WHERE DO I START?

Some potential new model railroaders are overwhelmed by the many facets of this hobby. One of the questions "newbies" most often ask is, "Where do I start out?" The text that follows is intended to help you pick your own individual path through the many, and sometimes bewildering, array of decisions that confront the new model railroad enthusiast. Along the way, I will try to help you avoid certain common "pitfalls", like filling almost all the available space with track, or trying to include too many things for the space you have available. However, please consider everything in this article advice, and suggestions, not a set of "rules" on "The right way" to build a model railroad. There's no such thing as one right way, and the only "rule" that applies is "It's your railroad, your rules." In other words, you are free to do your modeling any way you want. There is a saying that, "A modeler's first railroad shouldn't be his/her last." That is usually the case. Few experienced modelers have built one railroad, and had everything on it so perfect that they never wanted to make any improvements. Most all of us have built more than one railroad, often scrapping the old one(s), and starting over from scratch. Going through that process teaches us valuable lessons, but at a high cost. If any of the advice that follows helps you to get more satisfaction from your first attempt, then I will have accomplished my purpose. On the other hand, if you prefer to start out by building plan #3 from the Atlas track plan booklet, exactly as directed, that's fine. Remember, "Your railroad, your rules."

[Question 1] What should I buy to get started? [Answer 1] Nothing.

[Before spending any money, you may benefit from spending some time. Start by reading the rest of this article, then do any other research you wish, and do some thinking and sketching. All these activities are free, and may well save you some money and time, and frustration.]

[Question 2] Should I buy a train set? [Answer 2] No/or maybe?

Many new model railroaders start by purchasing a train set. Such sets typically include a locomotive, a few cars, a circle of track, and a DC power pack or, in a few cases, a DCC controller. Train sets are very convenient. They have everything needed to get a train running right away. There is, however, a downside to buying a train set; vs. buying the pieces individually. With a few rare exceptions, * the items in a set are of poor quality. This is necessary to keep the price of the set as low, and therefore attractive, as possible. Another trend in recent train sets is to include roadbed track rather than the traditional sectional track. The difference is the rigid plastic "roadbed" piece fastened to the bottom of each track section. This has good, and bad, sides too. On the good side, roadbed track pieces lock firmly together. This is a very handy feature when setting up any temporary track layouts, such as an around the Christmas tree setup. Some modelers prefer roadbed track, and use it on their permanent

model railroads. On the bad side; roadbed track limits you to only the curves, and other track shapes, available from one manufacturer. One brand of roadbed track does not easily connect to another brand, or to sectional, or flex track. In some cases, roadbed track can be adapted to be used with other types of track though. The marketing tactic of the manufacturer is to get the consumer "hooked" on their particular type of roadbed track, and ensure that when you need more track, you will have to buy theirs. This may lock you into buying their turnouts (track switches.) The Bachman "EZ-track" turnouts have a poor reputation for reliability. Roadbed track is also the most expensive of the three commercial track types. Among brands of roadbed track, Kato "Unitrack "is the best quality, but also the most expensive, roadbed track available. It also offers a wider assortment of curves, and other track types than other brands. Kato "Unitrack" turnouts are also reliable.

If you have not already purchased a train set, I advise you not to buy a set at all.* Instead, look for a decent, smooth running, locomotive first. Later you can purchase cars as needed. I would also recommend buying flex track rather than sectional, or roadbed, track. It is the least expensive, per foot, of the three types. Also, it can be used as straight track, or be bent into any desired curve. Flex track comes in 30"-36" pieces. This means fewer rail joints are needed than with sectional, or roadbed track. Rail joints can sometimes become a source of electrical and/or derailment issues over time. The fewer rail joints the better, and each joint you do use should be tight, and carefully aligned with the two rail ends that it joins. Many modelers favor soldering all the rail joiners. This also has good and bad sides. On the plus side, soldering every single rail joint makes a perfect electrical and mechanical connection. On the potential minus side, the rails have no way to expand or contract with temperature changes. In my opinion, it is best to leave most of the rail joints on straight track unsoldered. I do recommend soldering the rail joints on curves. This is best done with the two flex track pieces laying straight. After being soldered, the joined sections can then be bent to the desired curve. This method helps avoid kinked, angled, joints between rail ends.

