

Building HO Scale Dual Gauge Turnouts Using Fast Tracks Assembly Fixtures

Tips and Techniques

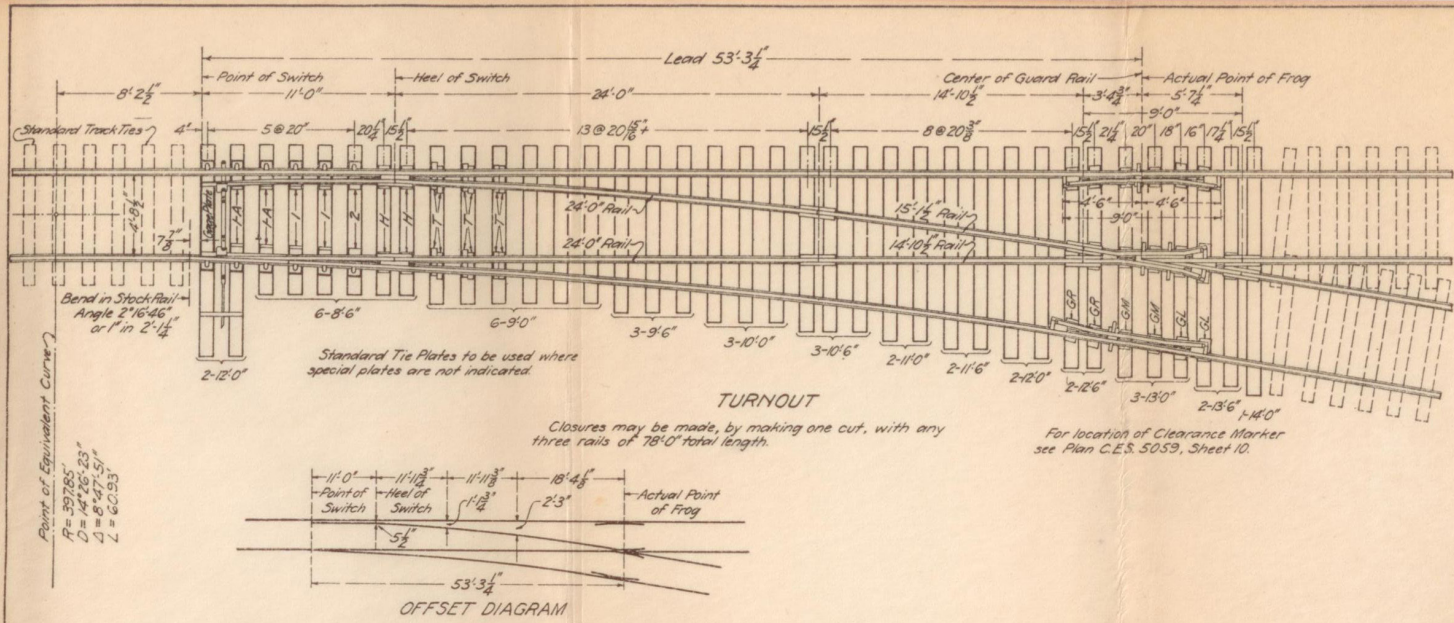
A Case for Dual Gauge

- Colorado in particular had several terminals that featured dual 3' gauge yards used for freight transfer and/or engine servicing.
 - Denver
 - Salida
 - Alamosa
 - Montrose
 - Mack (Uintah Railway)
- Size comparisons between narrow gauge and standard gauge equipment is visually striking and the added operations it presents is very interesting

Definitions

- Switches or Turnouts?
 - “Switch” is a term used by real railroad operating departments to describe the movable portion and throw mechanism of the turnout assembly. Switches are thrown by “Switchmen”.
 - “Turnout” is the term the operating departments use to describe the entire assembly: the points, frog, guard rails, all the fixed rails, and the machine.
 - These terms are used interchangeably today in model railroading. However, referring to a turnout instead of a switch in model railroading saves “switch” for our little electro-mechanical mechanisms (DPDT) that change polarity for us.

Railroad Templates



Point of Equivalent Curve
 $R = 397.85'$
 $D = 14^{\circ}26'23''$
 $L = 60.93'$

DATA

Frog Number	6 1/2
" Angle	8°47'51"
" Length	9'-0"
Length of Switch Points	11'-0"
Heel Spread of Switch	5 1/2
Switch Angle	2°16'46"
Lead	53'3 1/2
Radius of Turnout Curve	341.25'
Degree " " "	16°51'01"
Radius of Equivalent Curve	397.85'
Degree " " "	14°26'23"
Central Angle of Equiv Curve	8°47'51"
Length of Equiv Curve	60.93'
Straight Closure	38'10 1/2
Curved " "	39'1 1/2

BILL OF SWITCH TIES

NO.	SIZE	LENGTH	FT. B. M.
6	7 1/2"	8'-6"	267.75
6	"	9'-0"	283.50
3	"	9'-6"	149.63
3	"	10'-0"	157.50
3	"	10'-6"	165.37
2	"	11'-0"	115.50
2	"	11'-6"	120.75
4	"	12'-0"	252.00
2	"	12'-6"	131.25
3	"	13'-0"	204.75
2	"	13'-6"	141.75
1	"	14'-0"	73.50
37	"	"	2063.25

Head blocks, 12'-0" long, as shown are for a switch stand with 3'-6" connecting rod. Where 5'-0" or 6'-0" connecting rods are used, head blocks should be 14'-0" or 15'-0" respectively.

REFERENCES

Standard	11'-0" Split Switch	C.E.S. 5661
"	No. 6 1/2 Clamp Frog	" 5631
"	9'-0" Guard Rail	" 5645
"	Comb. of Turnout Mat'l	" 5649

THE A. T. & S. F. RY. SYSTEM
STANDARD

NO. 6 1/2 TURNOUT

RAIL; 75 LB. TO 90 LB INCL. IN ALL LENGTHS.
FROG; RIGID. SWITCH; 11'-0".

TIES; 7" X 9" WITH 6" VARIATIONS IN LENGTH.

C. E. SYSTEM. NO. 5680.

CHICAGO, MARCH, 1928.

