

Home Manufactured Track

Implications For Live, Dead and Zombie Rail

Gary Saxton 2025/05/08

Topics

Why DIY

Pass it around (live) and pictures (remote) audience

Make your own

Design your own and share

Ancillary information

Why DIY?

Joy of scratch building

Save money

Something not commercially available

Open significant opportunities

Save Money

Item	Commercial	HM Live	HM Zombie	HM Dead Rail
HO Flex	\$2/ft	\$2/ft	N/A	\$0.20/ft
HO Switch	\$25 ea	\$4 ea	\$4 ea	\$0.25 ea

Before “Passing It Around” 1/3

Things to Consider

Tie heights and detail - Prototype of something else?

3D filament printing is S-L-O-W

The shallower the tie, the less plastic, the faster it goes

Smaller nozzle - more detail but less speed

Before “Passing It Around” 2/3

Ties height - Min to function ~ 0.015” (option to layer up)

- **3” Ballast**

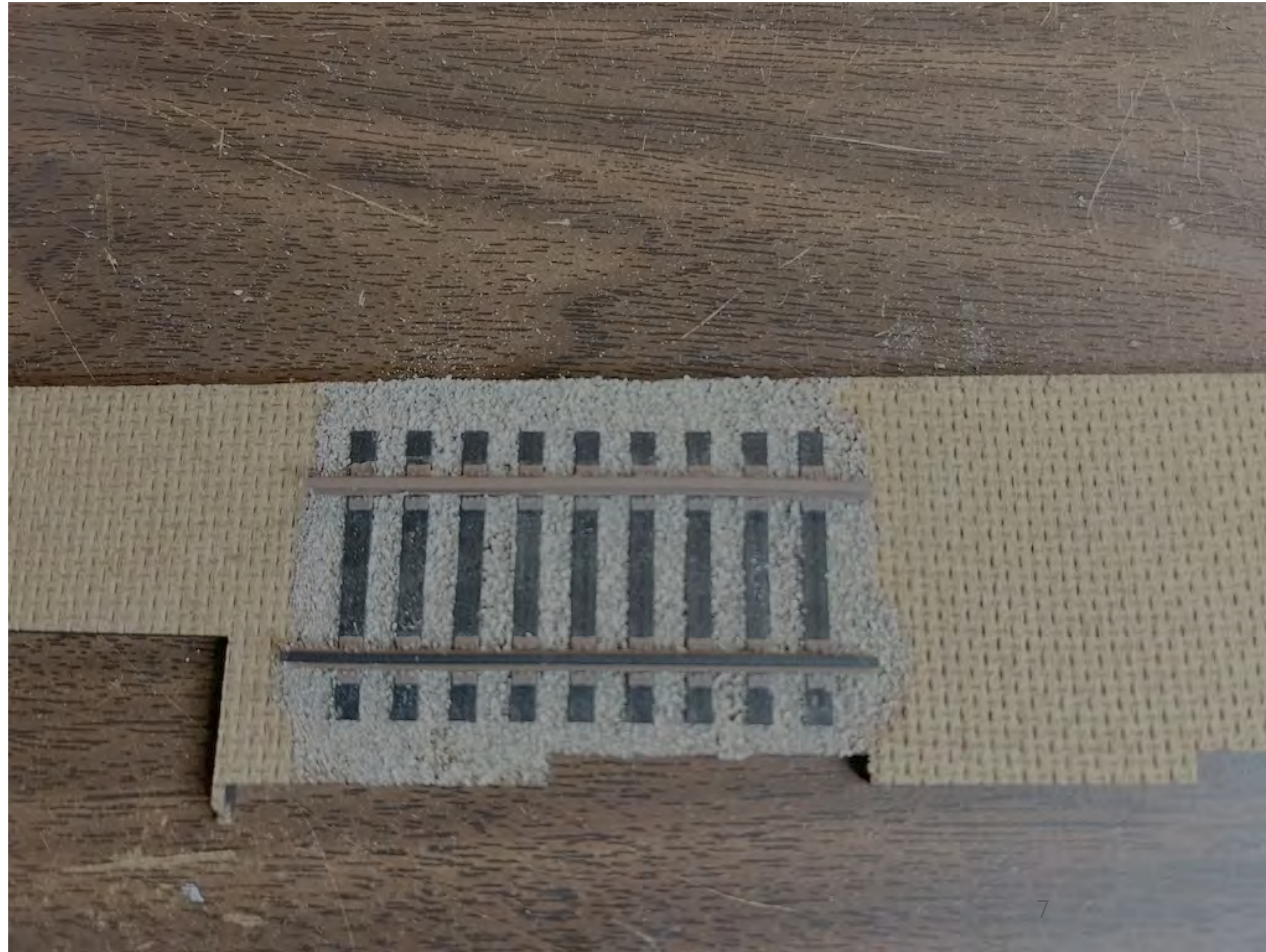
- Prototype 7”

- Match commercial product (varies)

0.2mm nozzle vs. 0.4mm (typical) or 0.6mm

Utility of Shallow Tie Height

Paint ballast color
Weather ties
Glue ties to base
Quickly add ballast
Let Dry
Hand vacuum and
recycle loose ballast
Lay rail



Before “Passing It Around “ 3/3

Rail - No budget for buying nickel silver in a variety of sizes

All “silver” (n-s or plastic) rail means nickel silver

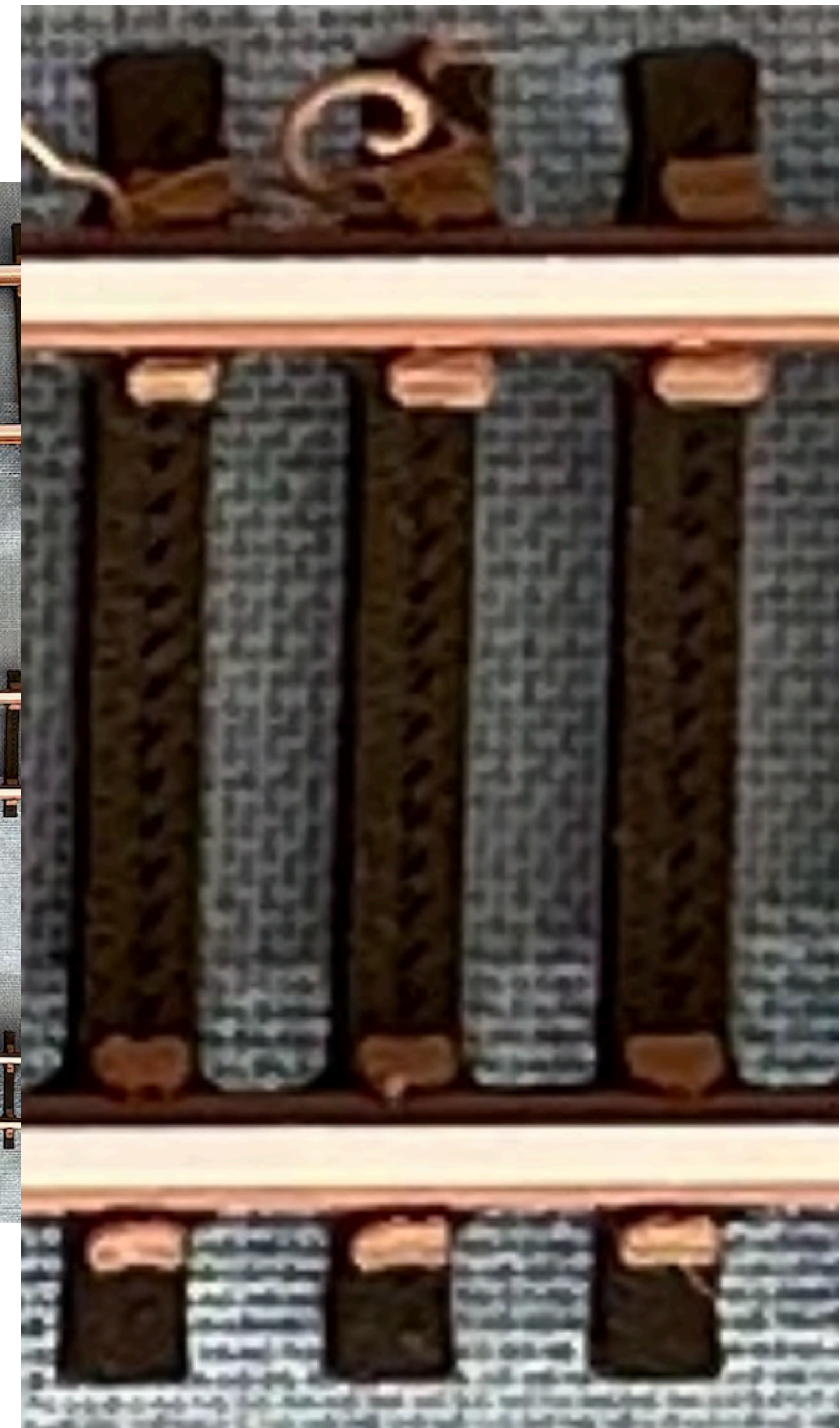
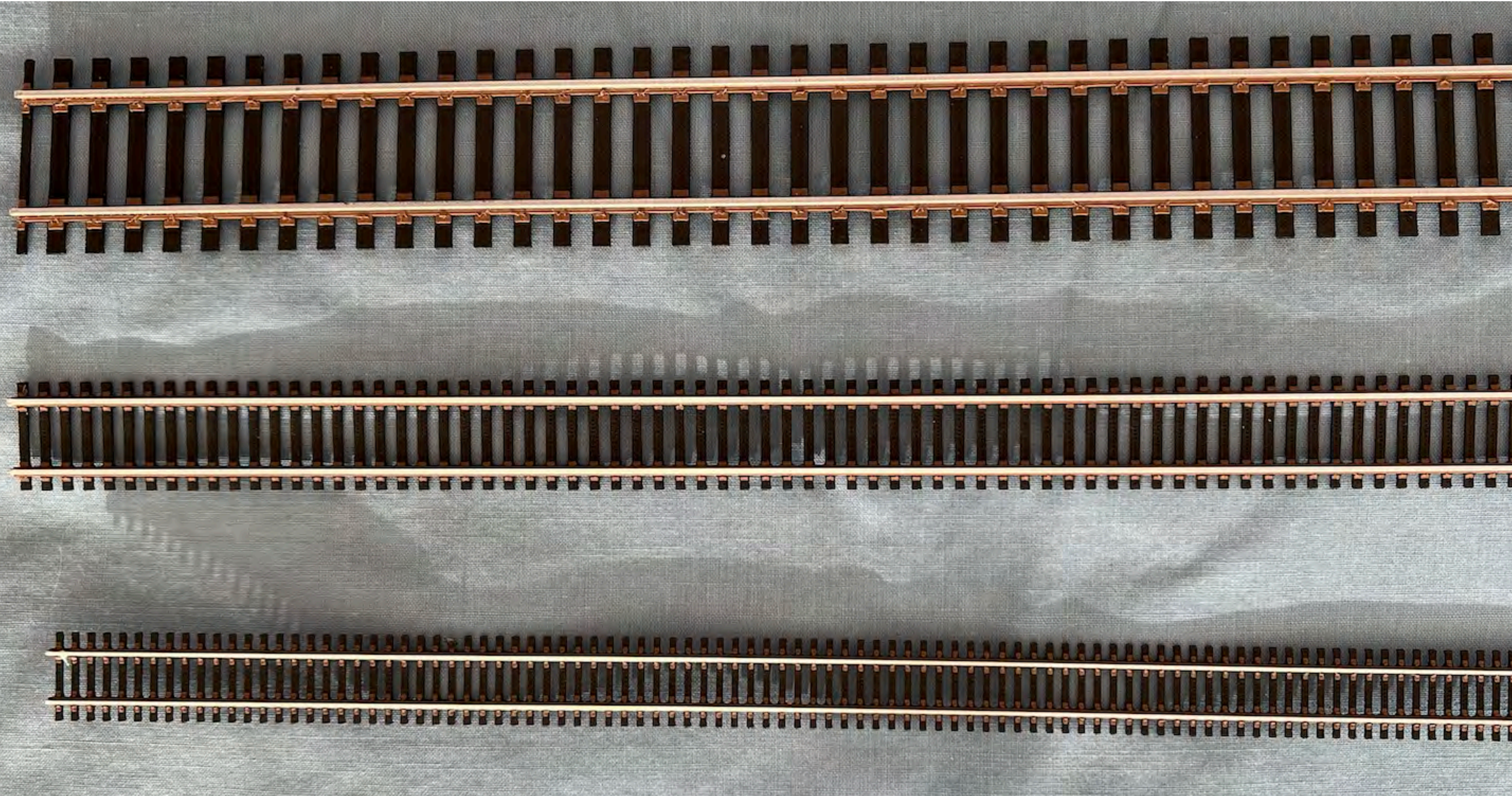
Brown with silver top is dead rail & often printed with ties

