

## **33 Track & Layout Planning Mistakes to Avoid**

**By Robert Anderson**

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There are only so many times you can watch your trains go around in a circle (or oval) before you'll eventually decide to take the leap to build a more interesting layout with a more functional track configuration.

Everyone has to start somewhere. Usually a simple oval layout is the easiest and cheapest solution until you eventually get bitten by the model railroading bug. That's when you'll decide to build that dream layout that's been floating around in your head for some time. The idea may have come from a particularly interesting piece in a magazine, or something you saw at a model train exhibition. Now you have changed from a toy train owner to a real model railroader.

You know it's time to make the start on that "railroad of your dreams", but the "getting started" part is usually the most critical point of the entire project. It's the point where so many mistakes can happen. Some of these mistakes are easily rectified later and are just part of the learning curve, but other mistakes at the planning stage can be critical and can have a long term effect on how realistic your railroad will look. They will also affect how operationally interesting and efficient it will be.

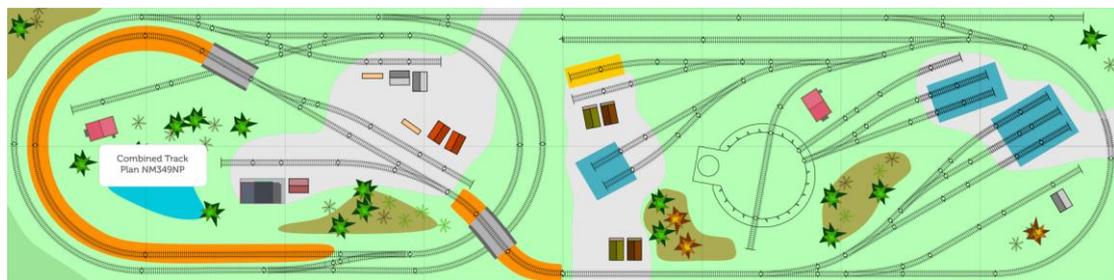
### **Correcting mistakes or just a work in progress?**

There's no point in spending time, effort and money building what you thought was the perfect layout, only to end up modifying it or starting all over again. That is very different from improving it, because there's nothing wrong with making positive changes and expanding your railroad as and when your skills develop. Most model railroaders do that – their railroad progresses as they progress.

The trouble is, if you haven't done track planning before how do you know your brilliant ideas will work? This report is not about choosing and constructing a track plan. It is about logically considering your environment and what makes sense in order to use that layout space to your best advantage. Track planning is an acquired skill, and you'll improve with experience, learning from your own mistakes and the mistakes of others. That is the key! Why make the same critical mistakes others have already made? If you do make mistakes, try to make them original rather than just repeating the same errors many others have made.

### **Getting ideas from different track plans**

Your first task should be to buy at least one track planning book or eBook, even if it's based on a different scale. You'll get ideas for different track configurations and learn what is functional and what could end up being a total waste of space.



Tony Nielson's track plan eBook "Space Saving N Scale Track Plans" is an excellent starting point. Even though the plans are in N scale, the eBook download covers all the track planning basics and includes 69 plans that you could easily adapt for any scale. <http://www.ngaugelayouts.com/n-scale-track-plans.html>

If you already have a plan in your head then this publication could confirm you are “on the right track” (excuse my pun!), or it could give you further modification or expansion ideas, before you get “too far down the track” (there I go again!).

Another eBook “The Beginners Guide to HO/OO Trains” by Tom Hobson has 18 well thought out practical “space-saving” track plans to give you ideas. It also includes numerous tips to get you started building a layout, and is available from <http://www.hoscalelayouts.com>

## Getting the basics right

This report is not about teaching you how to solve construction or wiring problems. There won't be a discussion of bad soldering connections, out-of-gauge track, or the issues associated with kinks in rail joints. Instead, the focus will be on avoiding problems caused by bad track design. It's meant as a guide to help avoid making bad track planning mistakes that could completely frustrate you and waste an enormous amount of your time (and money). A little careful planning at the outset pays big dividends later.

Most of these common track planning mistakes relate to mechanical, visual, access and operational issues. Let's get started...

## Here They Are - 33 Track & Layout Planning Mistakes

### 1. Making the track curves too tight



With the pressures of fitting everything into a layout, there will always be the temptation to make the curves tighter than they should be. This is typically fraught with problems, even if you have done some test runs with locomotives and cars around the curve.

Even if the trains run okay –

- Does the tight track curve look natural? If you are modeling a modern era railroad, rolling stock lengths are much longer these days than they were in the past. Long cars make the curves look even sharper than they are.
- Would a real railroad have curves that tight? The answer to this is always a resounding “no.” Real railroad curve radii are much larger than can be accurately modeled in a reasonable space. The best that can be done is to make the curves as large as your space will permit, then use some scenic tricks to distract the viewers from the appearance.
- What happens when you buy a new loco or longer car that won't make it safely around the curve? This actually goes back to the choice of era you choose to model. A setting with large late steam era articulated locos is not a good decision for a very limited space. Logging and mining or switching

puzzle layouts with shorter rolling stock are better choices if your situation requires sharp curves.