*There are some exceptional train set that do provide good quality pieces.

In N-scale I recommend the Micro-Trains starter set. It includes a Kato locomotive, and several Micro Trains cars; all are excellent quality products. The Kato company has recently released some very good train sets in N-scale, and HO-scale. Like all Kato products, these sets are high quality items.

In HO-scale, the Bachman, “Digital Commander” set offers two DCC equipped locomotives, a DCC controller, several cars, and a loop of their “EZ- track.” This set is a good way of getting started in DCC right from the start.

[Question 3] O.K. then what should I do first?

[Answer 3] The way I recommend you start, is to do some, “Armchair model railroading.” Think, about the general concept of what you would like your model railroad to be. There is no need for specific detail at this stage, just some overall concept. Most beginners tend to think in terms of physical features they want on the layout; a tunnel, a town, a river, a figure 8 where the track crosses over itself, whatever. Few give any thought to why their chosen railroad, (the one their model version is supposed to be based on) exists. What does your railroad do to earn a profit, and stay in business? If you don’t have a clue, try reading up on the history of some real railroads. Pick one small part, of one real railroad, that interests you the most. As a general rule, railroads were built to haul some commodity that was bulky, heavy, and valuable, from the interior, to the coast, or to a large city, where that commodity would be used. Several real railroads made most of their money hauling coal, for example. It would need to be transported from the mine, often to the coast, where it could be loaded on ships, or used in power plants, or factories, located in the coastal cities. Lumber was another dominant commodity for some railroads. Often these railroads were built specifically to haul logs from forest to sawmill. Most railroads, however, hauled general freight between cities. This could be anything from machinery to fresh produce. It’s not absolutely essential to invent a story for your railroad, but it can be fun, and will help your model railroad seem more like a real one.

How do I start? There are several different answers to that question. This is partially because model railroading is very much a personal hobby. No two model railroads are exactly alike; and each one is, to some extent, a reflection of the person who built it. My advice is to think about what kind of railroad you want to end up with. For example, some forum members are quite content to sit and watch trains roll by. They are not interested in realism, modeling a particular prototype, formal operation, or sometimes even building scenery, or structures. If that’s what you want that’s perfectly OK.

At the other end of the modeling spectrum, are the people who do all they can to create, and operate, a miniature version of some time and place, on a real railroad. These modelers want each thing on their model to be a duplicate of what was on their favorite real railroad, at that time and place. If their railroad didn’t have a particular type of locomotive, then you won’t find that loco on their model railroad. If a certain type of car (say double-stack container well cars) didn’t exist yet, in the time period they are modeling, then it won’t be used on the model.

Between these two extremes, lies a world of choices for you to make. Let's start with a very basic first choice. Do you want to build a "Train Setup", or a" Model Railroad?" What's the difference? The main differences are permanence, and realism. Many of us can remember building a Lionel toy train setup on the living room floor. We would run the train around the various routes available, until we got bored with it. Then we might take it apart and, either try another track arrangement, or put the trains and track away. Nothing was permanent, or realistic, about this arrangement, but it sure was fun! Three rail O-gage trains from Lionel, and other companies, are designed for lots of action, and great fun. There are working accessories that load and unload everything from coal to cattle. Some three rail permanent layouts have extra ties added to the track to fill in between the three-ties-per track section, furnished by the manufacturer. Painting and ballasting of track has also been done. However most three rail enthusiasts leave their track as is, and aren't the least concerned about making it look realistic. These trains are all about fun, and after all isn't that the ultimate goal of any hobby?

Many of the track plans intended for beginner's are, essentially, more permanent versions of those temporary, floor train setups. They consist of geometric shapes, like ovals and figure eights, around which the trains can run; until you get bored with it. In many cases, watching trains go around, and around, gets boring pretty quickly. That may not be true for you, in which case building such a layout may be a perfectly good choice for you.