Examples in various size (but technique the same)

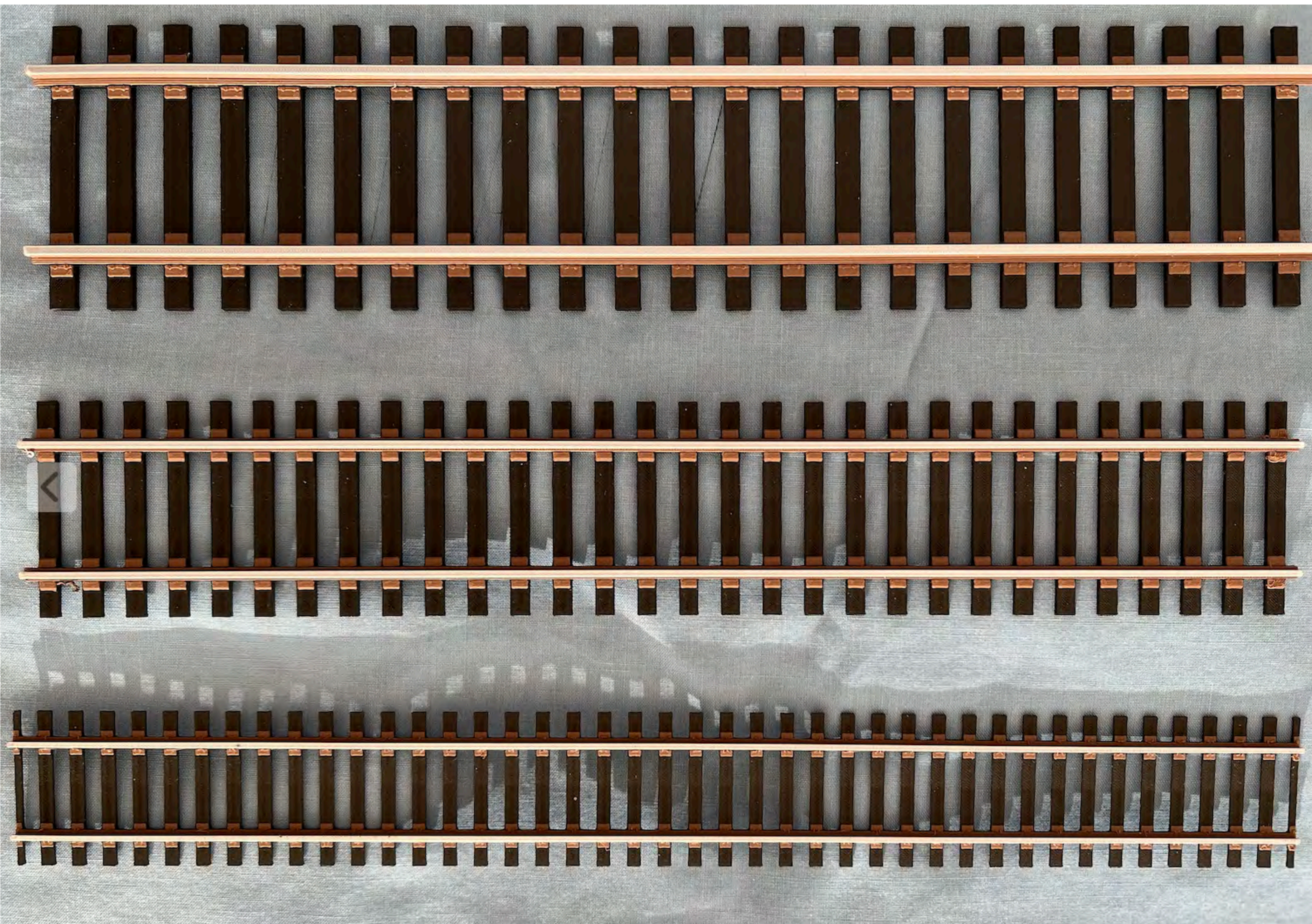
Finally Pass It Around

Pix

Z N HO



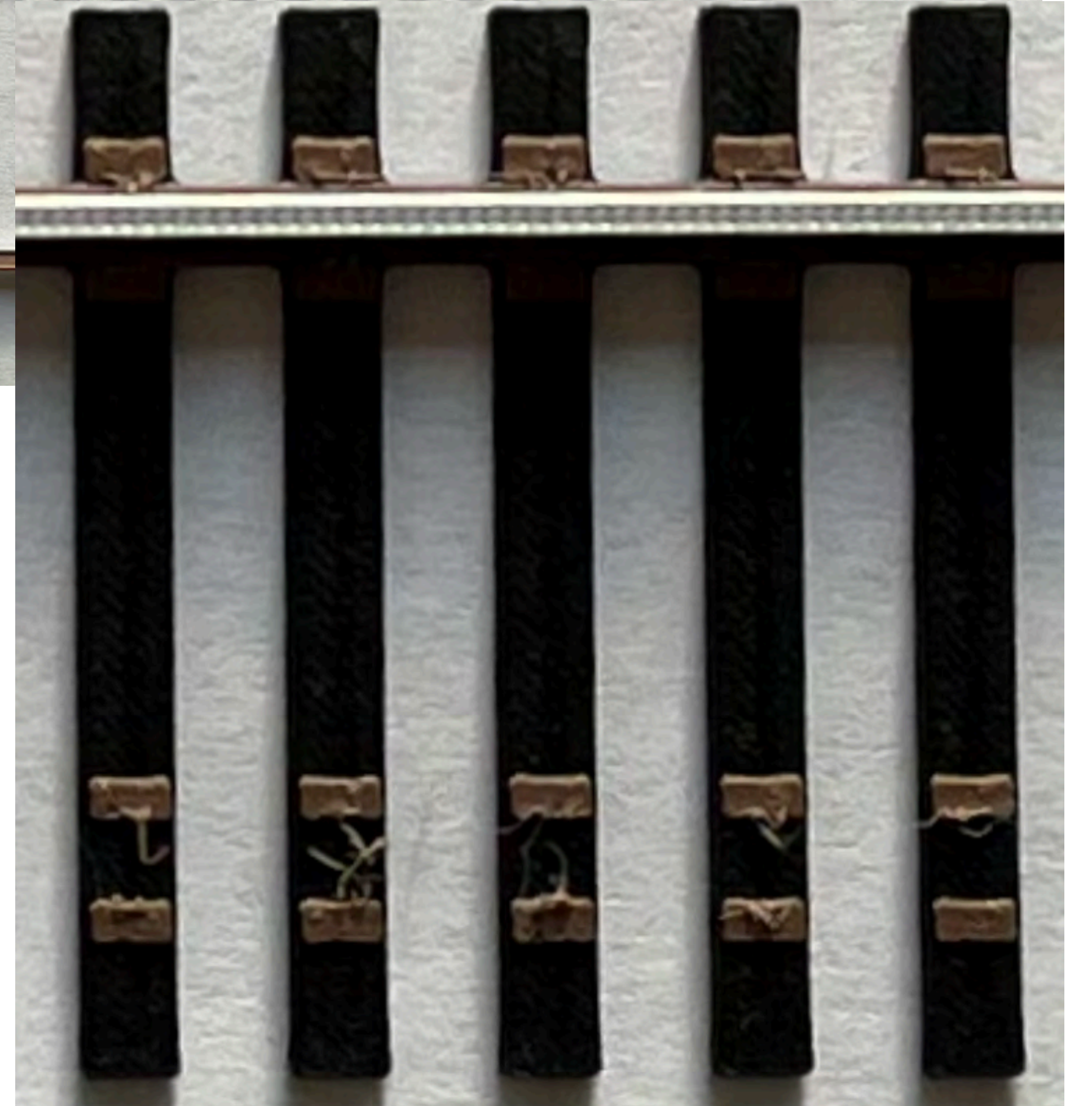
HO S Q