APPROVED: *J. H. Mink*
VICE PRESIDENT

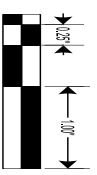
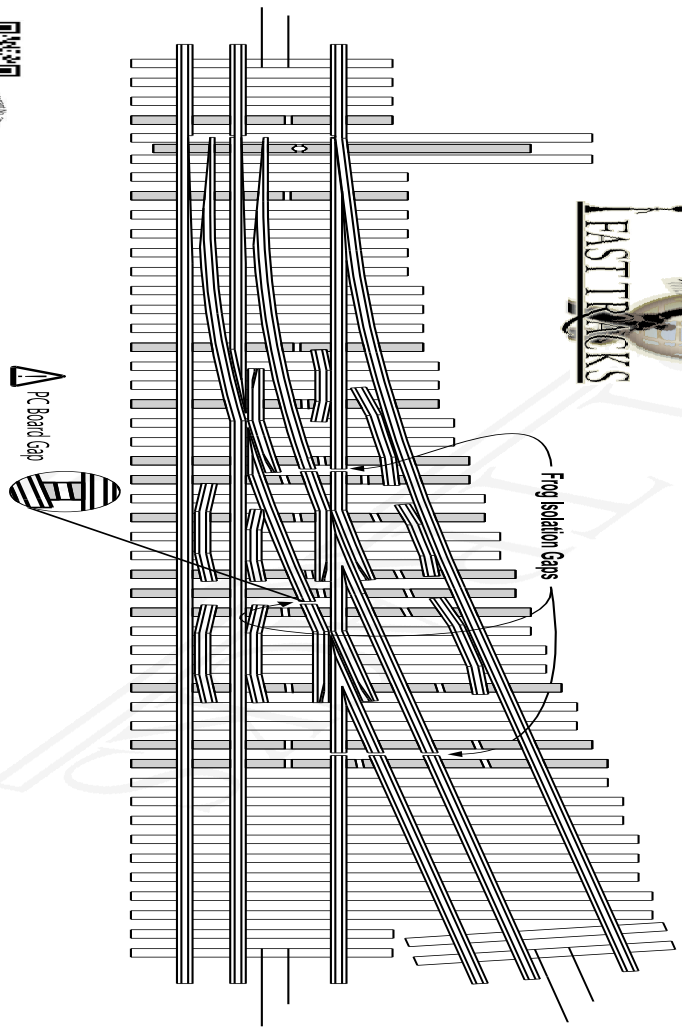
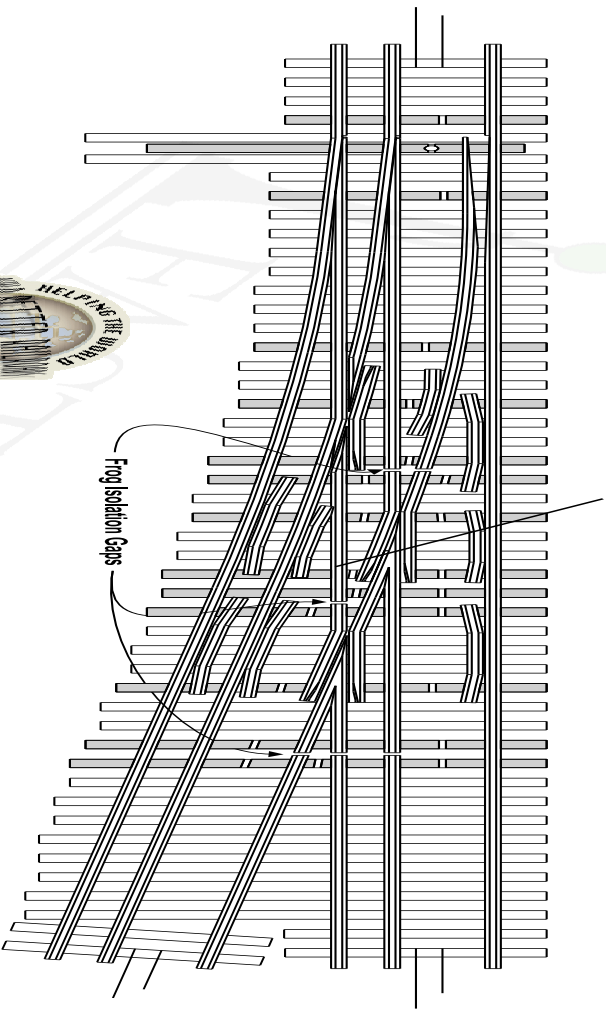
APPROVED: *W. E. ...*
CHIEF ENGR. SYSTEM

This drawing supersedes No. 6 1/2 Turnout C.E.S. 5020 dated May 1914.

Fast Tracks Templates

H0 Scale, #6 Dual Gauge Turnout P1NDF040N0254J1E1X

Narrow Gauge on Left



www.handeltrack.com

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Before Fast Tracks

- Traditional hand laid turnouts.
 - These were usually built in place on the layout.
 - The advantage is the turnout exactly matched your road bed.
 - If the frog number was 5 or 6-1/2, it didn't matter. Unfortunately, this method requires good solid road bed, quite a bit of skill and judicious use of track gauges to attain any consistency.
- Shinohara commercial turnouts were available for those wishing to design and build an HO layout with dual gauge track.
 - It is rumored that Shinohara has closed and supply of those is drying up.
- There were/are a couple of cottage industries like Railway Engineering that build dual gauge turnouts made to order, but they are quite costly and wait times can be long.

Before Fast Tracks-cont'

- Commercial turnouts can also present unique challenges for the dual gauge hobbyist.
 - One issue with commercial turnouts is the use of plastic ties, which if one is not careful, can melt into a hopeless expensive mess with too much heat, soldering on feeder wires.
 - They are also very difficult to repair and/or tinker with in the event that something goes wrong.
 - Its also a known that with Shinohara turnouts the frog gauge tends to be a little wide and HOn3 rolling stock will shake, rattle and roll going through the frogs...but they will go through...usually

Fast Tracks Assembly Fixtures

- Fast Tracks assembly fixtures are a great option to commercial turnouts and traditional hand laid:
 - Once the cost of tooling is amortized, cost per turnout drops dramatically.
 - Can be built at your bench
 - Can be tuned to operate virtually trouble free.
 - Have a nice prototypical look, are offered in popular HO rail sizes including code 40 (narrow gauge only) , 55, 70, 83,in dual gauge and code 100 (std gauge only).
 - You also have the option of building unique configurations, such as dual through, narrow or standard gauge diverging, or any combination in between plus narrow and standard only.