On the other hand, a model railroad that, at least to some degree, provides opportunities to mimic the operation of a real railroad can hold your interest for a lifetime. Like chess, there are so many possible moves that each session provides a new scenario. Things that will help you to choose, or design, a railroad with operating potential are, passing sidings (sidings with a turnout at both ends) on a single track main line, or a pair of crossovers on a double track main line. These track arrangements are essential to let trains pass each other.

Another important track type you will need is industrial "spurs." (These are sidings with a turnout at only one end.) Having industries will let your railroad pick up freight at the source, like a coal mine, and deliver it to a logical consumer of that freight, perhaps a coal-burning power plant. Another thing to look for, and make your own decision about, is space on the layout for these industries, and other structures; and scenery. Many track plans tend to fill nearly the entire layout with track. That doesn't leave much room for anything else.

A third thing that's desirable in a model railroad is creating the illusion that the train is actually traveling from one town to another; rather than just going around in, all-too-obvious, circles. This can be a simple matter of putting a backdrop, or a hilly ridge, down the middle of that 4x8 plywood table. This prevents us from having the train constantly in plain view, all the way around the track oval. Instead we see a train arrive in our town, do any switching of cars to/from industries in town, and then depart for another destination.

Once the train setup/model railroad decision is made, the next thing to consider is the amount of space you have for your railroad. The most common answer a newbie comes up with is the 4x8 sheet of plywood. This size and shape has advantages, and disadvantages, for you to consider. On the plus side, it provides a very convenient surface for laying out different track arrangements. It is also very easy to "build" since the table top is one pre-made piece, and doesn't require any actual building, beyond attaching a frame, and legs, underneath.

On the minus side, the 4'x8' shape doesn't bear much resemblance to a real railroad's "rightof-way." This term means the actual land on which a real railroad is built. A railroad's right-ofway can be miles, or hundreds, or even thousands of miles, long. However the typical width is only 100 feet. Trying to model something that incredibly long, and skinny, on a surface where the length, (8 feet) is only twice the width, (4 feet) presents some challenges. We have already seen one solution; visually dividing the 4'x 8' table. Another possibility is to divide it physically, by sawing it down the middle. We now have two 2'x 8' pieces, or a combined 2'x 16' piece. If these are put end-to-end, or against two intersecting walls of a room; forming an "L"-shaped layout, then we have gone a long way in creating the illusion of traveling a distance. Another benefit of this shape is that it doesn't hog most of the space in a room like the 4x8 does. OK, but how can a train turn around on a table only two feet wide? Well, unless you happen to be modeling in Z-scale, it can't. However it may be possible to widen the ends enough to hold the turn back loops needed for continuous running. If you don't have room for those wider sections at the ends, you might want to consider a point-to-point layout. This is the same "track plan" used by virtually all real railroads. Real trains do not run in loops, but rather in a line from one city to another. At the end of their run, the trains enter a yard where the cars are separated, and switched as needed. If the locomotives need to turn around, they do so using a turntable, or a wye. A new train is then assembled and heads back the other way. Point-to point layouts can be built on narrow shelves, even in larger scales.

Let's assume, for the moment, that you have a space the size of a spare bedroom, in which to build your model railroad. The shelves can then go all the way around the room, with a hinged section(s) across the door(s). This allows continuous running, without filling the middle of the room with railroad. Layouts like this have been built in basement family rooms, where most of the room is used for other purposes, with the railroad confined to the walls. This is simply another possibility for finding a space for your railroad. Look carefully around your home. See if you can find a suitable space. If you can't find a permanent space to dedicate to your railroad, you might consider a shared space. Model railroads have been built to slide under a bed, fold up against a wall, be hoisted up just below a garage's ceiling, or built into a coffee table. My own railroad is fastened to a couple of the walls in my garage, but my wife can still park her car in there too. It uses a "bookshelf design I copied from an old Model Railroader Magazine article. The top shelf holds books, the lower shelf holds the railroad, and the space underneath has

additional shelving for storage. This basically uses the same amount of floor space for three different purposes.