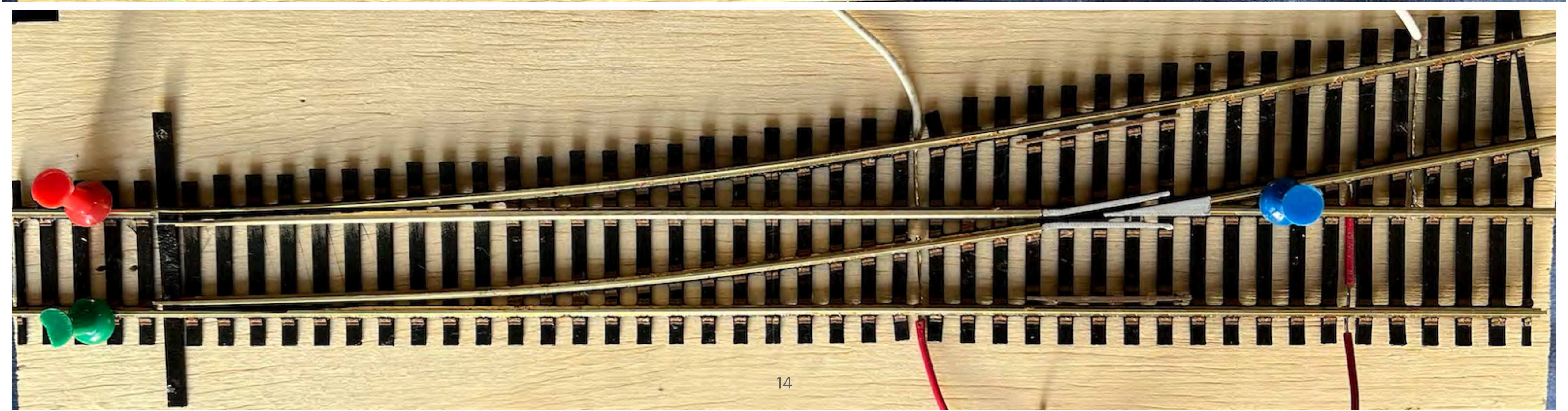
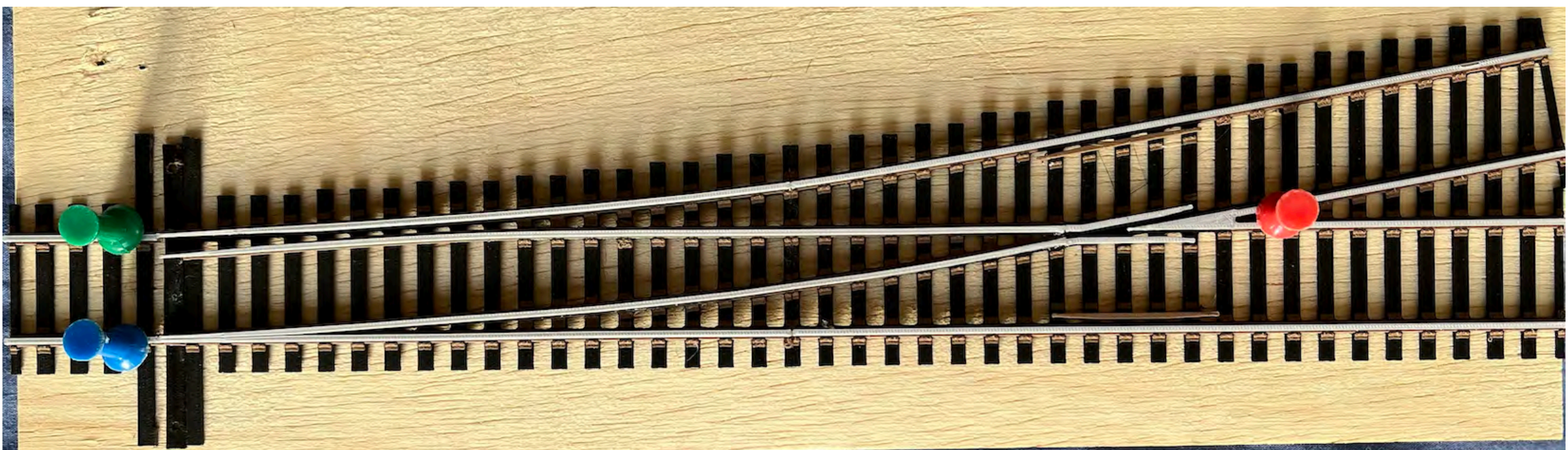
Z Bridge

Guard rails only

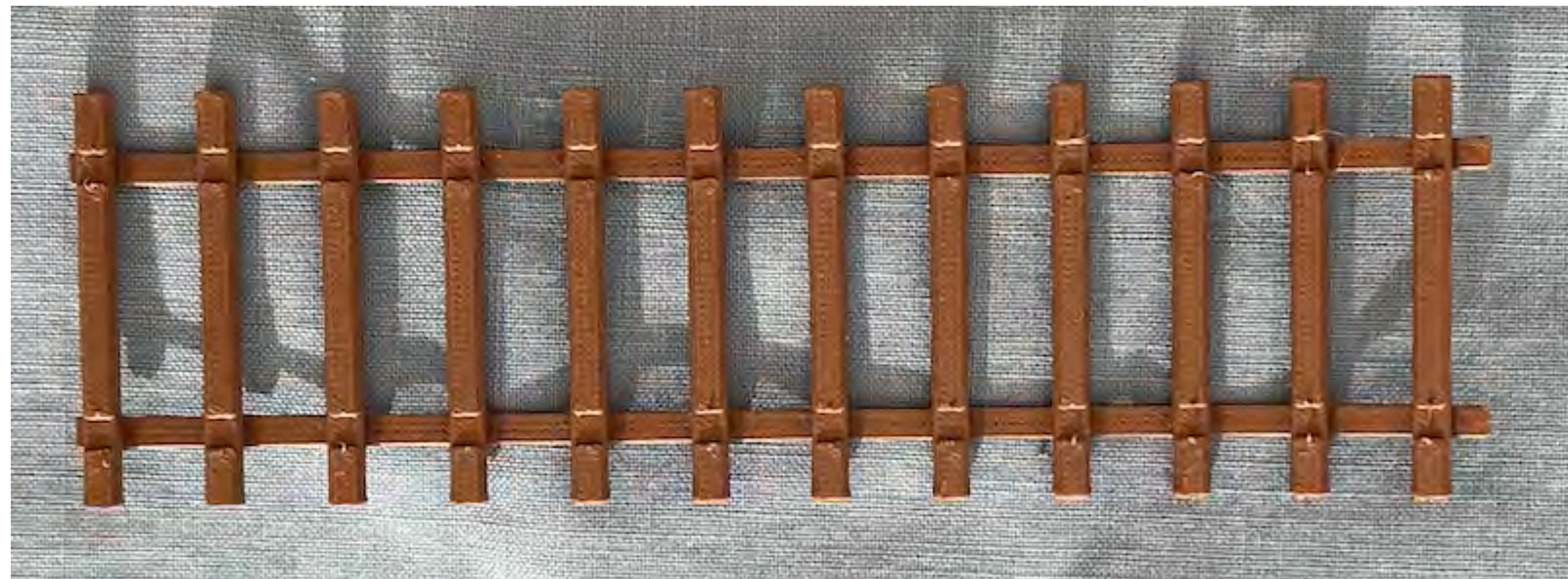
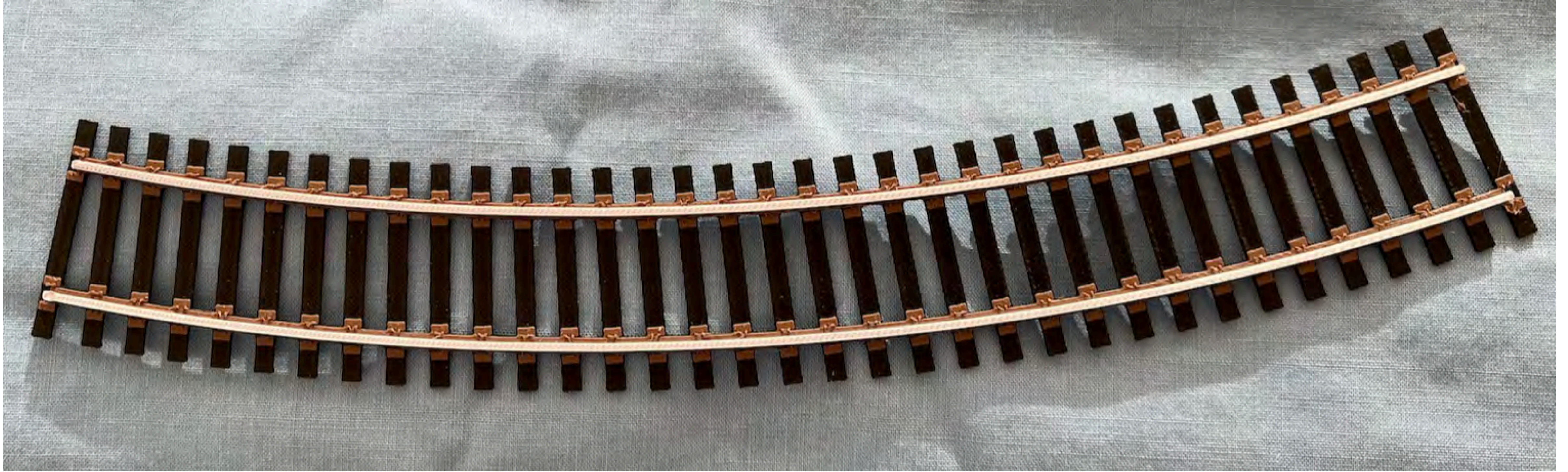