Tools & Supplies

- www.handlaidtrack.com
 - Assembly fixtures
 - Stock rail & point/frog/toad filing tools
 - Quicksticks laser cut switch ties
 - Machined pc ties
 - PBL “Trick 10k” solder and Stay Clean soldering flux
 - Solder wick
 - Weller 35 watt soldering iron (light blue professional grade)
 - Xuron or similar quality Rail nippers that shear instead of “smash” the rail
 - Sharp files, a 10” mill bastard and a Fast Tracks Points Shaping file
 - Jewelers saw
 - Handy but not a necessity:
 - Bench top belt sander for fitting the points to the stock rails (Fast Tracks now has a stock rail filing jig as well)
 - Dremel tool. Diamond impregnated cutting wheel, tiny drums, and various other tools occasionally aid in some operation, usually to fix something that has gone wrong!

Resources

- Fast Tracks has wonderful resources and free materials such as videos, scale turnout templates and instructions on how to use their system-so I won't be going into that detail. This is more my personal preferences based on years of use and operations at our club layout.

General Construction Tips

- I use a tiny sharp metal chisel point tool to hold rail in contact with pc tie while soldering. A sharp chisel point does not act as a heat sink and does not melt as other similar tools.
- Dremel tools have their place, but are best left for other grinding chores, and hand files used for rail shaping of turnouts.
 - You have more control and can make quick work with sharp files.
 - Files can heat rail rather quickly so use caution and slow down. Files only cut on the forward stroke so back and forth motion only creates more heat, and does not go any faster, just lift the file and repeat.
 - Use a card file to keep cutting edges clean, fine brass or stainless steel brushes work well too for cleaning file. Sometimes a sharp Exacto blade is needed to clean out pesky grooves that have metal stuck in them.
- Filing a slight radius on guard rails helps to ensure various track cleaning methods will not to snag on the sharp edges.
- Clean up the cut rail end with a file as there will always be some slight amount of flash even with quality rail nippers,
 - This helps to square up the end and keeps flash from allowing the rail from sitting flush with top of PC tie and/or not allowing rail to fit in jig grooves.

General Construction Tips Cont'

- Use only enough heat to complete the solder joint. Excessive heat can delaminate the copper foil from the substrate and weaken the joint. 35 watts ~850 deg is about right to get heat on joint fast and keep pc ties from becoming damaged.
- Hold chisel on rail for a sec or two just until the solder hardens to keep rail from lifting or moving out of alignment.
- 60/40 rosin core solder keeps iron tip tinned.
 - Clean/wipe tip often on wet sponge, reapply rosin solder.
 - Acid flux will cause tip to deteriorate and corrode faster. Wiping tip after each couple of joints and re-tinning keeps things going between rail shaping operations. Keep several spare tips on hand in case tip has become corroded and unusable.

General Construction Tips Cont'

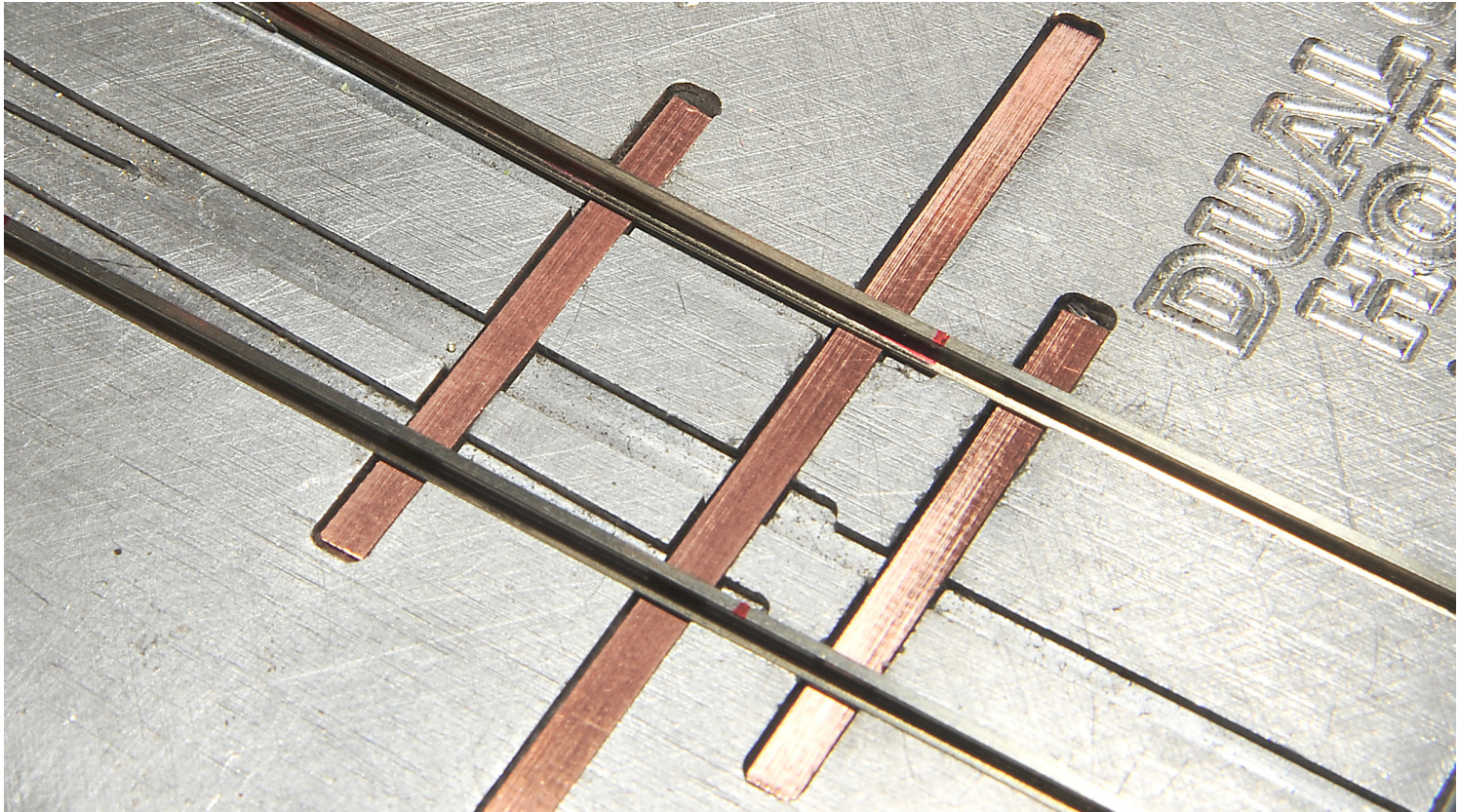
- PBL's "Trick 10K" solder is a great alternative to 60/40 rosin core solder for turnout building. Its very strong, contains no lead, and is easier to use.
 - Use a small paint brush to apply just enough PBL Stay Clean flux to the joint to quickly clean and flow the solder.
 - Be mindful to keep flux right around the joint so solder will not flow out onto the tie.
 - Applying too much flux and it will wick around the sides and seep under the pc tie and begin to corrode the aluminum jig. Should wash the jig in warm soapy water with an old tooth brush after each soldering session to keep corrosion in check.
- Applying solder to the joint
 - The 10k solder does not have a flux core so when you lightly touch the iron tip to the solder, you can just "nik" off the tiniest bit of solder.
 - Without flux, the solder will not flow back onto the tip allowing it to be placed right into the joint.
 - Slowly rotate the iron tip in a tight circular motion to release the heat and puddle the solder and finally lift it just onto the rail for a strong joint.
 - I like this technique as compared to holding and feeding solder into the joint; 1. holding solder does not allow you to hold a tool so you can hold the rail in contact with the tie, and 2. usually results in way too much solder added to the joint. Less is more in this case!