The golden rule is this: make the minimum radius AT LEAST as large as that recommended for the longest car you plan to run on your layout. That way you won't have any regrets later.

## **2. S-curves that derail trains**

S-curves can be a railroader's worst nightmare, yet they are a feature of many track plans because they can add interest to a layout. If you are going to add an S-curve, plan it carefully. That means that you need to have at least one straight section of track at as long as your longest car between the curves. Otherwise, regular derailments might become unwanted events on your layout. Fixing a problematic S-curve can be exceptionally hard once the track is permanently placed.

One of the most challenging placements for an S-curve is just beyond a turnout. Avoid having a curve in the opposite direction immediately after the turnout diverges. Follow the straight section between changes of direction practice described above.

## **3. Track too close to the edge of the benchwork**

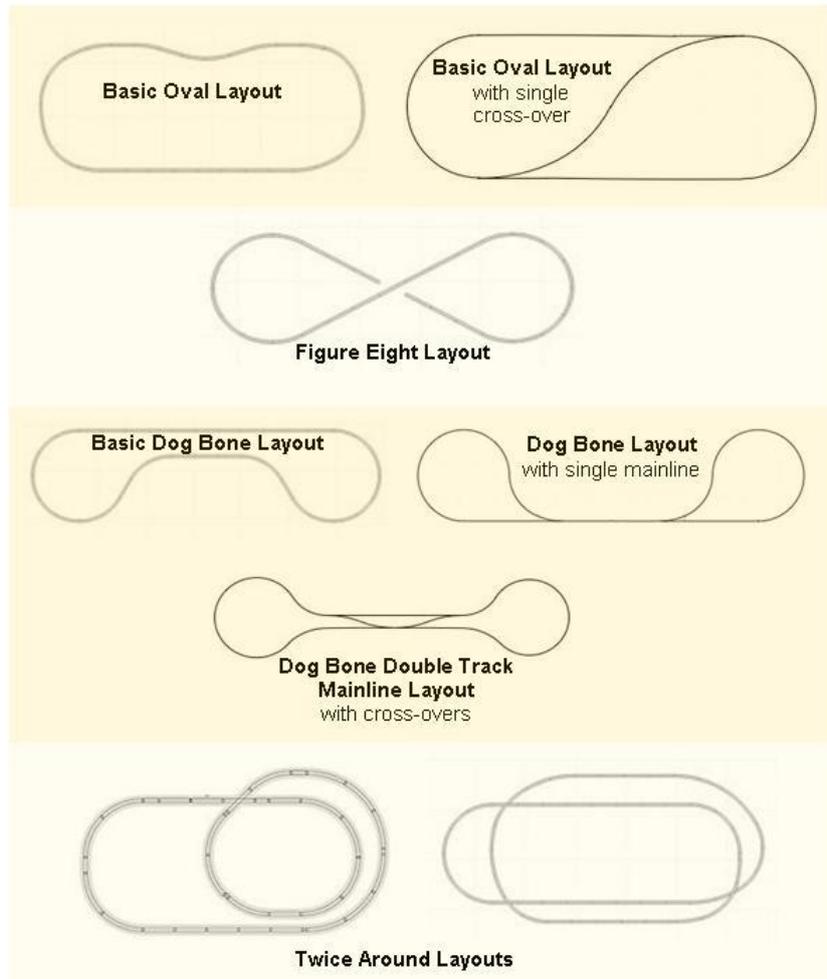
Space limitations may tempt you to run the track close to the edge of the benchwork. Doing so could allow for an extra track, but the big risk is that your prize loco could end up wrecked on the floor.

The accident might not be the result of an operational derailment. Instead, it might simply be because someone caught the train with their elbow, or perhaps an earthquake shook it free. When gravity comes into play the only direction is down, and the only thing stopping your loco will be the solid floor which could be several feet away.

Trains generally look longer when they disappear momentarily behind a tree, some vegetation or a structure. Where feasible, try and move the track at least 2-3 inches back from the edge of the benchwork and add some small obstacles between the track and the edge. Use some well-glued miniature bushes, a small slightly raised bank, a robust fence of some kind, or some clear acrylic plexiglass to form a physical barrier.

## **4. Making the track layout too predictable**

Although related to point #3 above, this point is about realism and aesthetics. To look realistic and not "toylike," a layout should not be too predictable in design. A mainline running along close to the edge of a standard 4ft x 8ft space and then curving at the end to form an oval will definitely look "toylike" unless there is clever scenery or props to disguise the predictable track configuration. Where possible, it usually looks more realistic to include gentle curves (just like on a real railroad), and position the mainline at a slight angle from the edge of the benchwork. Hiding the curves with tunnels or hill cuts is an effective way to distract the eye from the fact that the train is running around an oval.



Another alternative is to make the layout point-to-point. Real railroads work this way so why not yours? Unless your whole purpose is to run the train in a continuous loop, a point to point layout featuring two separated industries or towns that exchange goods is the most realistic way you can operate. Remember, though, that you need to figure out how to turn the locomotives around at each end. A turntable, wye, or reversing loop may be necessary – but they also offer additional challenges as well as interest and convenience.