Flex Track



HO 14-1/2 R



HO 28" spaced log tie

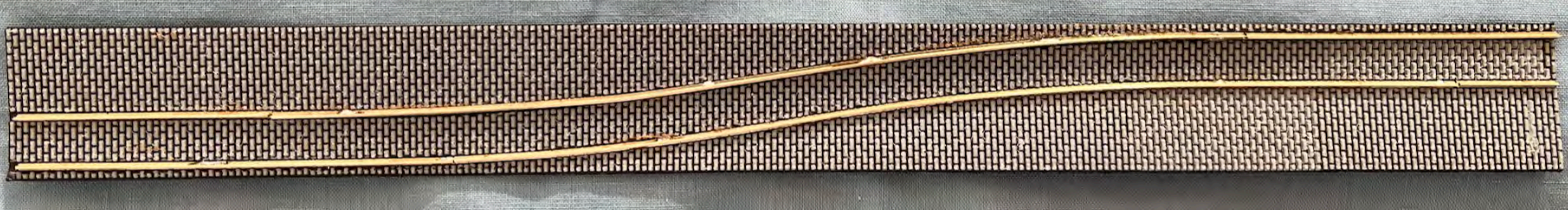
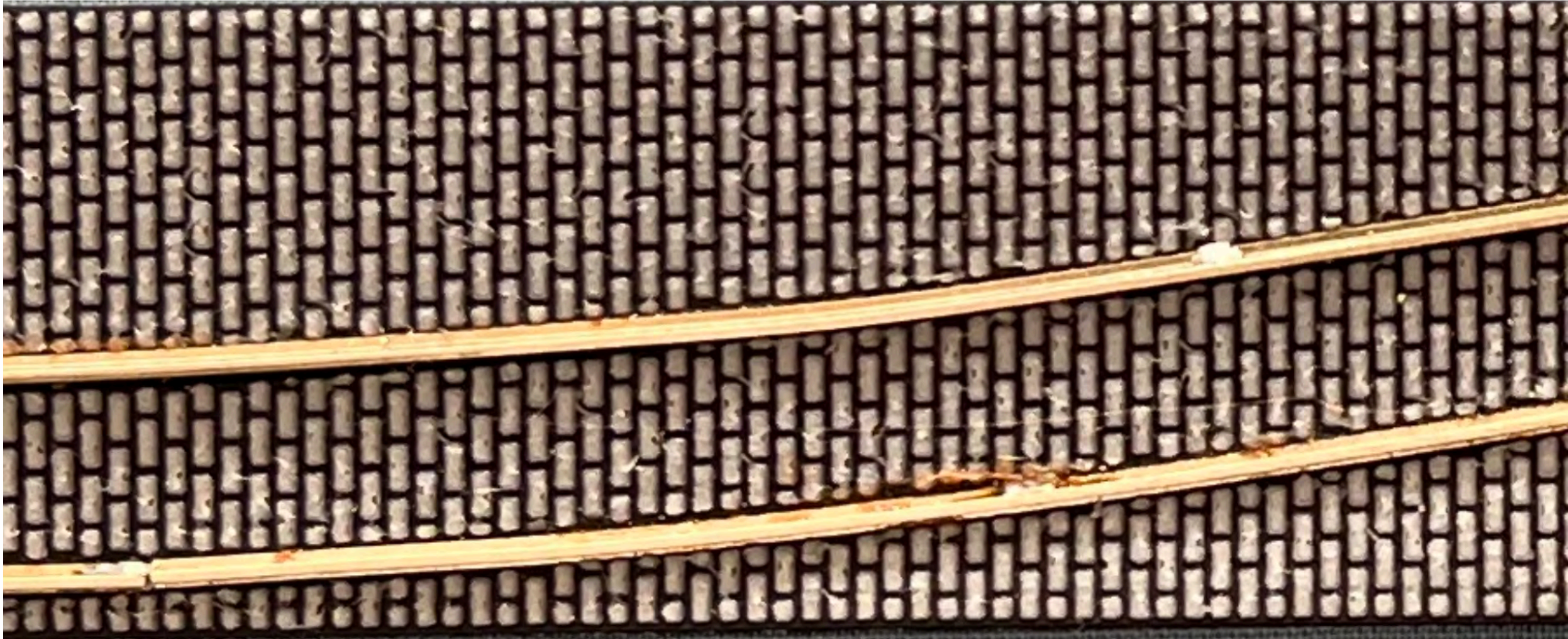
Almost HO No. 6

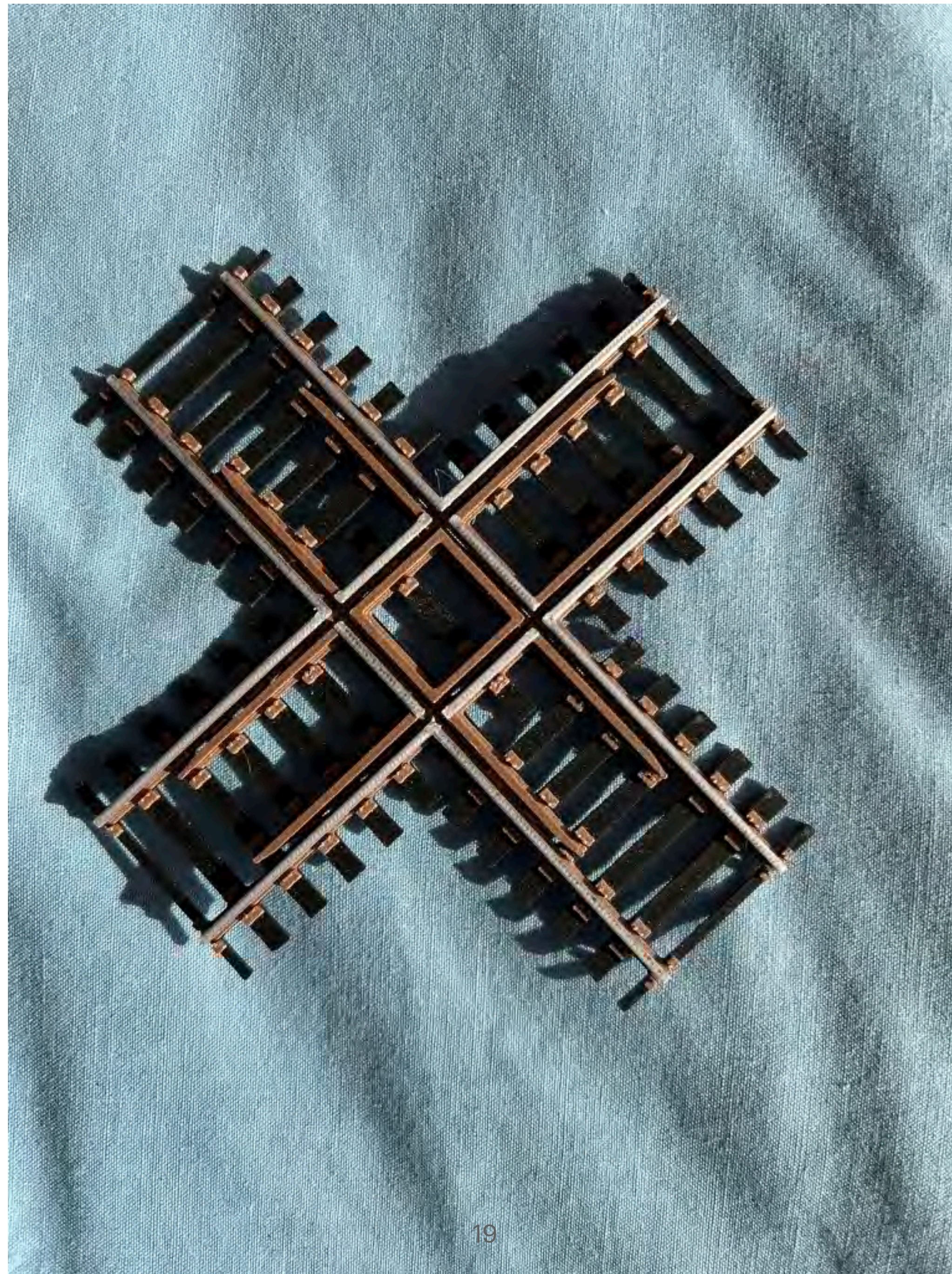


HO Holiday track



Z In paving stones





Make Your Own

Download from Thingiverse (free)