The available space may have an important effect on your next decision; what scale are you going to use? If the available space is small, then you should look closely at smaller scales like N-scale, or Z-scale. They have the advantage of being able to turn around on smaller diameter turn-back loops than the larger scales. They also help with the overall illusion of a real railroad; in miniature. The trains are realistically smaller than the trees, buildings, and terrain that surround them; just as in real life. You may also be able to run realistically long trains with more cars, since the cars themselves are shorter than they would be in a larger scale. The downside of smaller scales is that they may be too small for you to handle, or repair. This is a matter of personal choice. It can be affected by your age, manual dexterity, and eyesight.

The various scales have other differences than just their physical size. The more popular scales, HO-scale, and N-scale, in that order, are a bit less expensive than the less popular ones. The more popular a scale, the more variety of locomotives, cars, and accessories are available for that scale. Before "taking the (economic) plunge "of spending lots of money on trains, you might want to metaphorically "dip a toe" by purchasing a couple of simple boxcar kits. Try one in HO-scale and another in N-scale. This will let you get a feel for the size of the two most popular scales without spending a small fortune. If you want to go a step further, buy a kit in Oscale. It's third in popularity, and similar in size to those Lionel toy trains you may have seen, or owned, as a kid.

Well, now that you have picked your favorite railroad to model, found a space, and settled on a

scale, the next step is acquiring a track plan that will fit in your space, using the scale you have chosen, and including at least some of the features you want to include on your layout. The key word in that last sentence is "some". Nearly every beginner starts out wanting too many features for the space available. Try to get a working concept of how big something would be in your chosen scale. How many square feet does that coal mine, steel plant, airport, harbor, etc.; that you want, occupy in real life. Then divide the general length and width of that feature into scale feet, and you may well find that just one of the many things you had in mind would fill, or exceed, your entire available space! There are some modeler's tricks that can help a little bit with this problem, but for now, be realistic with yourself. Which feature do you like best? Which one(s) do you think you might be able to live without? Try to get things down to a manageable size.

Now that we have a better idea about what we want; it's time for some accurate planning. Track curves, and especially turnouts (track switches) take up a lot more room than most new model railroaders allow for them. A rough sketch is a good way to start, but you should then draw every part of your proposed track layout to accurate scale, to see if things will really fit.

These days there are digital track planning programs like SCARM, which can do most of the work for you. If you try to fit something in a place that's too small, the program will make the correction for you. There are also many complete track plans available online, and in books. You can copy one of them and adapt it to your space and personal preferences.

Some track plans don't, even remotely, resemble something a real railroad would likely build. These are the geometric shape layouts that were mentioned earlier. These track plans are not "wrong", just unrealistic. That doesn't mean you can't use this type of plan if you really want to. Remember "It's your railroad; your rules." What may happen is that, as you gain some railroad experience, you may become disappointed with such a plan. Here is a pair of classic examples of the plans you might choose to skip.

1) The figure eight.

This arrangement lets the train climb up a grade and pass over the lower track it started on. It's quite popular with new modelers. Many list such a, "passing over itself" feature, as one they want. It can be done, in fact it has been done, many times, but there are some problems inherent in this plan. One is physical, and the other ascetic. The physical problem concerns climbing grades. Unless you have a lot of space to build in, the grade needed for a train to climb high enough to have sufficient clearance for a train to fit under the bridge; is going to be quite steep. That means most of your layout will be devoted to the grades needed to perform this maneuver. Steep grades will also limit train length. Your engine may not be able to pull more than a few cars up that grade. Grades also need to be longer than most "Newbies" think. To be reliable, grades need to be kept gradual, rather than steep. They also need "vertical easements" (sections of even milder grade) at the top, and bottom of each grade. This takes up still more layout space.