You'll get plenty of helpful ideas at the Online Model Train Club. The club has members worldwide and is like a giant online library of information and techniques you can access anytime of the day or night. Detail here <http://www.modelrailroadhub.com/Train-Club.html>

## 5. Loops for no reason

Following on from points #3 and #4, loops can be a useful idea but need to be carefully planned. A track that just goes around and around and around runs the risk of imitating a toy train set. The track plan eBook I mentioned earlier shows several options worth considering that will add interest to the track configuration. Possibilities include a "twice-around" for a long mainline, adding some sidings, or incorporating 2 or 3 separate loops to facilitate multi-train action. This avoids the resemblance to a Christmas tree toy train layout that just goes round in an oval.

If you decide to have 2 or 3 loops, you have the option of setting up a different scene around each loop. The individuality of each loop can minimize the appearance of the track connecting back on itself.

Scenery, buildings, bridges, tunnels, sidings, gradients and curves can all add interest and disguise the appearance of a boring oval-shaped racing track.

## **6. Biting off more than you can chew**

Enthusiasm is wonderful, but sometimes it can cloud our judgment for what is realistically feasible. Unfortunately, many model railroaders “bite off more than they can chew” when it comes to selecting a suitable track plan for the space, time, skills and financial resources they have.

Constructing a layout is not a five minute job; it might actually take you years to complete. That doesn't mean you're slow and inefficient, it is just that attention to detail takes time. It is likely you'll also want to modify or expand your railroad over time, so it might never actually be finished.

The worst thing to do is to launch into a huge project only to lose interest because of unexpected complications and delays you may encounter. Your family circumstances might change or you might relocate. Who knows?

It is better to start small with a layout that won't utilize the entire space you have available. Construct it one section (module) at a time, as this will give you the opportunity to perfect your skills with wiring, ballasting, track laying, scenery construction etc. A railroad doesn't need to be big to be fun! Manageable individual pieces is the key to success

The module approach also nicely fits the limited-budget modeler. Adding features to a module usually isn't a hugely expensive project and allows you to try out a new skill or refine an old one on a limited basis that won't destroy your personal economy.

## **7. Making the layout too permanent**

Modules can also alleviate the inevitable problem that occurs when you decide to relocate to another property. It's easier to dismantle and reassemble a layout when it is built in modules. If it is to fit through a doorway or onto a vehicle, size and weight will be a serious consideration. It's not pretty to see a layout hacked to pieces just to move it.

Modules should be screwed or bolted together to allow them to be easily dismantled. Care needs to be taken when joining track between modules, so as to avoid bad electrical connections and rail gaps.

## **8. Not being able to properly access the layout**

Putting areas of the layout beyond reach is a mistake that can and should be avoided during the planning stages. You'll not only want to be able to recover that derailed engine, but you'll also need to be able to interact properly with the layout to get the most enjoyment. Even though everything might operate perfectly in the early stages, that may not be the case if areas of the railroad can't be easily accessed to clean and properly maintain. You'll need to be able to reach all the wiring, the scenery, and the trackwork.

## 9. Making the grades too steep

Don't make your track gradients (slopes) too steep. Locomotives do look magnificent struggling to haul fully laden cars up a grade, and perhaps crossing over a bridge above another train on a lower level. However, grades require lots of space, so if you don't have enough benchwork space for trains to comfortably navigate a grade, you are better off with a flat track.



Grades for mainlines should be kept to 2% or less. Grades on branch lines are sometimes in the 3% to 5% range, but this can pose problems. For example; the pulling power of a loco climbing a 2% gradient can be reduced by up to 50% or more. Extra effort required if the grades are on curves, as they often are if the train is to climb to a summit without requiring space for long straight lengths of track.

The descent can be equally demanding. If the grade is too steep, the engine might battle to hold back the cars as they try to race down behind. The weight of the cars could cause the loco to buck or jump the rails, because the downhill force is stronger than the gravity holding the cars on the track.

There are several ways to manage these problems, including not making grades too steep, taking care when mixing curves and grades, making trains shorter, and adding an extra engine(s) at the front/back/middle of the train to help with the ascent and descent.

SCALE	CLEARANCE	2% RUN	3% RUN	4% RUN
Z	1.5" (40mm)	75" (2000mm)	50" (1333mm)	37.5" (1000mm)
N	2" (50mm)	100" (2500mm)	66.67" (1666mm)	50" (1250mm)
TT	2.5" (65mm)	125" (3250mm)	83.33" (2167mm)	62.6" (1625mm)
HO	3.5" (90mm)	175" (4500mm)	116.67" (3000mm)	87.5" (2250mm)
OO	3.75" (95mm)	187.5" (4750mm)	125" (3167mm)	93.75" (2375mm)
S	5.5" (140mm)	275" (7000mm)	183.33" (4667mm)	137.5" (3500mm)
O	6.5" (165mm)	325" (8250mm)	216.67" (5500mm)	162.5" (4125mm)