Print

Recommended printer

Recommended material

Endurance test

Download From thingiverse.com

6 designs are on Thingiverse.com

Search: *HMT GAUGE*

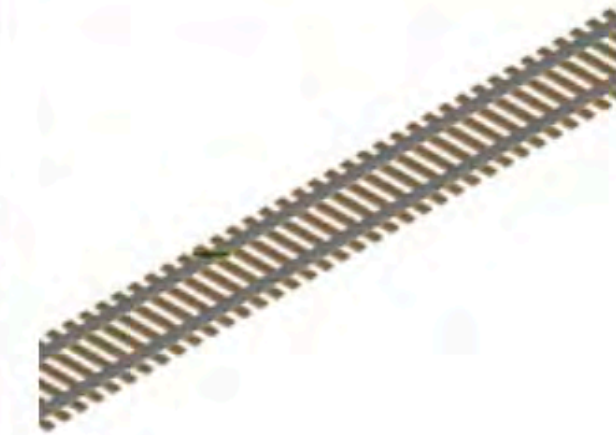
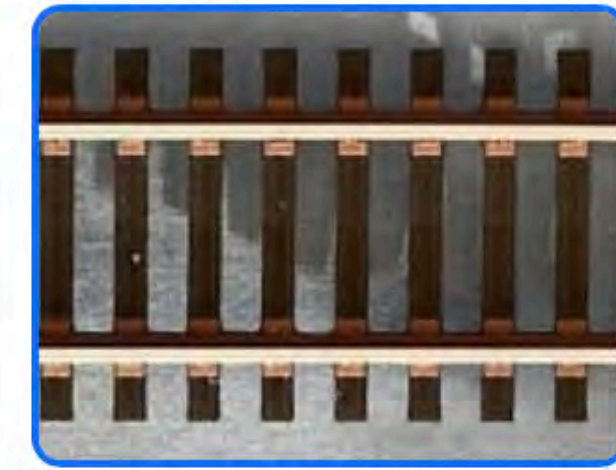
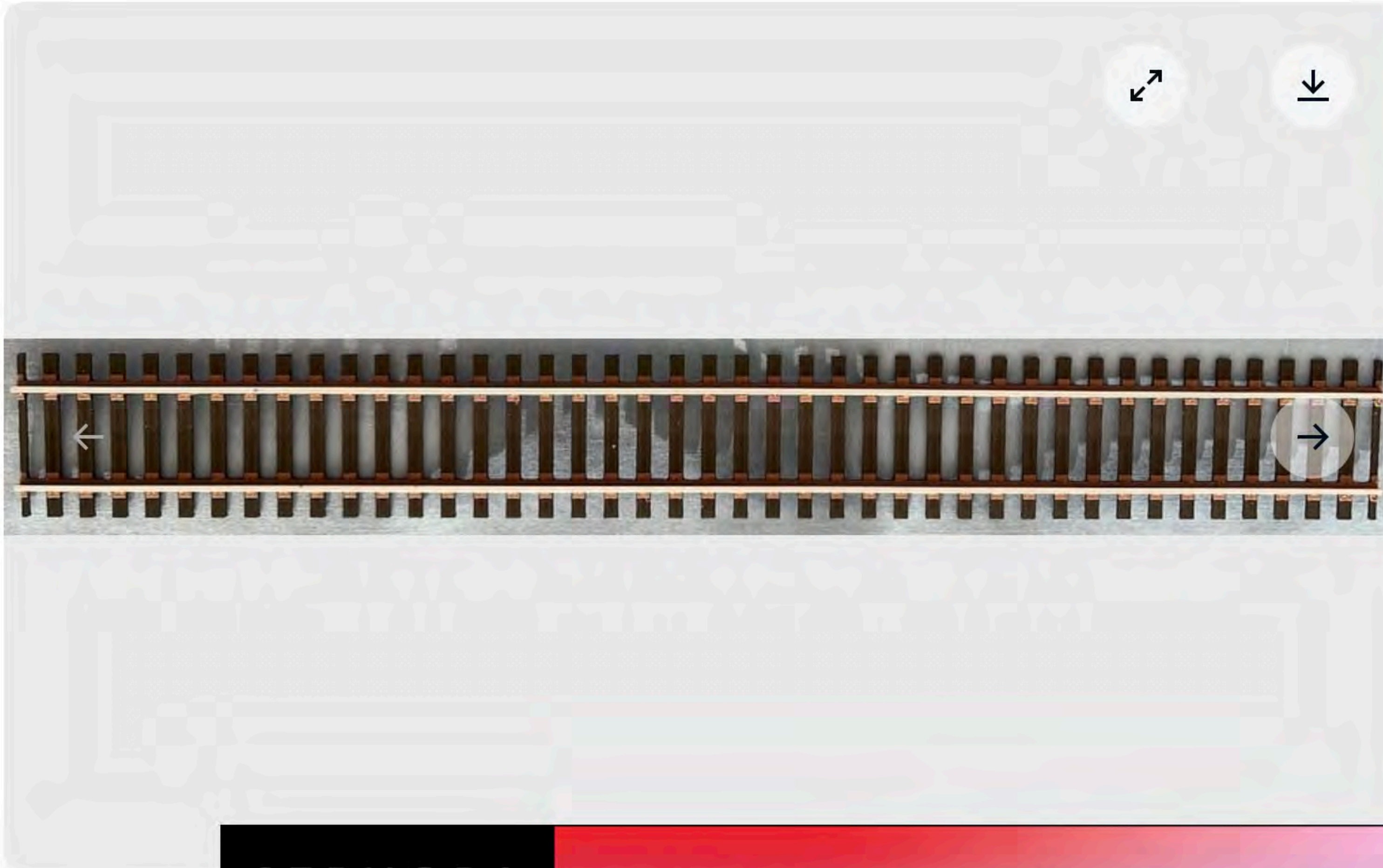
Example: *HMT HO*



HMT HO Dead Rail Straight Track GSax

JohnCheese March 23, 2025

Download all files ⏴



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-



Pos

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22



Download Folder - Look For...



HMT HO Dead Rail Straight Track GSax - 6988890.zip

Open Zip File...



files



images



LICENSE.txt



README.txt



HMT-HO-DR_LoTie_Rigid_GSax.dxf



HMT-HO-DR-LoTie-Rigid-GSax.stl

3D Print

Run through slicer

Pause at begin tie plates (change filament black to brown)

Dead rail only - pause at second to last layer (brown to silver)

Rigid 14-5 in R 30 deg

Prepare Preview Device Project Calibration

Slice plate Print plate

Printer

Bambu Lab P1S 0.2 nozzle

Plate type Textured PEI Plate

Filament

1 Bambu PLA Matte

Process Global Objects Advanced

0.10mm High Quality @BBL X1C 0.2 nozzle

Quality Strength Support Others

Layer height

Layer height 0.1 mm

Initial layer height 0.1 mm

Seam

Seam position Aligned

Advanced

Only one wall on top surfaces Top surfaces

Only one wall on first layer

Line Type	Time	Percent	Used filament	Display
Inner wall	16m26s	25.7%	0.52 m 1.66 g	<input checked="" type="checkbox"/>
Outer wall	13m27s	21.0%	0.30 m 0.95 g	<input checked="" type="checkbox"/>
Overhang wall	<1s	<0.1%	0.00 m 0.00 g	<input checked="" type="checkbox"/>
Internal solid infill	7m37s	11.9%	0.28 m 0.89 g	<input checked="" type="checkbox"/>
Top surface	6m58s	10.9%	0.12 m 0.37 g	<input checked="" type="checkbox"/>
Bottom surface	2m9s	3.4%	0.02 m 0.07 g	<input checked="" type="checkbox"/>
Bridge	<1s	<0.1%	0.00 m 0.00 g	<input checked="" type="checkbox"/>
Gap infill	2m58s	4.7%	0.05 m 0.17 g	<input checked="" type="checkbox"/>
Custom	6m35s	10.3%	0.03 m 0.10 g	<input checked="" type="checkbox"/>
Travel	8m2s	12.6%		<input type="checkbox"/>
Retract				<input type="checkbox"/>
Unretract				<input type="checkbox"/>
Wipe				<input type="checkbox"/>
Seams				<input checked="" type="checkbox"/>

Total Estimation

Total Filament: 1.33 m 4.21 g

Model Filament: 1.33 m 4.21 g

Cost: 0.11

Prepare time: 6m20s

Model printing time: 57m40s

Total time: 1h4m

29 2.90

1 0.10

3432

Rigid 14-5 in R 30 deg

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Process Global Objects Advanced

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Quality Strength Support Others

Layer height

Layer height 0.1 mm

Initial layer height 0.1 mm

Seam

Seam position Aligned

Advanced

Only one wall on top surfaces Top surfaces

Only one wall on first layer

Color Scheme Line Type

9 0.90

1 0.10

9359

Rigid 14-5 in R 30 deg

Prepare Preview Device Project Calibration

Slice plate Print plate

Printer

Bambu Lab P1S 0.2 nozzle

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Filament

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Process Global Objects Advanced

0.10mm High Quality @BBL X1C 0.2 nozzle

Quality Strength Support Others

Layer height

Layer height 0.1 mm

Initial layer height 0.1 mm

Seam

Seam position Aligned

Advanced

Only one wall on top surfaces Top surfaces

Only one wall on first layer

Color Scheme Line Type

28 2.80 Pause

1h1m49s

Pause

1 0.10

277

Recommended 3D Printer

Bambu - Printer as tool, not start of another hobby

- A1 - very quick change nozzle size
- P1S - enclosed, more materials & 10% to 30% faster

Price check May 7, 2025 up ~ \$200 this month

A1 (not mini) \$500 - \$700

P1S \$800 - \$1050



Recommended Material - PLA (Polylactic acid)

Most common

Work with open printer - no odor, low temperature

Lots of colors, finishes, add mixtures and suppliers

Bambu - chip in reel for AMS read

Tried it first, prepared to do more, but it worked

Endurance Test

How many **trains** per track per session?