The ascetic problem is that this track arrangement (where a long train may pass over itself) is almost unknown on real railroads. If realism is important to you, then any prospective track plan should have to pass this simple test. "Why would a railroad build this track arrangement?" The few real life examples of this "up-and-over," (Tehachapi loop for example) scheme were built from sheer necessity. The railroad needed to climb a lot, in a restricted space. Remember, when looking at possible track plans that real railroad companies need to make a profit in order to survive. They do not build expensive items like grades, overpasses, and tunnels unless they absolutely have to because of the terrain. So, if we want a tunnel or grade, or whatever, we might want to build the scenery in a way that shows why our fictional railroad company had no practical choice but to build these things. A common example of this is the typical Model Railroad Tunnel vs. a Real Railroad Tunnel. While real railroads avoid drilling tunnels, because of cost, Model railroads often have many tunnels. We sort of need tunnels to hide our model trains from view occasionally. Tunnels and multiple track levels are also needed to allow some

densely tracked plans to even be built. Model railroad tunnels are often constructed in ways and places where they would never be built in real life. Model tunnels often have very thin "mountains" to pass through. The land on top of many model tunnels is so thin that a real railroad would just blast an open-toped "cut" instead of a much more expensive tunnel. Model tunnels look more realistic if there is at least double, (preferably more) thickness of land above the tunnel, than the height of the tunnel portal. If your railroad runs straight into a high cliff, it's obvious that a tunnel was the only way to get through. This makes it look more realistic.

2) The alternate cutoff.

A very common plan has the basic oval crossed by a slightly shorter route. A turnout at either end of the "main line" and the "cutoff "selects which of these two routes the train will travel. New modelers often build a tunnel over one of the routes. This lets the train either pass through the tunnel, or go around it. "Why would a real railroad build this track arrangement?" They wouldn't. Tunnels cost millions of dollars. Railroads avoid drilling tunnels unless the mountains don't allow any cheaper alternative. If the railroad had a handy cutoff available, why build the expensive tunnel at all? The same two turnouts could be better used to build a passing siding instead. Unlike fanciful "through the tunnel, or around tunnel," arrangements, passing sidings are very common, and indeed essential, on real railroads.

There is no harm in building either of these features for your layout. They just don't look much like something a real railroad would do. If you don't care about that, and you want to build a figure eight, or alternate cutoff route, then by all means do so. "Your railroad your rules."

Once you have settled on a track plan, and made sure it will fit your space; it's time to start construction! The first thing that will need to be built is the "benchwork". This is the structure that supports the entire railroad. For that job it needs to be strong, rigid, and resistant to warping. It also should be light enough to move without too much effort, and it needs to provide access to all of the track, for cleaning and repair, as needed. That's a tall order, but fortunately you probably won't need to invent anything. There are already several types of benchwork that are tried and true. We have talked about the 4'x8' table. Other types are, "open grid, "and "L-girder." Open grid benchwork is a simple wooden box, usually made of 1"x3" pine planks. Inside the rectangular box frame, 1"x3" cross pieces called "stringers", or "joists" are mounted about every 16". This type of benchwork is strong, fairly rigid, but not very resistant to warping. It can be topped with plywood, or "extruded foam insulation board". This is the hard, pink, blue, or green, type sold at home improvement stores. (The white Styrofoam "bead-board" you may also find at those stores, is not strong enough to serve as a layout base.)

Extruded foam insulation board has revolutionized layout construction, particularly scenery construction. Features like hills and riverbeds can simply be carved out as needed. This is simpler, and less messy, than traditional plaster scenery. A two inch thick piece of extruded foam can act as a layout base with, or without, plywood under it. Without the plywood, it makes a lightweight, rigid base. The disadvantage of not having plywood under the foam is that you don't have a convenient surface for mounting switch machines and wiring to the bottom of the layout. A good compromise would be to use a ¼" sheet of Luan plywood glued to the underside of the foam. Luan is lighter than other plywood, but it will allow you to mount switch machines, and other hardware, to the bottom of the layout.