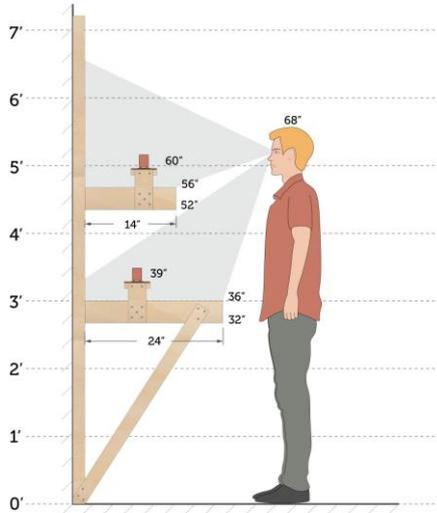
The run distance pertains to just one grade.  
For an over-crossing, two runs of the distance is needed for the train to rise and descend.

This chart shows the scale clearances you'll require for tunnels and bridges. A track that rises will usually come down again, so the length of a grade will need to allow for both rise and descent.

To help calculate grades you can use the free grade calculator (and several other free model railroading calculators) at

<http://www.modelbuildings.org/free-calculator-tools.html>

## 10. Making the benchwork too high or too low



Although not directly related to track planning, constructing benchwork at the wrong height can adversely impact railroad operations and the operators.

Model trains generally look best when operated at eye level. If the benchwork is too low, the track is also too low. If the benchwork is too low, the constant bending over to access items on the layout could put you (the operator) at risk of back problems. Squeezing beneath the track to access wiring etc. could pose further problems.

Unless you're really short, or have double deck or similar constraints, 42 inches should be a minimum height. Something closer to 48 inches OR MORE would probably be more practical depending on how tall you are. However, making the benchwork too tall will pose its own problems. The higher the benchwork, the harder it is to stretch and reach derailed cars at the back of the layout. Your visitors (including children) will want to be able to see all the details without having to pull themselves up to see the track. You might need to put in ramps or steps so that viewers can comfortably see.

## 11. Making the aisles too narrow

This is a delicate one to answer, because we all have different waist measurements. Don't make the aisles too narrow if you plan on gaining a lot of weight, or inviting a lot of friends over. Some railroaders get by with aisles of two feet or less, but usually three feet is necessary if you have two or more operators at once. Let's face it; it's not a lot of fun breathing in to squeeze by another person every time you need to move around the layout. It is possible to skimp aisle space in some areas, but usually the main viewing or operating area needs to be a comfortable width for two or more people.

When you visit a train show you'll find that people often congregate around scenic areas of interest such as a turntable, long bridges, engine facilities and busy yards, tunnel portals, a mining town, a train station, or anywhere there's activity. The same will probably happen with your layout; visitors will gather around areas of interest. In those areas there needs to be sufficient aisle space to accommodate the congestion.

Also be aware of dead-ends at the finish of aisles. Although this is not always avoidable, it's not ideal when visitors or operators get trapped by others blocking their exit.

## 12. Making the benchwork too wide

Stretch your arms out and see how far you can comfortably reach without losing your balance. Now imagine you have a train derailed at the rear of the layout, or you need to manually uncouple a few cars, or adjust the throw rod on a turnout, or solder a rail

wire, or remove some dust. Could you comfortably reach the spot and complete the task? Can you reach in two feet and still manipulate your fingers to fix a delicate problem? Does the scenery you are planning get in the way of your reach?

There's one thing you'll discover: the higher the benchwork, the shorter your reach. The worst effect is to have to put your weight on the layout to reach over. That risks damaging scenery, track, electronics, and valuable trains...or yourself!

Try making access holes so you can crawl under your layout and pop the top of your body up through the middle. If you are tall or no longer a spring chicken, then crawling under a layout is not the easiest of tasks. Although you probably won't get any taller, you certainly won't get any younger, so planning for the future is the wisest approach.

With that in mind, consider making your benchwork accessible from both sides if feasible, and aim to keep it to 2 feet wide (or less). There's never enough space, especially if you want a wide layout with lots of scenery and track. However, the maintenance and access practicalities need careful consideration. If you are unable to reach it, you won't be able to maintain it, and if you can't maintain it, your trains will not run on it.

### **13. Making the layout too big for the train room**

There is an amazing layout that was set up in a standard sized bedroom that would normally fit two single sized beds. The layout looked fantastic from the doorway, but to get past the door frame a duck-under the benchwork to the pop-up gap in the middle was necessary. The owner (an 86 year old) crawled under, but there wasn't room for more than one person in the middle. To retrieve a derailed train he climbed on some portable steps and leaned over with a stick – not ideal.

The point is this - try to create a walk-in design if possible. If that's not possible, then consider incorporating a lifting, swinging, or dropping bridge to better access the layout. However, be aware that they pose some construction, track-laying and wiring issues.

### **14. Lack of visible track**

Model railroading is all about showcasing trains, so having too much hidden track is generally a big no-no! That is not to say that trains shouldn't disappear momentarily into tunnels, or behind structures or vegetation. Scenic features can add a great deal of interest, as long as they don't dominate and detract from the trains.