General Construction Tips Cont'

- I like to first lay in the stock rails, then build the frogs/toads, then points, the rest of the rail and finally add the guard rails. The last step is to solder the points to the throw bar.
- Even though you are using a fixture, sometimes, there are minor alignment issues and checking all the flange ways, points and track with a NMRA track gage can save lots of headaches down the road.
- Rolling a wheel set through the switch can sometimes reveal an issue...and its rewarding to see how smooth it rolls through all the complicated maze of rail!
- Bending rail points require slightly more force to fully close than hinged points so if you are using a switch machine keep this in mind as you may have to use a stiffer wire. This is especially true with Tortoise slow motion switch machines.

Construction Tip: Stock Rails

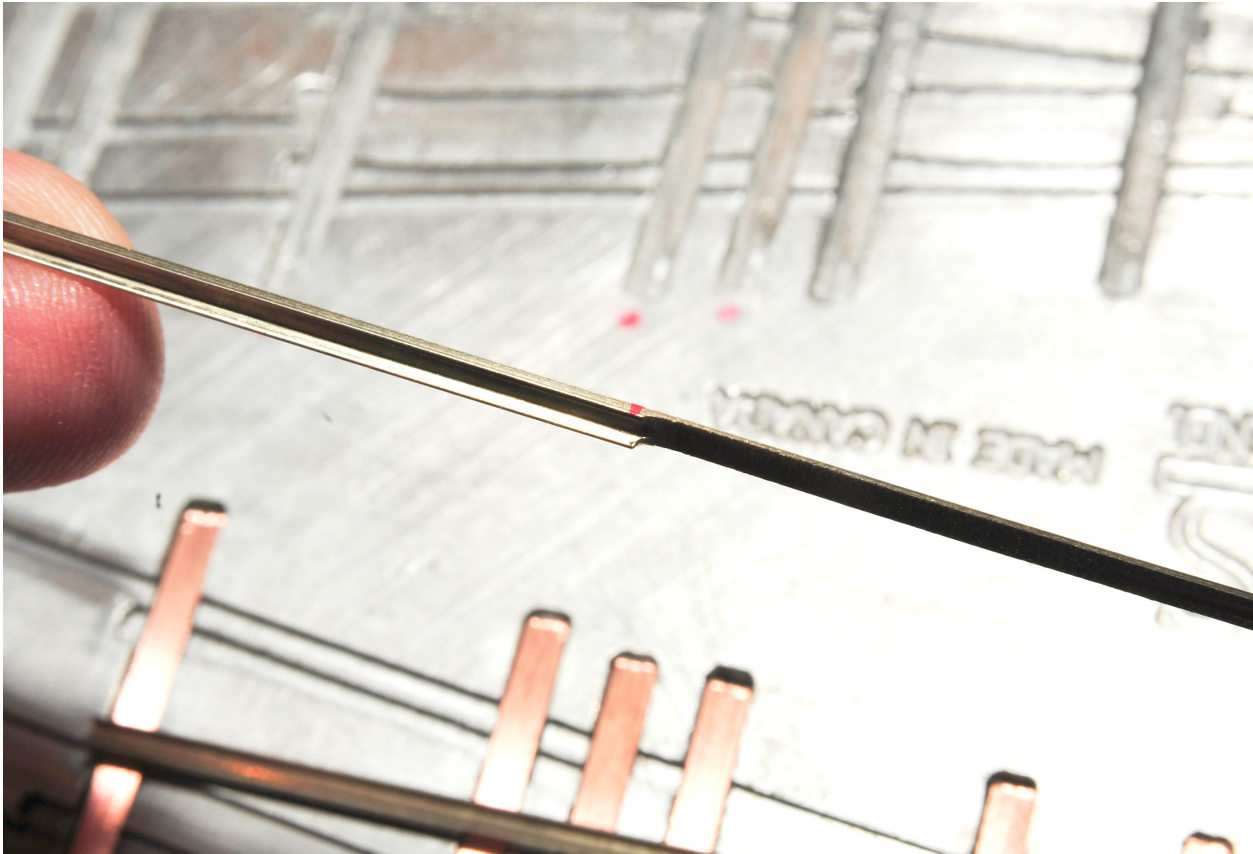
- I have found that test fitting rails into jig, and pre-bending curves, alleviates “Pre-Stressing” solder joints. Also keeps rail from slipping on tie as solder hardens. Marking rail with a Sharpie ultra fine point aids in construction



- Next solder the stock rails to the pc ties. I solder both sides of the rail where for added strength.