L-girder is a type of benchwork invented in the 1960s. It isn't used much today; at least not in its original form. However its basic component, the L-girder, can be adapted to other types of benchwork to help make them warp resistant. The L-girder looked like a wooden version of an "angle iron." If the frame and stringers of the open grid are formed of Lgirders, instead of flat planks, they will be super strong, and resistant to warping. The legs can also be L-girder if you wish. They will be as strong as 2x4s but much lighter. Another way to prevent warping is to paint, or seal, all the wood. Whether or not you want to bother with any of these things depends on how much humidity you have to deal with.

One very useful benchwork feature is seldom included in first layouts. In my opinion, though, it should be included in every layout. That feature is sectional construction.

Which layout would you rather carry up a flight of stairs, around several corners, and through a narrow doorway? Your first option is the "good old, traditional," 4 'x8' plywood table. In one, single, and very large, awkward, piece. The second option is the same 4'x8' layout, divided into four 2'x4' sections. Obviously the smaller sections would be easier to transport. Most model railroads, except for modular portable ones, are not designed to be moved; ever! Sadly, many a model railroad has needed to be moved to a different house, and is often badly damaged, or even had many years of work destroyed, because no provision was made to allow it to be moved.

Sectional construction has other advantages that can benefit you, even if you never have to move your household. Sections can be built start-to-finish, as training steps. You can practice laying track, wiring, scenery building, Etc. relatively quickly, and learn each skill before moving on to the next section. There is no need to bog yourself down in ALL the track work, followed by ALL the wiring, and ALL the scenery of an entire model railroad.

Wiring is infinitely easier when you can take a section to the workbench and turn it upside down. The more common practice of shoehorning the modeler under the table, to work overhead, is many times harder; even for the young and flexible, let alone for the "old and

not!" Model railroads often take years (or even decades) to finish construction. You may start out young and agile, but no one stays that way forever!

Building simple joints in a layout is not difficult. You can even have that 4'x8' plywood sheet cut into 2'x4' pieces right at the home improvement store; thus making it easier to haul to, and into, your house. As you build just make sure there are rail joints near, (but not directly over) each joint in the table. The grid frame should also be made in 2'x4' rectangles; which are bolted together. Wiring should pass through plug-and-jack connectors, or terminal strips, at each benchwork joint.

After the benchwork is built, we can start laying track, and creating major scenic features, like rivers and hills. I have already mentioned that there are three basic types of track available, and given some information on two types, "roadbed track and flex track. The third type is sectional track. Here's a little more information on this type.

Sectional track comes in rigid straight, and curved, pieces. The curves come in various radii, or sizes. Sectional track does not have any plastic "roadbed" piece attached to the bottom. Like roadbed track, sectional track simply plugs together at the ends. Also like roadbed track, sectional track has a limited selection of curved pieces available. Unlike roadbed track, sectional track does not lock together. For this reason, sectional track is usually nailed or glued down. Atlas is, by far, the largest manufacturer of sectional track.

Sectional, and flex, track are also sold in various "codes." You may see track advertised as "code 83, or "code 55" etc. The code number is simply the height of the rail in thousandths of an inch. Thus code 83 rail is 83/1000" high. Some track is made way oversize. For example Atlas N-scale, code 80 rail would scale up to real rail about a foot high. That's much bigger than any real rail ever used by the railroads. Trains will run well on most track, regardless of code. The rail codes are about appearance. In my opinion, the most realistic looking flex track is offered by Micro Engineering. I use Micro Engineering's code 55 flex track for all the visible track on my railroad. However, on the hidden staging tracks, I use Atlas code 80 flex track. It doesn't look nearly as good, but it works just as well as, and costs less than, the Micro Engineering flex track.

Another, very important piece of track, on any railroad, is the turnout. (Track switch) Any railroad intended for realistic operation, will need multiple turnouts. They are a major expense item. Having good, reliable turnouts will make your railroad fun, to operate. Unreliable turnouts will cause derailments, and frustration. They may end up being replaced after you have gotten tired of the problems they cause. When that replacement happens, all the money spent on those poorly operating turnouts will be wasted.