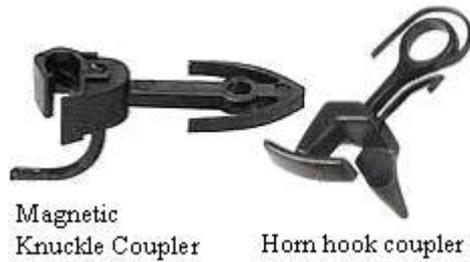
Keep in mind the need for cleaning and maintenance, and train retrieval on hidden hard-to-reach sections. Keep the track out in the open as much as possible.

### **15. Track turnout engineering that doesn't work**

Track plans often look good on paper, but sometimes fail the practicality test. Any hand drawn track plan needs to take into account that the curved turnout leg might be broader than it looks on paper. The turnouts shouldn't resemble a right angle. It's no fun and a waste of time to convert the plan into track and roadbed only to discover it doesn't fit. The best approach is to carefully measure the actual turnouts being used BEFORE getting started. Build a temporary section of the track including the turnout on your kitchen table. Get a measuring tape and measure the true size of the

turnout arrangement you are planning. You will usually find that the turnout takes up quite a bit more space than your plan shows.

## 16. Coupling and uncoupling problems



When planning your track configuration, consider whether you want to do a lot of switching. There's no right or wrong answer because modelers are all in this hobby for different reasons. Some like switching, others are not so keen on it and prefer to simply run long trains.

It's a fact that all couplers, regardless of the scale, will operate better on "straightaways" and on gradual curves than they will on a hairpin bend. Automatic uncoupling doesn't work well on curves. Uncoupling manually is possible, but certainly not as easily as it would be on a straight track. This is a good opportunity to obtain a coupler height gauge for your scale and measure all your couplers. Mismatched coupler heights aggravate uncoupling problems on curves.

If you're planning on using your yards for switching (and not just for display), then incorporate as many straight sections as possible to enable switching maneuvers.

## 17. Turnouts in tunnels

If you are new to the hobby tunnel turnouts are not a good idea. Although they can add interest, they can also cause the beginner a lot of problems. Turnouts can be problematic even when they are easily accessed, so hiding a turnout inside a tunnel can make the task of fixing issues even more complex, not to mention the possible difficulties associated with maintenance and cleaning.



Operational issues also need to be considered. Can you be 100% confident the hidden turnout has "thrown the right way" for the approaching train? If there are no alternate ways of making your plan fit, then a tunnel turnout could be an option, but consider the drawbacks. A better idea would be to place the turnout a short distance in front of the tunnel mouth and use a double portal.

## 18. The operator (Engineer) losing control

Walk-around wireless DCC control overcomes many operational issues, but the layout still needs to be manageable if you are the only operator. You'll not only need to be able to reach everything, but you'll also need to be able to see everything including car numbers.



Having a busy factory/warehouse industrial scene is a great idea because there will be a lot of traffic and train movements. Remember, though, you'll need to be able to stand close to where you are doing the switching and not have to walk five feet around the layout to uncouple a car you can't reach. Throwing a manual turnout from a distance is inconvenient at best.

Before laying out your track, imagine you are the engineer or operator in charge, and think carefully about where you will need to stand or sit to retain full control over the layout. Confirm that everything is where it should be and close enough to properly do your job of operating the railroad.

## 19. Tripping over cords and wires

Walk-around control is a great innovation and wireless throttles are even better. With wireless you can walk around following your train without plugging in the cord every few feet. Knowing how many operators and how many locomotives is something to consider, because this will help you determine the number of throttles or cabs and power boosters you'll need.

By comparison, a tethered walk-around throttle is one that you can unplug and plug in again at different locations while the train continues moving. They are a good way to enjoy train operations and troubleshoot distant track problems.

If you are going to use tethered throttles you'll need to allow for them when planning your layout. You'll need to ensure there are sufficient jacks for the throttles to plug into. The jacks will need to be in convenient locations. If you intend to have more than one operator, you'll need to ensure the cords don't get entangled when each operator is following their train around the track.

If your throttles are in a fixed location and can't be unplugged, where they are located will be critical if you are to reach the key areas on the layout. Also consider the possibility of someone tripping over the cord, or it blocking someone's access down the aisle. It comes down to planning for efficient management of train traffic, people traffic, and ease of access to all parts of the layout.

