The size of the table was 30 inches by 60 inches. This allowed it to be stored a trailer just like any other five foot module. The panel would have six places to plug in throttles and each track would track have its own volt and amp meter. This was a trouble shooting feature and in my opinion was money well spent. Now we could divide the layout in half if we ever wanted to. Because it was going to be heavy we built sturdy handles onto each end. The panel also includes a twenty foot extension cord that brings 110 volts into the panel. A 14 wire cable about twenty feet long takes power back to the track (we only need twelve wires, there are two spares.) When the new control panel was ready we striped all the hardware off the old panel and gave the module to the person that owned the log camp. Some of the old hardware was included into the new control panel.

The best thing about the new panel is its flexibility. It can be placed anywhere in the layout. With those long cables the panel can be placed away from the layout (when there is room) allowing complete access the modules. Because the panel is mostly cords, plugs, and switches it should never become obsolete, a throttle from any manufacture can be plugged into the layout. A throttle is simply put on the table, plugged in at all the proper places and its ready to go. Lastly, we never have to plan the layout around it.

A Few Final Thoughts.

Earlier I talked about the 2 inch adjusters used on the modules. Most of the time this is more than enough. But don't depend on the floors always being level. We have been in one older department store where the floor was out 1 ½ inches in seven feet. In another building, the entire floor went down 2 inches in twenty feet. We spent about an hour scrounging for wood, bricks, rocks, anything flat that we could use to level the layout. Now we carry a box in one of the trailers filled with ¾ inch plywood that we can use in case we run into this situation again. This box also contains a large number of ¼ inch plywood pieces. These are handy when setting up on carpet. When placed under the feet they help contain the settling and shifting that can occur on carpet.

Another thing that is not included in the SRV specs is any requirement for painting of the under side of the modules. Experience has shown us that this can be a really handy feature, especially if it's painted white. Flat or semi-gloss works best, but a high gloss will also work. Painting is not just for protection from the elements. Some of our early modules were never painted and haven't suffered any damage because of it. That white paint is handy for another reason. One of the things that most model railroaders don't do is keep accurate, update records about the wiring. The problem is that some time in the future you may need to repair something, or add something and you can't remember what set of wires was for what purpose. This especially true for modules that have already been modified several times over the years. Now you need to fix something and you can't remember what you did or why. What are all those wires are for? This problem can

compounded by not removing wires that are no longer used. That's where the white paint comes in. we simply write next to the wires what they are for; these wires go here, that fuse is for that building, those wires are connected to that track, and so no. The flat or semi-gloss is easiest to write on but some markers will write on gloss. That white paint also reflects light better, this is something that is probably more important during the first few years when making repairs, changes or additions is more likely. Even with a small light that white paint makes the whole area brighter. Corrections are much easier when you can see what you are doing, and you know what the wires are for. I have worked under modules that were painted in that dark green paint we used for the modules, its like working in a dungeon. And there's no sense trying to write on dark paint, you couldn't read it.

Over the years we handed out our specification to anyone that was interested in starting a modular railroad. Out thinking was that when the NMRA finalized their design that they would use the most commonly used features from all the designs presented to them. The more people that used our design, the more likely that parts of our design would become part of the NMRA standard. All the other clubs could build, or modify, their modules to match ours, not the other way around. This didn't work out quite like we had hoped. The final NMRA design didn't resemble ours, but there are enough common features that we have connected our modules with those built to NMRA standards.

Two places that we know about have used our specs virtually unchanged. A member of the Lansing club told me that except for the module length and the color the specs were used unchanged. The Lapeer club also used our specs virtually unchanged. I think that this speaks well of our final robust design and the time we spent working on it.

Both of the Lansing and Lapeer clubs kept the use of the dropins in spite of the problems discussed above. I still think that they solve more problems than they cause.

We wanted to have a module that could be connected to other modules from various places around the country and formed into one large layout the same way the N-Scale does. But, this whole idea never seemed to pan out in HO scale. Almost all of the HO modular railroads I have seen at shows were all assembled using only modules from their own club. I would think this is mostly due to the many variations in module design from club to club.

Don't be in too much of hurry to put scenery down. No mater how good a track plan looks on paper, it is when it is put into operation the flaws in the design show up. After using the module for a while you might decide that: This turnout would work better over here, that spur should be extended to there, I could use a runaround here, or it could be a bad piece of track that needs replacing. It is much easier to make these changes before the scenery is pit down. Put down the scenery only after you are satisfied with the operation of the module.

I discussed the problems with dropins and track measurements how many people thought that close was good enough. A little extra time spent making sure that the

modules are square and the track measurements are correct will save a lot of time when setting up. Building modules and laying track is a one time event, setting up the layout is a many time event. Errors when building, cost time and cause problems when setting up.

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