Construction Tip: Stock Rails

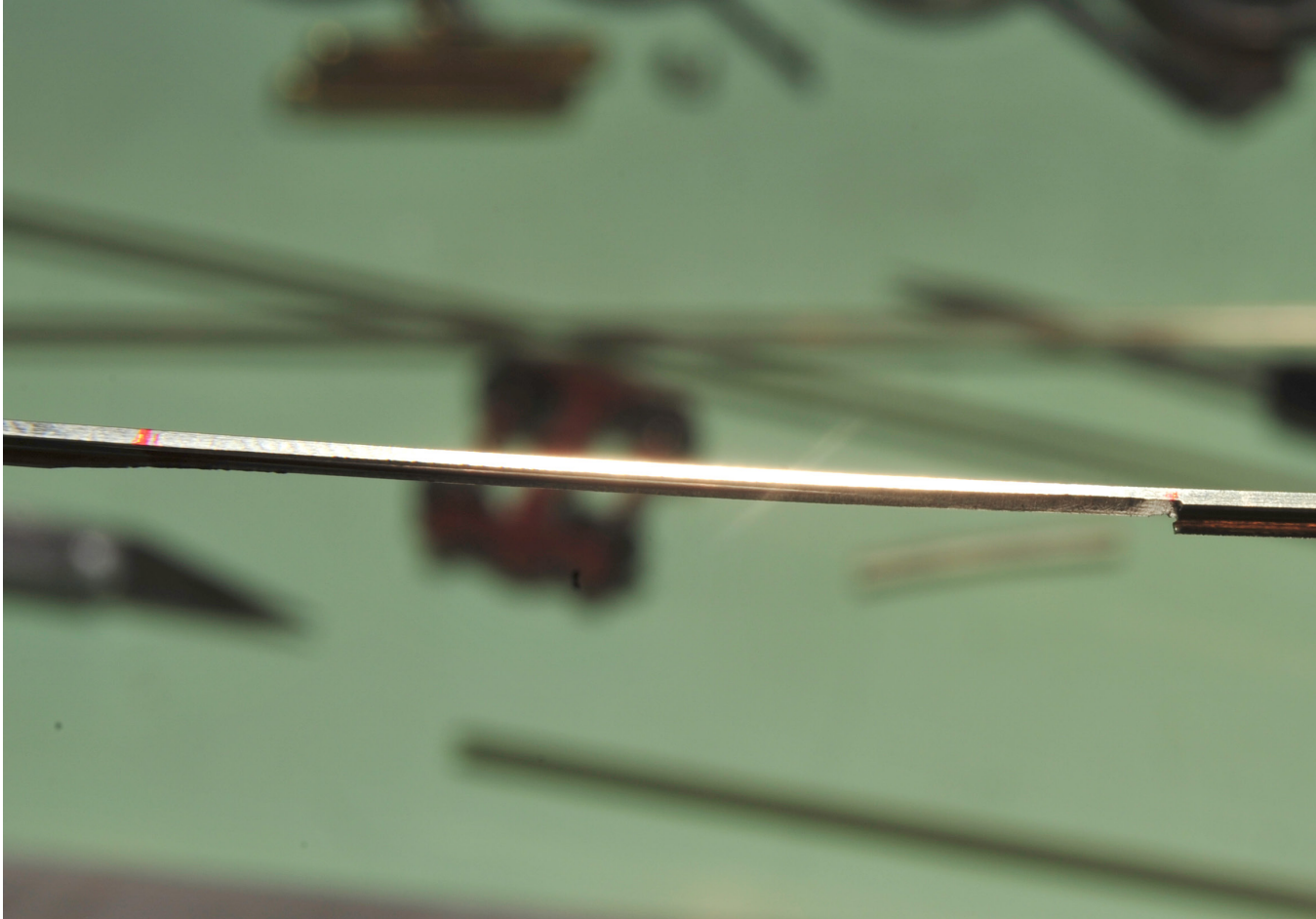
- I use a Delta desktop sanding machine to notch the stock rails. I like to slightly inset the notch into the rail head so that the point will just nest in to the stock rail and sit flush. Real railroads don't do this, but I find it helps for smoother model railroad operation. Clean up the curved notch area with a sharp file to alleviate any interference with the point.



- Don't forget to notch the 3rd stock rail!