How many **session** per year?

How many **years**?

Endurance Calculation

Trains/Session/Trk	16
Sessions/Year	
Design Years	
Test Design	0

Endurance Calculation

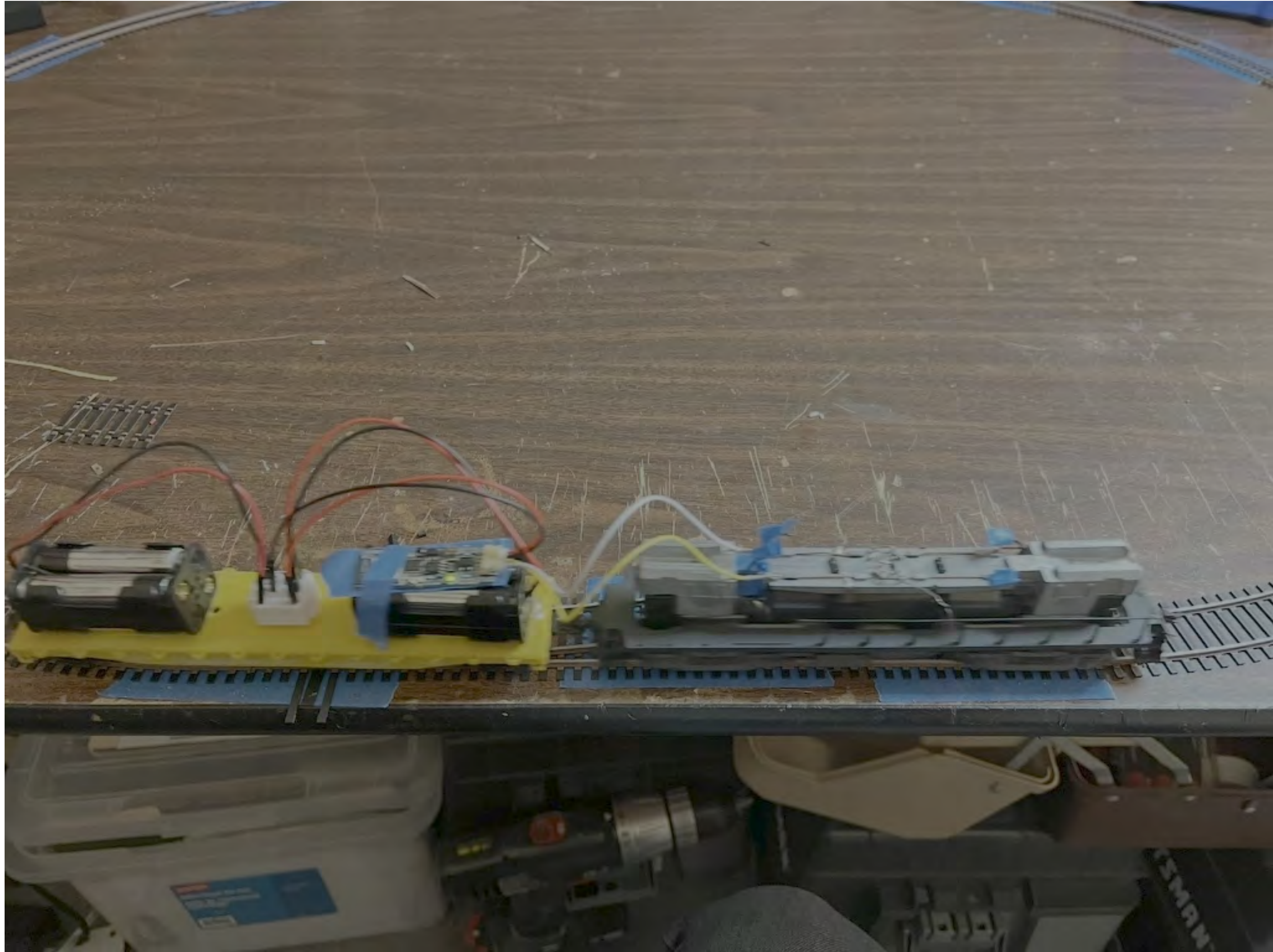
Trains/Session	16
Sessions/Year	15
Design Years	
Test Design	0

Endurance Calculation

Trains/Session	16
Sessions/Year	15
Design Years	20
Test Design	4,800

Testing 14-1/2" R





5,000 Laps Endurance Testing

No visible wear except frog point - a crumb

Test too easy

- One loco with 2 axel trucks**

Test too difficult

- 14-1/2" R**

Design Your Own

CAD software capable of ...

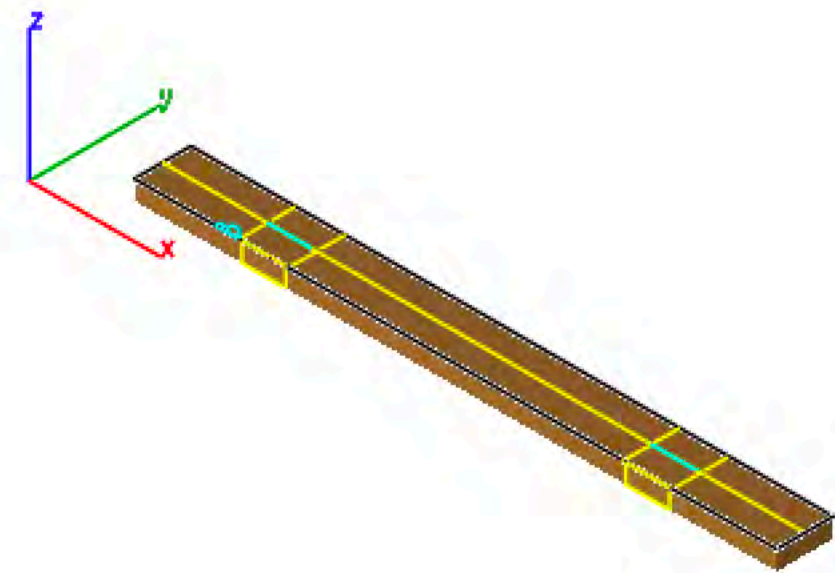
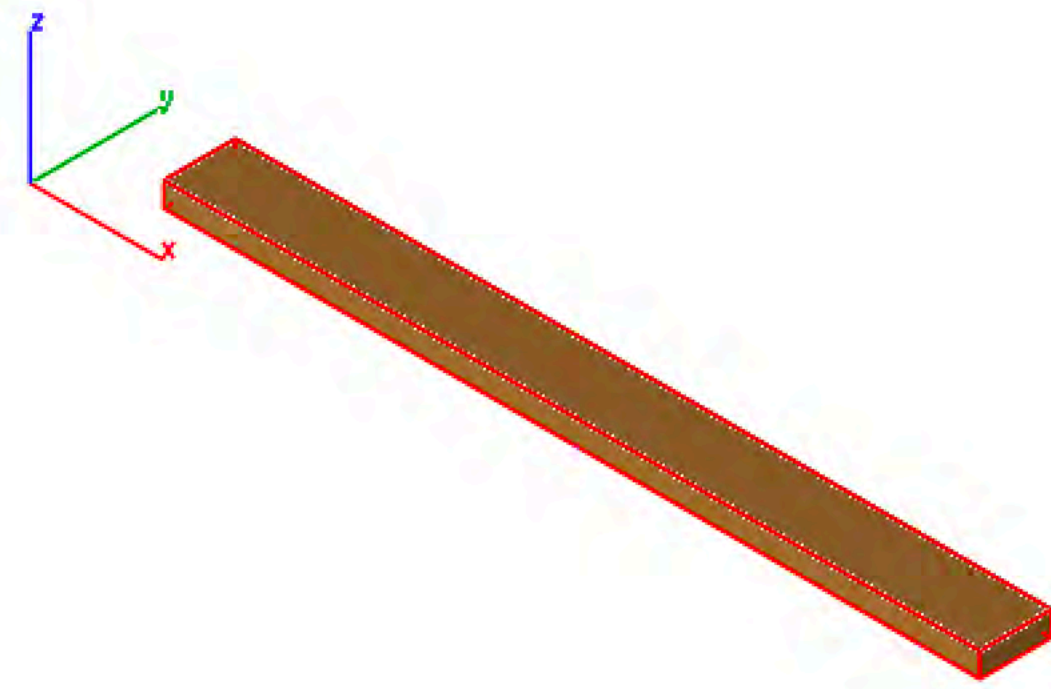
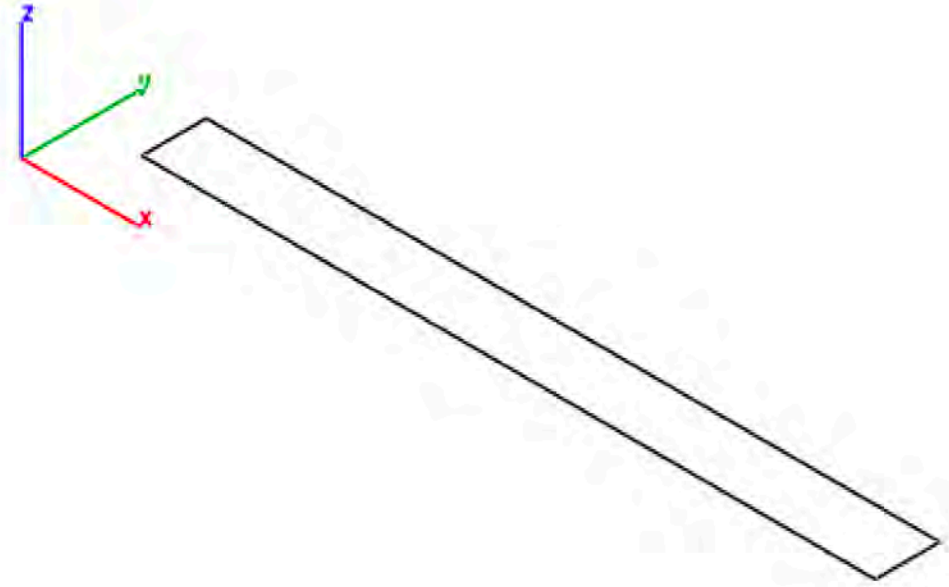
3D drawing (required)