I, and many other experienced model railroaders, strongly recommend Peco brand turnouts. They cost a bit more than some other brands, but are well worth the price difference. They are well made, and rarely, if ever, cause any derailments. I happen to build my own turnouts, but the few commercial ones on my railroad, are all Peco. Of course, opinions vary among modelers as to which brand of turnouts they prefer.

As mentioned earlier, turnouts take up more room than you may expect them to. It's a good idea to use the actual turnouts and lay them out on the railroad exactly where you plan to use them. When you are ready to start laying track, start with the turnouts. Don't forget to make provision for connecting a switch machine to each turnout. Depending on the type of machine, this may include drilling a large hole or a slot under the throwbar, or cutting a larger rectangular hole for a Peco twin-coil machine that mounts directly to the bottom of the turnout. Turnouts, and the motors that power them, are two of the highest cost items on a model railroad. A good commercial turnout, like Peco, retails for about $30. The popular Tortoise switch motors sell for about $18 each. Multiply those prices by the dozen(s?) turnouts on a typical model railroad and you are facing a pretty big cash outlay. Peco makes their own brand of twin coil switch machines. They are a bit cheaper than the tortoise motors, but still not cheap, and you may still need many of them.

Most "newbies" start out with Atlas turnouts. They have some design issues which can make them a poor choice. (For more specific info on these issues, you can read my post titled "Improving Atlas Turnouts." It can be found in this forum's "General Model Train Discussion" section. Use the search function to pull it up by title.) Atlas turnouts also have some good points; indeed, many forum members use them, and like them. First, Atlas turnouts are slightly cheaper than Peco. The downside here is that you may get frustrated with them and end up replacing them with Peco turnouts later. (Many people have done just that.) If that happens, instead of saving cost, you will nearly double it! Atlas turnouts have either a manual, or electric, (twin-coil) switch machine mounted on the side of each turnout. This means that you don't have to spend extra money buying separate switch machines, or do the extra work of installing them. These switch machines are also big, ugly items in plain view. (There are adapters that let Atlas machines be moved under the table.) The Atlas twin-coil machine is quite weak, and prone to burnout, unless powered by a capacitive discharge unit. Some of the N-scale Atlas twin-coil machines I once had, actually tore themselves apart. This was due to the vibration inherent in their "snap action" design, and a weak joint between the case, and cover, of those machines.

There are ways to save money on switch machines. The ground throws made by Caboose Industries are cheaper than electric switch machines and quite reliable. There

are also several do-it-yourself manual turnout controls. (One is described in my post, “$5 switch machine. It’s in the “Beginner’s Q&A” section of this forum.)

It is also possible to make your own turnouts. This will save you money, but cost you the time it takes to build them. Most new modelers prefer to buy, rather than build, their turnouts.

If you are curious about making turnouts, there are many methods available online. Some are right here on the forum; including mine. Again search the “General Model Train Discussion” section. This time use the title “How I scratchbuild turnouts.” You may also want to check out “Hand-laid turnouts from a first timer” on the HO-scale section of this forum.

After you have picked a track type, and brand; and made your choice of turnouts, what’s next? The location of major scenic features like river valleys and any bridges that cross them, along with mountains, tunnels, roads, and towns, should be measured and cut, or built up, as we lay track. Rail yards with their string of turnouts, (called a “ladder”) and extensive wiring should be a starting point for track laying.

If you look at real railroad track, you will notice that it is usually laid on top of an embankment, above the level of the surrounding landscape. You will also see the crushed rock called “ballast” under the track. Both the raised embankment and the ballast are used primarily for drainage. Real railroad track, of course has to survive outside, in all sorts of weather. Without provisions for drainage, track can be washed out,

Model railroaders simulate the embankment with cork, or foam, roadbed. We also ballast out track to look like the real thing. The roadbed is pined, and glued, down and the track is nailed or glued on top of the roadbed. Latex caulk is a good adhesive for both these jobs.