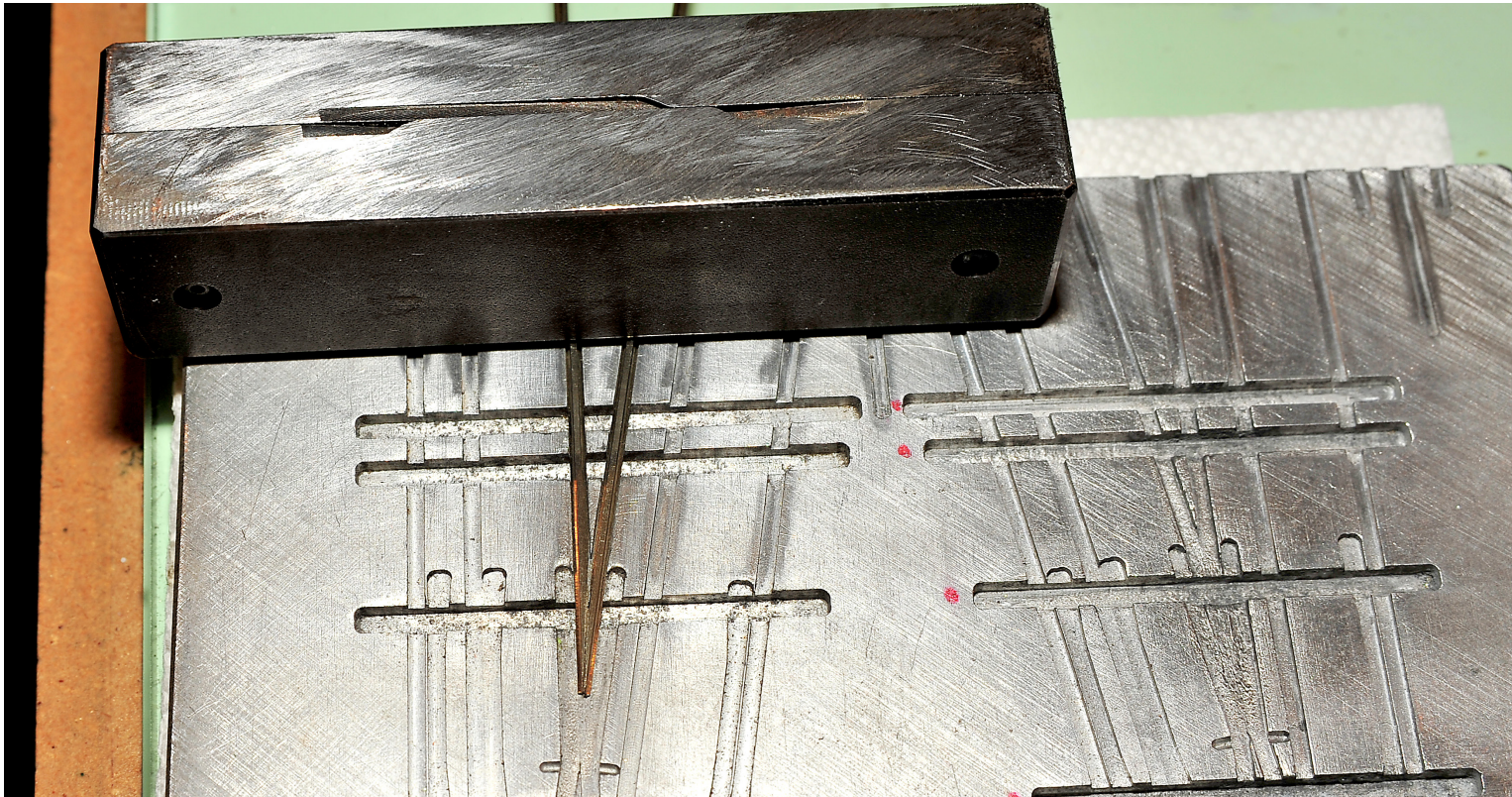
Construction Tip: Stock Rail

- Cleaned up stock rail



Construction Tip: Frog

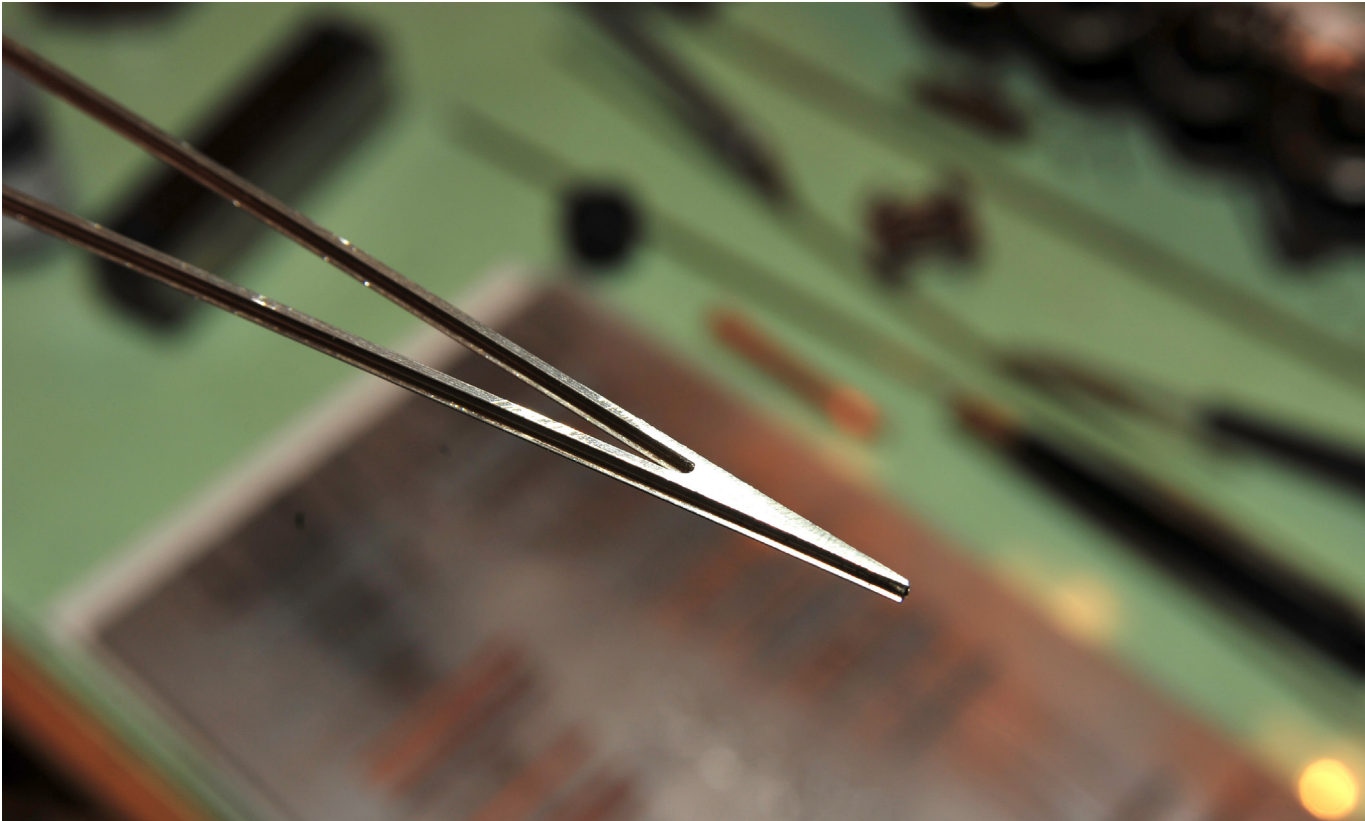
- After preparing the frog rails using the Point Form tool (shown) slide frog rails in till they just touch each other but do not deform. Slide back and forth until satisfied with fit. I like to set the Point form Tool on the rails to keep them from moving. You may have to balance the tool so that it makes contact with both rails.



- Flow some flux into the joint but be careful not to get it on the outside of the rails or solder will flow out of the joint. Apply heat and flow enough solder to fill the joint about 3/8-1/2" or so from end.