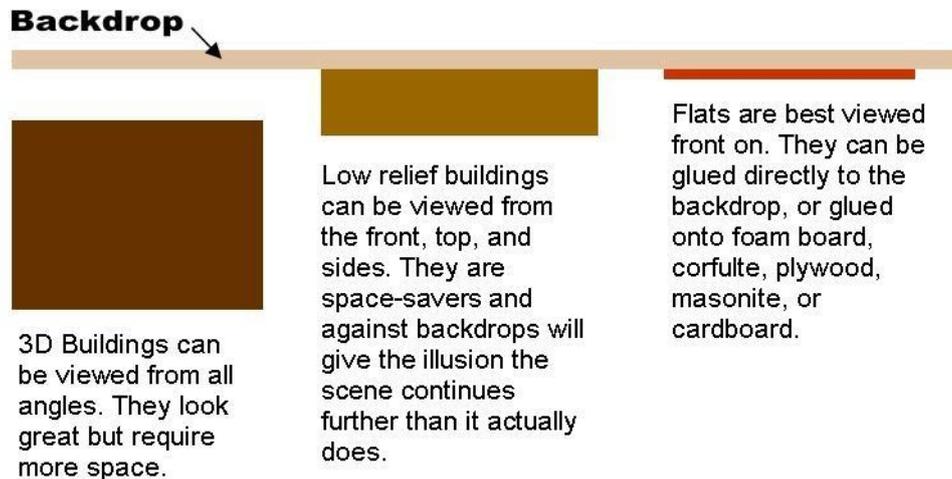
If you are interested in knowing more about DCC and how to get the most from it, then the "DCC Model Trains Handbook" by Tony Richardson is an excellent starting point <http://www.dccmodeltrains.org>

## 20. Not doing justice to the scenery

If you have a narrow shelf layout or like a lot of switching work, scenery might not be as important as having more track. The type of layout you build is really over to you,

and there are clever ways of incorporating more scenery and structures without a cluttered appearance.

Thin low relief buildings (with part of 3 sides and a roof), or “flats” with just the frontage visible, are an excellent solution for positioning against backdrops. They can not only look like full-depth buildings, but can also give the illusion the layout stretches much further than it really does.



Low relief buildings can be constructed from low-priced corflute (from a DIY store), foam board, or card. They can even be scaled down in size by 5%, 10% or more to provide the illusion of them being miles away in the distance. They are very versatile and exceptionally strong when assembled. Here are some excellent examples of low relief building that can also be made as flats:



<http://www.modelbuildings.org/low-relief-buildings-G.html>

If you are using plastic, wood or card kits to make 3D buildings keep in mind that they'll require more space. If you are going to position buildings between tracks you'll need to allow not only enough room for the structure, but also for the roadbed, maybe a fence, or perhaps a road or path leading to the building.



The buildings can be made to HO scale, S scale, OO gauge, or N scale  
<http://www.modelbuildings.org/Low-Relief-Buildings-B.html>

These 6 buildings are also available for O scale here <http://www.oscalebuildings.com>

A building cramped up against the track won't look natural, especially if it's so close the miniature plastic people need to open the doors to let a train pass through. Buildings aren't normally hard up against track unless they are a factory or warehouse backing onto the tracks (see below), a signal box, telegraph office, train station, goods depot or something like that.



<http://www.modelbuildings.org/background-building-plans.html>

Residential houses, shops, etc are usually set back from a railway line because they need road access, sidewalks and room for scale sized vehicles, people and animals to complete the scene. Here are some really good examples of 3D houses (and garages) from the same website:



<http://www.modelbuildings.org/scale-houses-8-house-models-to-make.html>

Positioning scenery at different levels can add considerable interest to a layout. Even just running adjoining track at different levels can offset the predictability of a simple track layout. However, raising one track higher than another needs to look natural and stay in context with the scene. The tracks will need to flow scenically, so

they may require a retaining wall, small cliff face, or raised grassed hill to achieve the right look.



<http://www.modelbuildings.org/wild-west-scale-models.html>

## 21. The layout doesn't make sense visually

Try to keep to a layout theme, or at least use carefully planned scenic transitions or scenic dividers if want to mix eras, seasons, or extremely different geographic locations.

It is easy to get carried away with something new at the hobby store, but will it be a logical fit with the rest of your layout? Will adding more items just clutter your layout? Does placing a mountain in the middle of a desert scene make sense? Will a 1972 British MGB sports car look out of place in a 1960's US town scene?

## 22. Too much happening on the layout

Real railroads typically stretch for hundreds of miles, often through sparsely populated, non-urbanized areas. Obviously, without owning a football stadium packed with millions of dollars, it is impossible to accurately replicate a complete railroad as a scale model, so compromises will always be necessary. It will be a matter of deciding what to include and what to leave out.



Brian Miller has some excellent ideas in his eBook "Model Railroading Scenery Construction Techniques."

<http://www.modelrailwayscenery.org/model-railroad-scenery.html>

If, for example, you wanted to include a port serviced by freight yards (for lots of switching action), and also include a mining town and some rural scenes all on the same layout – then it can usually be achieved. Instead of the trains travelling hundreds of miles from the mine to the port, you could create the illusion of distance by using some clever scenery techniques. Tunnels are one such technique; a train can disappear into a tunnel and mysteriously reappear on the other side where the scenery could start to change in nature. That way you could have two feature scenes (a mine and a port) at different ends of the layout with mountains, countryside, bridges, and even a small town or a couple of buildings in between. You probably won't have space for a large mining town with 20+ structures, but a small mining town with half a dozen structures could look equally good. Low relief buildings, vegetation, and other scenic effects against the backdrop can add dimension and give the illusion of a bigger scene stretching off into the distance.