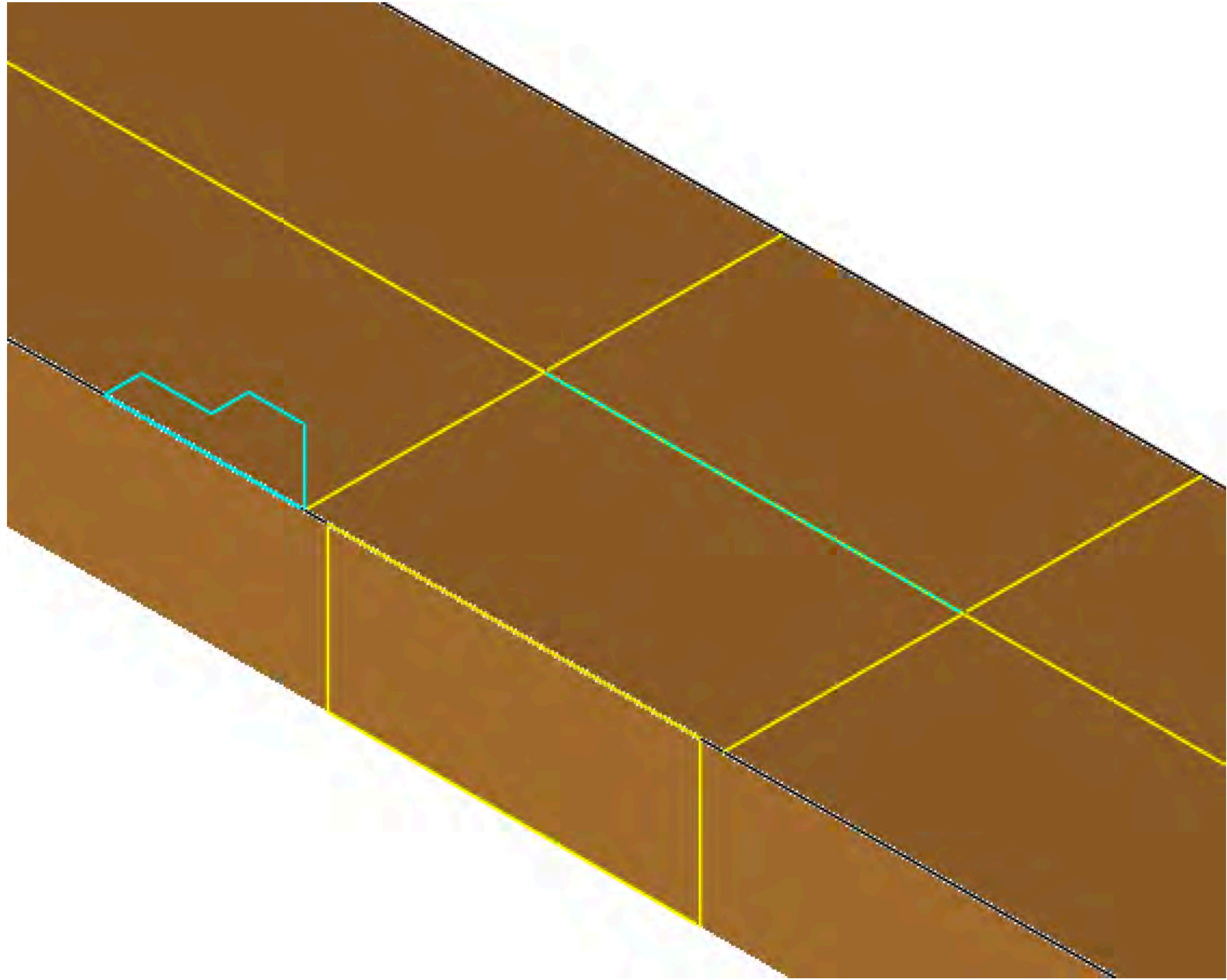
Export .stl (3D Printer) (required)