Construction Tip: Frog

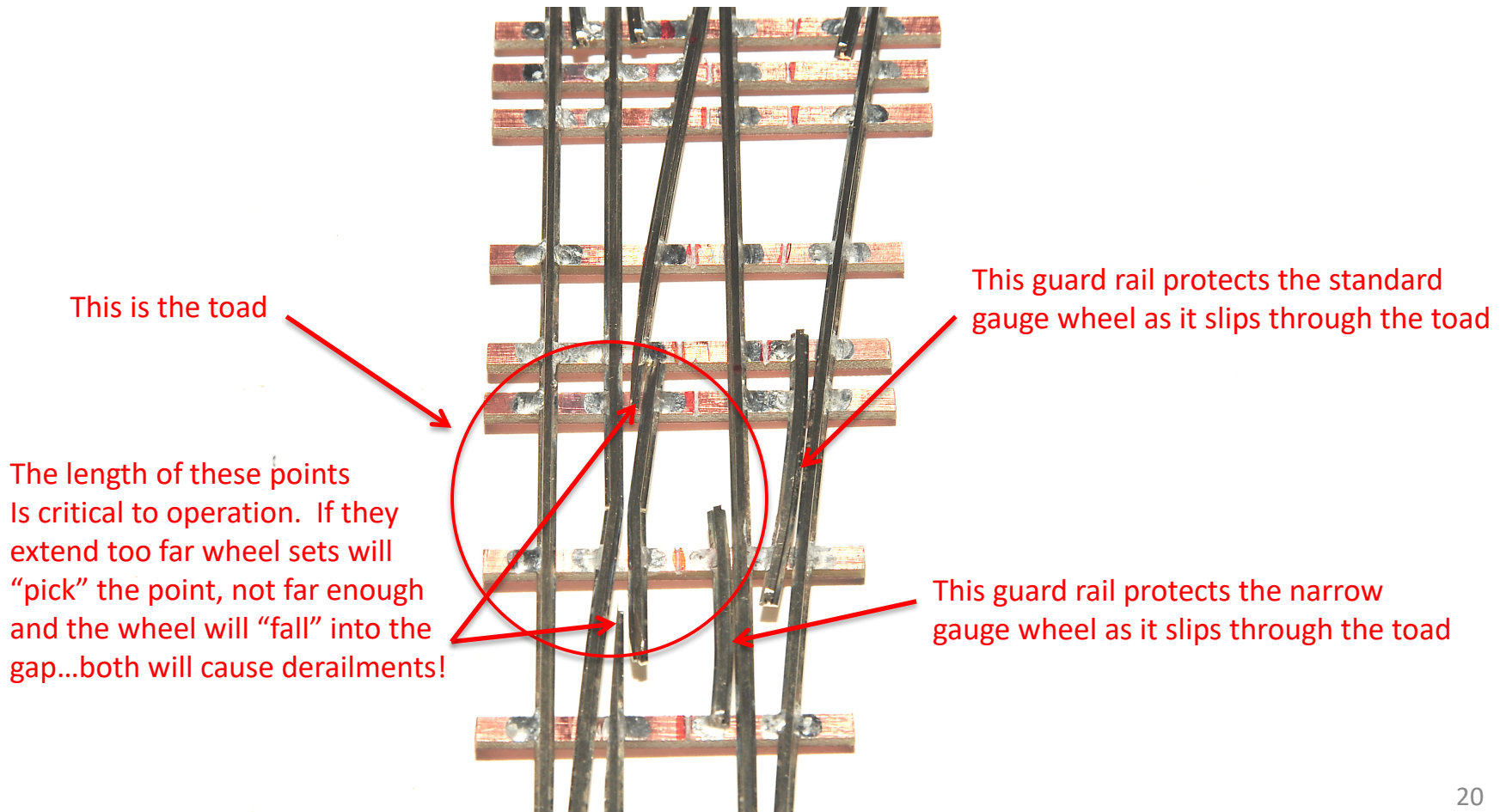
- After solder has cooled, file excess solder from top of rail but be careful to just file off solder and remove any rail.



- Build the other frog in the same manner as the first one.

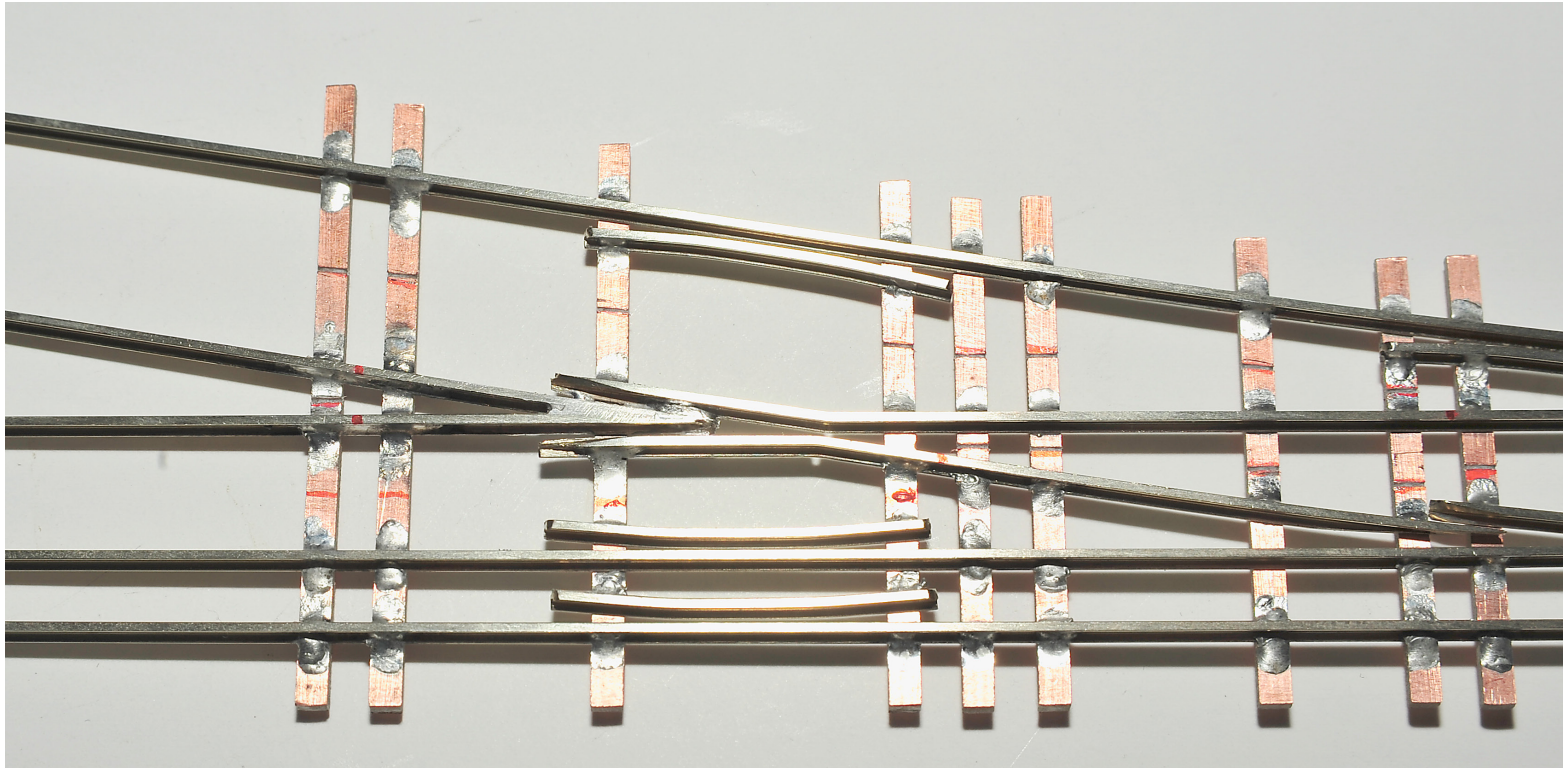
Construction Tips: Toad

- The “toad”, as it is called, is the area that one rail crosses over to the other rail. Its where the standard gauge or narrow gauge wheel crosses over the 3rd rail or vice versa. Its important that this feature is correctly built for trouble free operation.