<http://www.modelbuildings.org/mining-town-buildings.html>



If you are building a port and want to make low-cost intermodal containers for your trains you can get 40 plans here <http://shippingcontainermodels.com>

Some scenery, structures, and accessories (like huge mountains, large lakes, big roadhouses etc.) look great and add a lot of interest, but they can be “space-wasters.” It is really a case of deciding priorities, and deciding which scenery, structures, and accessories are essential and which one’s you could possibly do without. Too many features might look cluttered and spoil the overall effect.

Dozen more buildings are available at <http://www.modelbuildings.org> including special big value packs saving 50% to 80% of individual list prices. Range includes: trains stations, church, silos, barns and farm buildings, warehouses, terraced houses and shops, grain elevator, goods depot, engine sheds, signal box, telegraph office, crossing shanty, station platforms, mining town, wild west town, residential houses and many more downloadable plans to construct. Full details online.

### **23. Making the structures too small**

One solution to save space and fit more into a layout is to reduce the size of the buildings and industries. However, to appear natural the structures need to be to scale, unless you are deliberately positioning them at the rear of the layout to give the impression they are in the distance. Again, low relief buildings or “flats” can achieve this objective without compromising the reality of a scene. Unlike plastic models; downloadable buildings can easily be scaled on a home printer, and so can be reduced in size or duplicated (printing several copies) if necessary.

Having one or two reasonably large industries will usually look more realistic than several tiny factories or warehouses that are almost identical in size to the boxcars lined up out front.

### **24. Not enough workspace**

Filling every square inch of your space with the layout itself might be very tempting, but where do you undertake repairs, assemble kits, lubricate and service locomotives, weather cars, or work on new projects? Maybe you do those jobs in

another room, or perhaps you have a pull-out workbench stored under your layout. A good well lit, well organized clean work space is an essential requirement for any hobbyist.

## **25. Not enough staging and storage**

Apart from having a layout and a work area, you'll also need storage space for parts, supplies, non-operational trains etc. Under the bench is one option, particularly if you are able to pull cabinets out on wheels and still access the under-bench wiring. Shelving above the layout is another option to consider. Be careful, though. You don't want items stored on the shelf to suddenly take flight and become part of your layout, complete with collateral damage.

Incorporating staging track into the layout is another option for storing and/or displaying more trains. Having hidden spurs or sidings where trains can come and stay for a while can increase flexibility. It is usually best to install staging tracks at the planning stage. You'll probably need more than you think, because they'll soon fill up as your collection expands.

## **26. Trains with nowhere to go**

Just as on a real railroad, model rail traffic needs somewhere to go to and somewhere to come from. That's why an interchange is one of the key elements for realistic operation.

Without an interchange of some kind, it can look a bit strange when boxcars and motive power from different railroads appear on the same layout. In real life railroads get a lot of income from interchanging cars with other railroads. A model railroad can come to life with action and realism in the same way.

An interchange doesn't need to be fancy. It could be as basic as a secondary track branching off the edge of the layout to a make-believe location, or a more complex classification yard for sorting trains from other railroads.

## **27. Congested yards**

This follows on from the last two points, because railroads need plenty of space and track to operate efficiently. Yards are where train operations can come to a grinding halt if they are too crowded or not organized properly. Apart from being a place to store cars, a yard is where switch engines and yard workers manually maneuver and shuffle cars around. A larger loco might drop off empty cars and pick up full cars ready for departure. If the cars are not ready, or there is a bottleneck, it can cause delays in schedules which would cost real railroads money. If the switcher engine is constantly experiencing delays trying get its work done, you might need to lengthen the yard tracks or add a thoroughfare track (often called a "run-around") so it can quickly get to and from each end of the yard. Ideally, a switcher should be able to do its job without interrupting traffic on the main line.

At its most basic, a rail yard will need an arrival track for the incoming trains, one or more sorting tracks for rearranging cars, plus a departure track for departing trains.

If the yard becomes too congested you might need to reduce the workload required of your yard.

## 28. Insufficient sidings

Trackwork is not just about laying the right track in the right place. It is also about planning how the trains will run, and how to avoid operational problems which disrupt the flow of rail traffic. It's not usually a problem when running just one train, but the minute you add another train (or several), operations can be affected or slow to a crawl.

More sidings will usually lead to smoother operations. With three (or more) sidings, a second train will be able to spend most of its time running instead of waiting for the other train to pass. With just two sidings, the train will need to rush between sidings before the other train gets there.

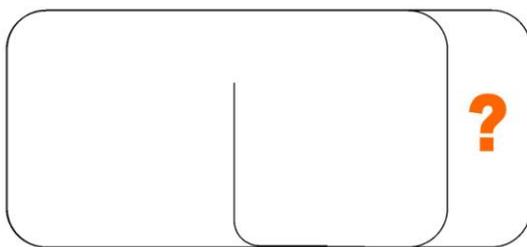


With just one siding, one train will have to wait while the other runs. Three or more sidings is usually best, depending on space availability. Also keep in mind that the length of a siding is going to determine the lengths of your trains. Sidings that are too short to accommodate the shortest train on your layout will be useless.