After laying the track (at least on one of the layout’s sections) we need to do some wiring, to be able to control our trains. There are several train control technologies in use. The two most common are DC and DCC.

DC stands for Direct Current. This is the traditional train control system that goes back through most of the history of model railroading. DC is simple in electrical theory, but requires a lot more wiring if you want to run more than one train at a time. In a DC system electric current comes out from one of the two “track” terminals on a power pack. The current travels along a wire, to one of the rails. Metal wheels on the locomotive, pick up this current. Wiper contacts inside the locomotive pass the current

from the wheels on into the motor. The electric current causes the motor to run, moving the locomotive down the track. Electricity must also travel back to the source for things to work. After traveling through the motor, current goes to another set of wiper contacts to the wheels on the opposite side of the loco, into the opposite rail of the track, and through another wire, back into the other "track" terminal of the power pack. Thus electricity travels in a circle. Electrical folks call this a "circuit." By opening the circuit we can stop the locomotive. By reversing the two wires we can make the loco run backwards. By moving a speed control on the power pack we make it speed up, or slow down. That's DC control. It is very simple; until you add a second locomotive. Then things can get more complicated. If we just put the second loco on the same track, it will do the same thing as the first loco. We have no way of controlling the two locos independently, when both are on the same track. The simplest way to run two trains, at the same time, is to put them on two separate loops of track, with a separate power pack for each loop. Then we have independent control of the individual locos. If we connect our two loops with a pair of turnouts (called a "crossover") then we need to put insulated rail joiners between the two turnouts. When a train crosses over onto the other loop, it will be controlled from the other power pack. If booth trains end up on the same loop, we lose independent control, and we're back where we started.

A model railroad under DC control, will actually have many sections of track, all insulated from each other. These sections are called "blocks." Each of the blocks will need its own pair of wires going back to a control panel. That's going to be a lot of wires, if you have more than a few blocks. At this panel each pair of wires will be connected to an electrical toggle switch. (Again, a lot of toggle switches, one for every block.) These switches can, in turn, connect that block's pair of wires to either one of the two power packs. Thus to run a train around the railroad, you and the other operator will constantly need to flip the toggle switches to gain temporary control of the various blocks. Now it doesn't sound quite so simple does it?

That brings us to DCC. It stands for "Digital Command Control." This system works in a way similar to radio controlled model airplanes, or cars. A control station transmits signals that are received by a circuit board inside each model. The signals can control what the model does. If there is more than one model plane or car in use at the same time, different signals will be directed to the two, or more, models. This allows each operator to control his/her model separately.

On a DCC controlled model railroad, we use the rails to carry the signals out to the various locomotives, instead of sending the signals through the air. Each locomotive contains its own receiver (called a "decoder.") Signals leave the control station addressed to an individual loco. Other locos ignore signals not addressed to them. This

way we have completely independent control of multiple locomotives, on the same track. No insulated blocks, only one pair of wires from controller to track, no toggle switches to flip, you run your train wherever you choose. Simple right? That's the beauty of DCC. You save a lot of wiring and still have independent control. DCC also allows you to have sound from the locomotive, and control headlights, ditch lights, horns, and yes, literal, bells and whistles. Things like reverse loops, and turnout frog polarity, can also be automatic, and trouble-free, using DCC.

Both systems work well, and each one has its loyal fan base. Locomotives, factoryequipped with DCC, are becoming more common, and less expensive, as time passes. A DCC equipped locomotive will still be more expensive than a DC one, particularly if you want sound. However the cost difference between the two seems to be gradually shrinking. If you are able to solder, then you can also install a DCC decoder in a DC loco to convert it to operate on DCC. Unless your railroad is very small and simple, and you only plan to run one train at a time, I recommend using DCC control right from the start.

That's plenty to get you started, and keep you occupied, building your first model railroad.

Good luck, and if you have questions just ask on the forum;

Traction Fan