Construction Tips: Last Steps

- After all rail, guard rails, and frog is complete, its time to isolate the frog. Using the appropriate Fast Tracks track template to mark cuts in rail and on ties. This will allow you to power the frog.



- Here is where using a Dremel tool with a cut-off wheel is tempting but take it from experience, its best to use a triangle file or one of the very nice Fast Tracks points shaping files to file gaps in the PC ties. "SLOWLY" file away just enough copper material so as to leave a gap and do not cut into the substrate as removing any of this material can and will weaken the PC tie...and it just looks bad! Use a jeweler's saw to cut rail gaps.

Installed Turnouts: Dual Gauge Wye



Installed Turnouts: Dual Gauge #6 Curved



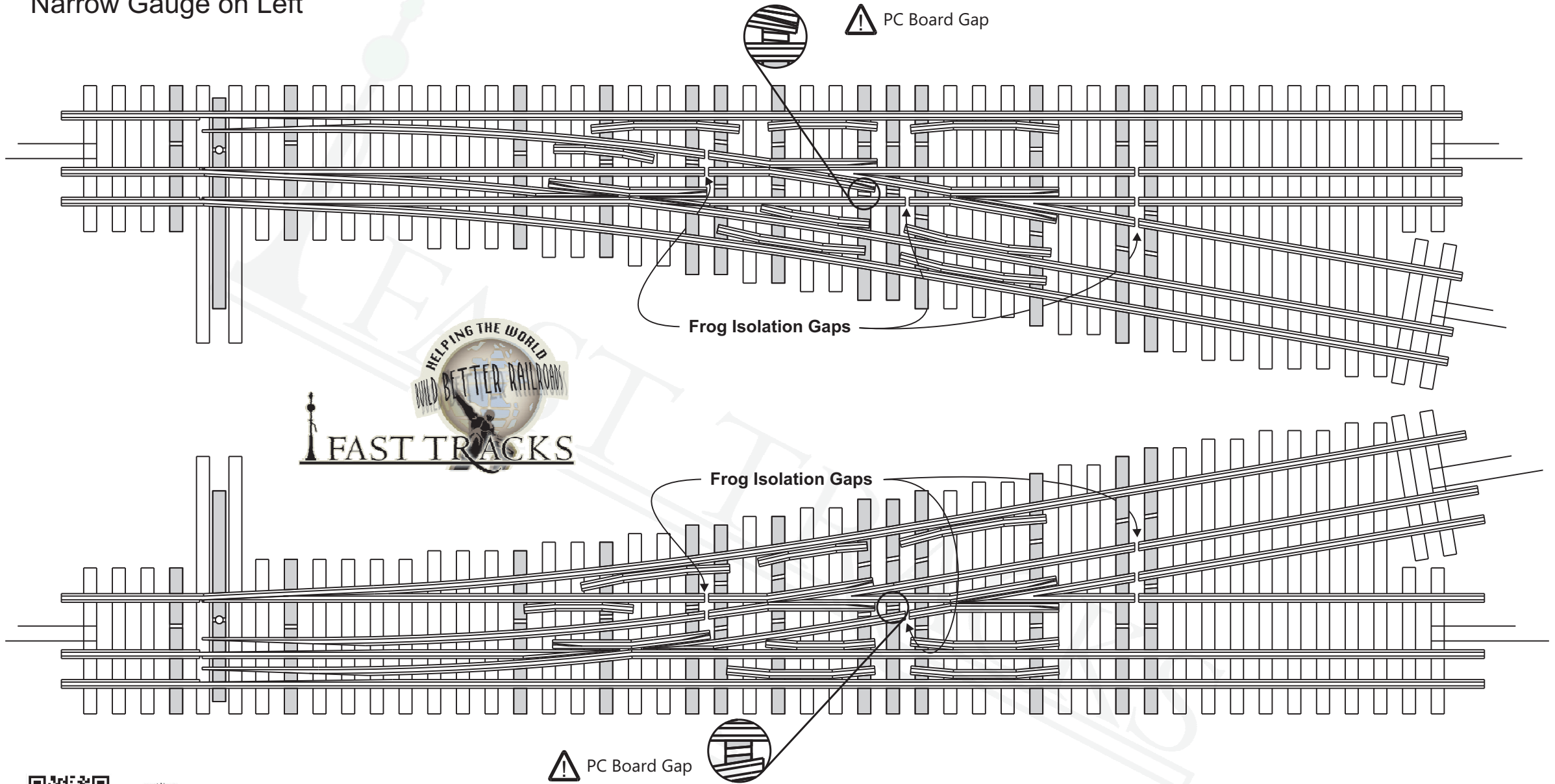
Installed Turnouts: Dual Gauge #10 Curved



HO Scale, #6 Dual Gauge Turnout

P/N: DF-HO-HON3-T-6-L-MExx

Narrow Gauge on Left



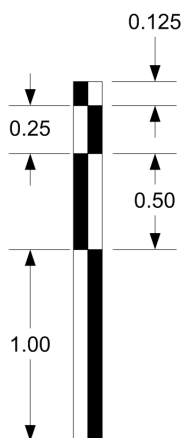
Fast Tracks Tie Template

HO/HOn3 Scale No. 6 Dual Gauge Narrow Right

Produced To NMRA Standards
Version 1.01

Printing Instructions

- Select the Print option in the Adobe toolbar.
- Be sure that all page scaling, fitting or cropping options in the Adobe print options box are turned off.
- Setup your printer to print in B&W or Greyscale with the highest possible quality setting.
- **Select 8.5 X 14 (Legal) paper.**
- Be sure that your printer is set to print full size with no page scaling, fitting or cropping.



Confirm that the template is printed at the correct size by measuring the above scale with a ruler or vernier caliper. If the size of the scale is not correct, then check your printing settings to be sure that all scaling and fitting functions have been turned off.

Shaded ties are PCB ties.

Important Notes

This template has been designed to aid in the placement of ties for your Fast Tracks built trackwork. The location of the rails is purely for aesthetic purposes and is not intended to imply the correct or accurate placement of rail.

This template is only intended to help you place your ties on your layout and should not be considered to be representative of the accuracy of our Fast Tracks assembly fixtures. All Fast Tracks fixtures are precision machined to your exact specifications and selected standard.

We are constantly reviewing and improving our templates. Always be sure that you are using the most recent version of this template by visiting our website.

For a complete selection of printable templates, visit us on the web at www.handlaidtrack.com

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