## 29. Cross-over and double track problems

This point also relates to avoiding operational problems. Will it be possible for trains running in either direction to use the wrong main for a passing siding? Will trains running in either direction have access to all spurs, sidings, and yards? Before pinning down the track, work out the routes in advance. There's no fun in finding out later that your trains can't do what you wanted them to do, or go where you wanted them to go.

## 30. Duplicate routes for no purpose



Duplicate routes (as shown above) are something not infrequently seen on layouts, but it's not something that's likely to happen in real life. It would be unusual for a railroad to give a train a choice of two routes to the same destination. Real railroads are all about making money, so they wouldn't want a train to travel the long way round, unless it might be a scenic tourist train.

If the layout is going to look something like this, there needs to be a purpose for having two routes. Having different industries on each or adding an industrial spur on one route is a possibility. Another option is to apply some kind of physical restriction on one route, such as a tunnel with height restrictions, or a bridge with

weight restrictions. This would force some trains to take the longer route to reach the same destination.

Having parallel routes for no reason is just a waste of valuable space that could be put to better use.

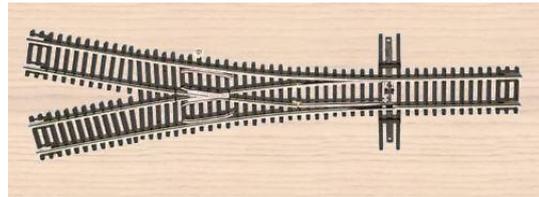
### **31. Complicated switching**

Complex switching arrangements are not necessarily a bad thing if that's what you like doing. It's just that on a real railroad, track and switching are kept as simple as practical. However, the rules are for breaking if you like doing switching puzzles with short tail tracks and multiple switchbacks – because model railroading is about having fun, and doing what you personally enjoy regardless of what others might think.

That said, just be aware that unintentional switching puzzles can be frustrating. If you are not good at working movements out 4 or 5 steps before required, then complex switching might not be for you. If you get frustrated and don't use that section of track it defeats the purpose.

### **32. Unnecessary reversing connections**

It comes down to what you want from your railroad, but be mindful that reverse loops and wyes require a lot of space. Again, in real life, railroads don't usually turn around trains just so they can return the route they came.



However, if you like operating wyes for turning locomotives and 'single-ended' rolling stock, then why not? Just remember, they require space and with some equipment also pose special electrical wiring issues.

### **33. Trains not kept busy enough**

To operate at a profit, the railroad's resources (trains, employees etc.) need to be kept busy. With this in mind, it follows that a model railroad should also be a "hive of activity." If there's not enough work or business to keep the trains busy, or if they just go round and round in circles, then a layout can become boring. Although it's not advisable to cram everything in just to make the layout look busy, the more varied activities your railroad has, the more enjoyable it will be for you (and your friends) to operate and/or observe.

To keep activities on your railroad interesting your trains could:

- pick up and deliver passengers
- load and unload freight deliveries of various kinds
- travel the main or branch line
- divert into sidings to allow other trains to pass
- wait at signals
- have cars rearranged in a yard
- interchange cars with other railroads
- maintain track with specialized Maintenance Of Way (MOW) equipment
- undergo minor maintenance on a siding or RIP track
- undergo locomotive maintenance in an engine shed or roundhouse
- be redirected on a turntable or wye



The list goes on. Keep your trains busy and you'll never get bored.

This list of mistakes is by no means complete. Every layout is different, and you'll no doubt think of specific problems relating to your layout before (or when) they arise. Hopefully, you will be able to identify potential trouble spots or planning errors in advance, as avoiding issues in advance is usually a lot easier than trying to rectify them after they have happened.

The important thing is that you have started thinking about ways to sidestep potential layout and track planning problems. You will already be better equipped than many in the hobby.

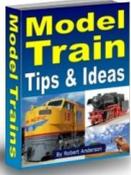
***Other recommended resources:***

Model Train Blog (bookmark this site to visit it weekly for updates)  
<http://blog.model-train-help.com>

The blog has a link where you can post questions and have them answered by some of the 10,000 weekly visitors to the site. The blog is very popular, so to maintain the high standard only the best, most clearly worded questions get published.

You can download a free sample building <http://www.modelbuildings.org/free.html>

Download 16 Free train room signs  
<http://www.modelbuildings.org/free-train-signs.html>



If you haven't already got my "Model Train Tips & Ideas" eBook you can download a copy for free here

<http://www.modelrailwayscenery.org/free-railroad-tips-ebook.html>

The 4<sup>th</sup> edition of my best selling "Model Train Help" eBook is available here

<http://www.model-train-help.com>

Get started with model railroad mini controllers here

<http://www.dccmodeltrains.org/mini-controllers.html>

More model train eBooks <http://www.modelrailroadhub.com/How-To-e-Books.html>

*Happy Railroading!*

*Robert Anderson*

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