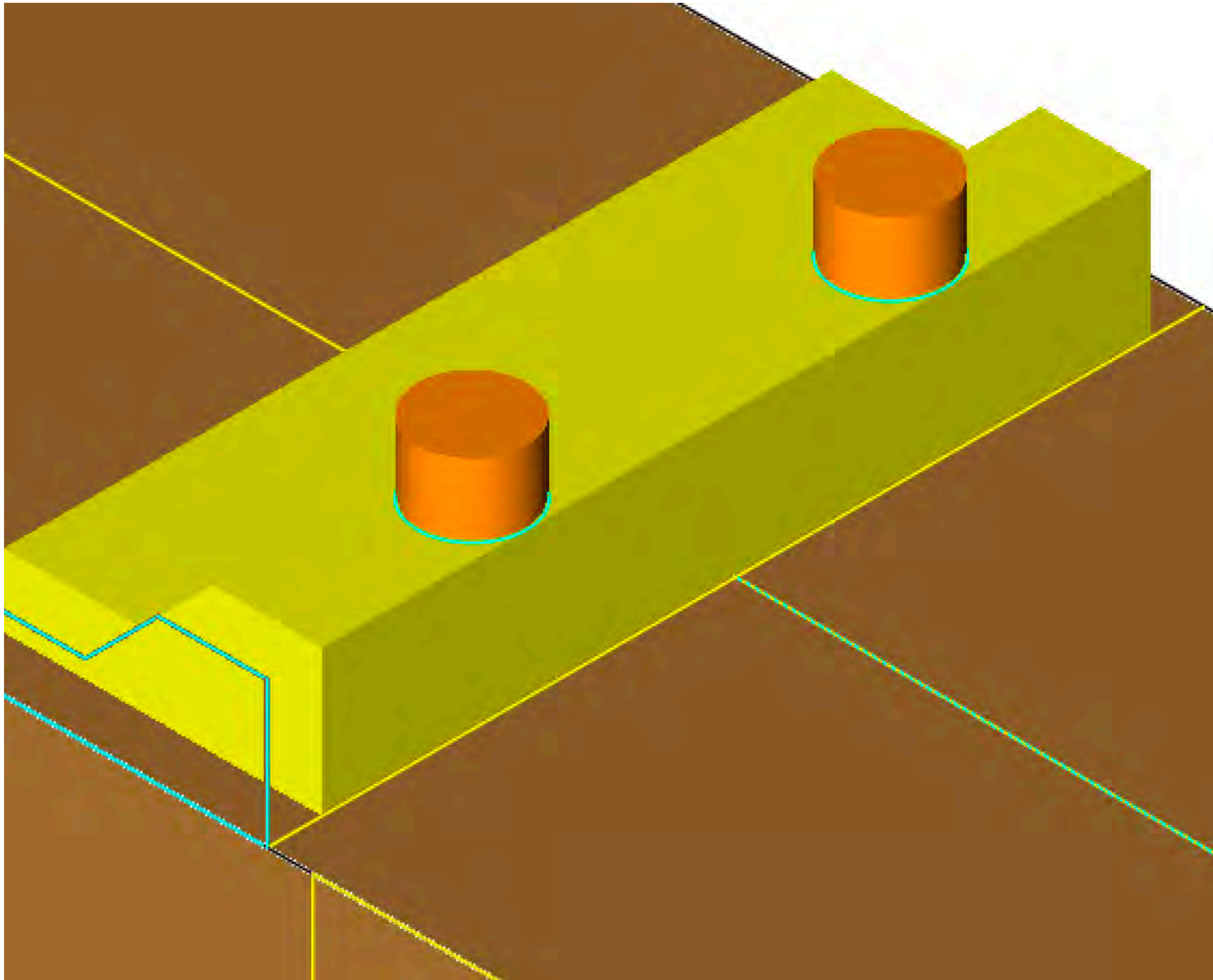
Import/Export .dxf is also useful

Seems like every CAD package has **different** user interface

I use TurboCAD Deluxe but you can probably do better







RP-15.1 Rail

RP-15.1 Rail

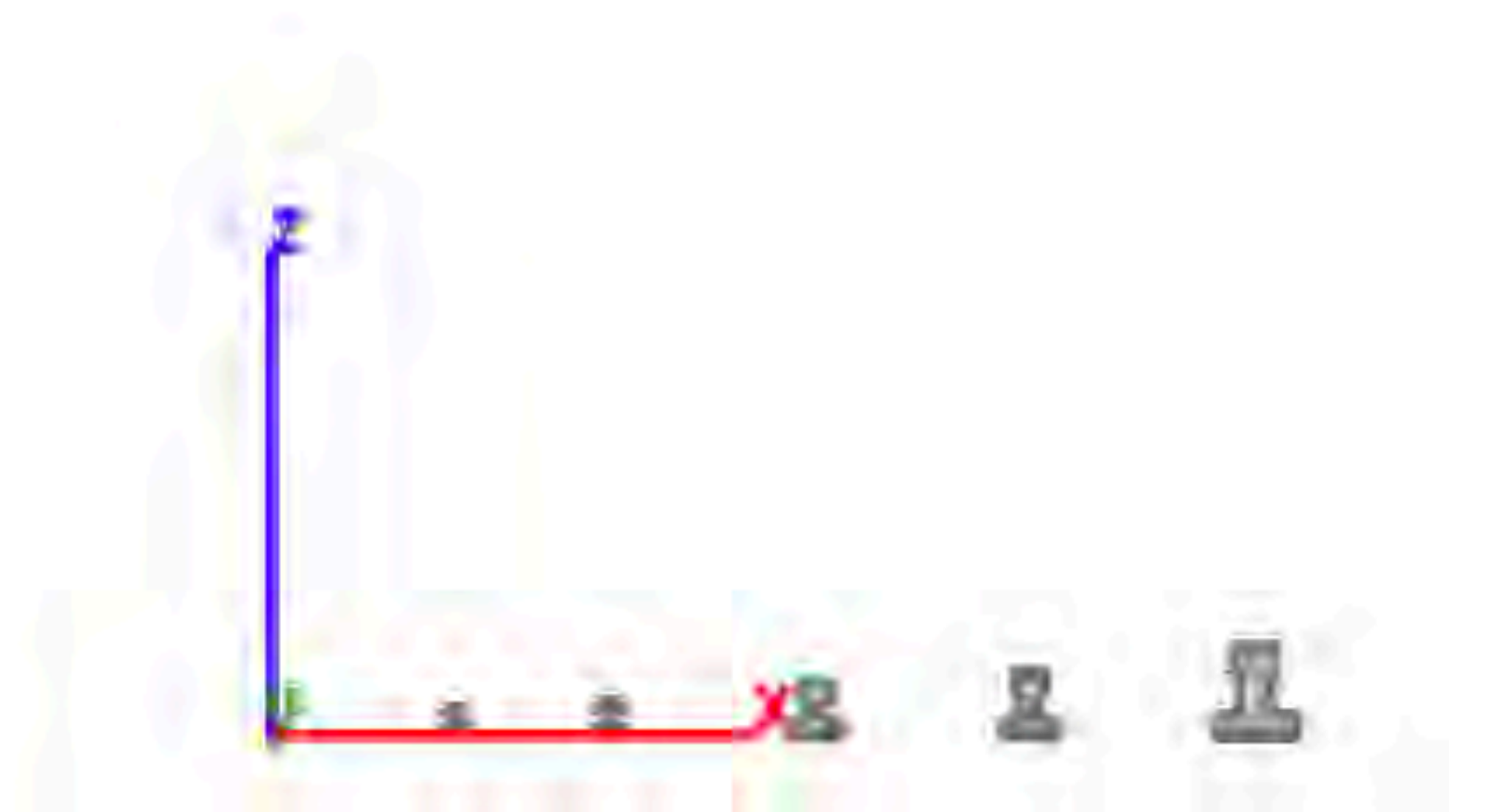
<https://www.nmra.org/rp-151-rail>

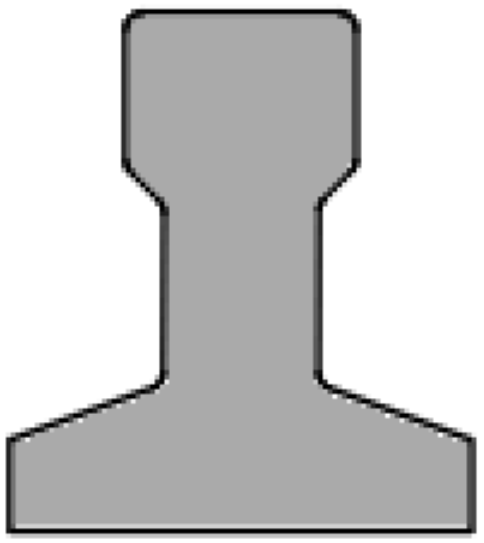
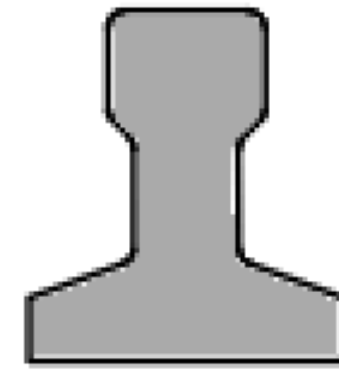
Web = $\frac{2}{3}$ head width

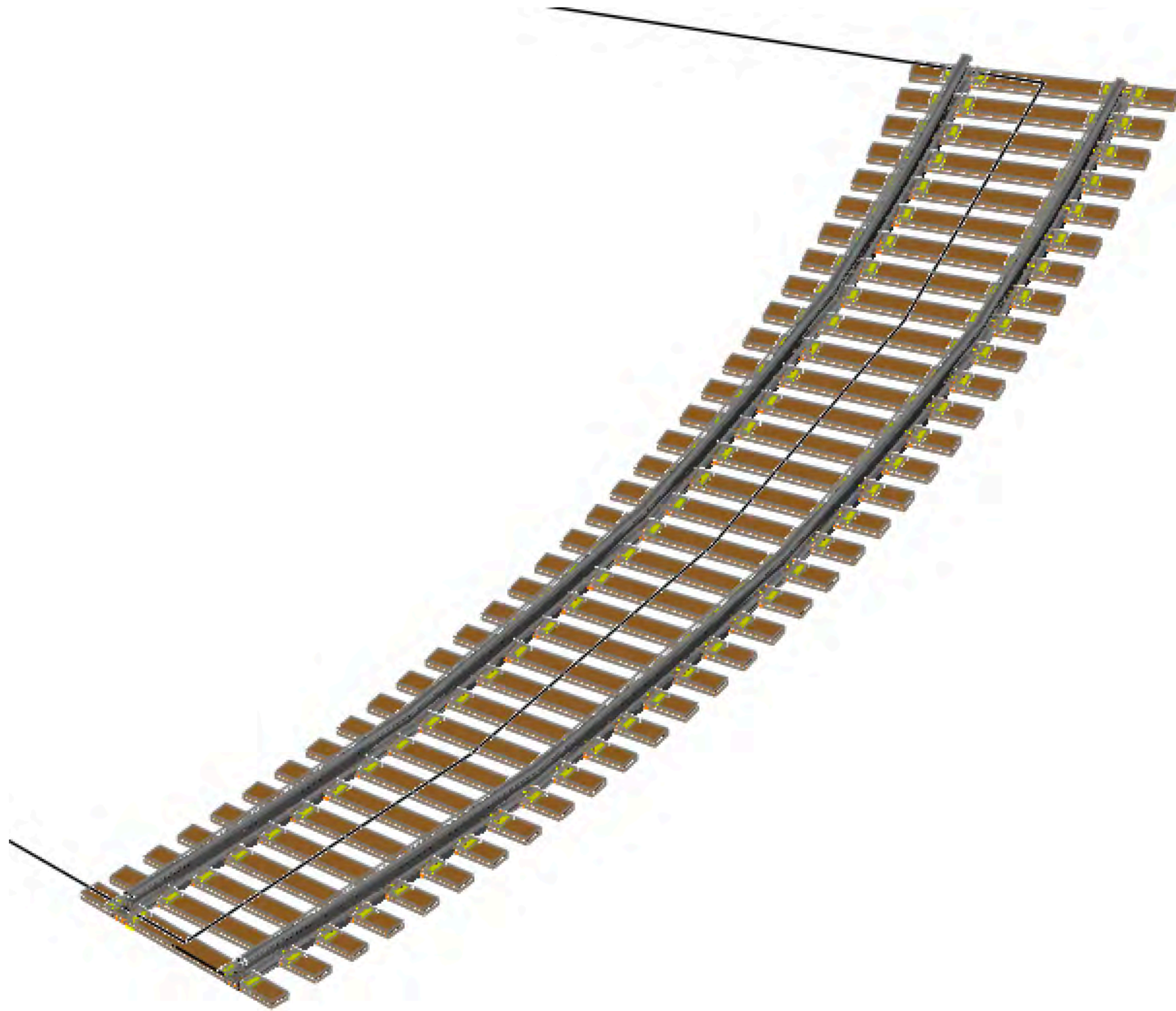
Dimension from NMRA

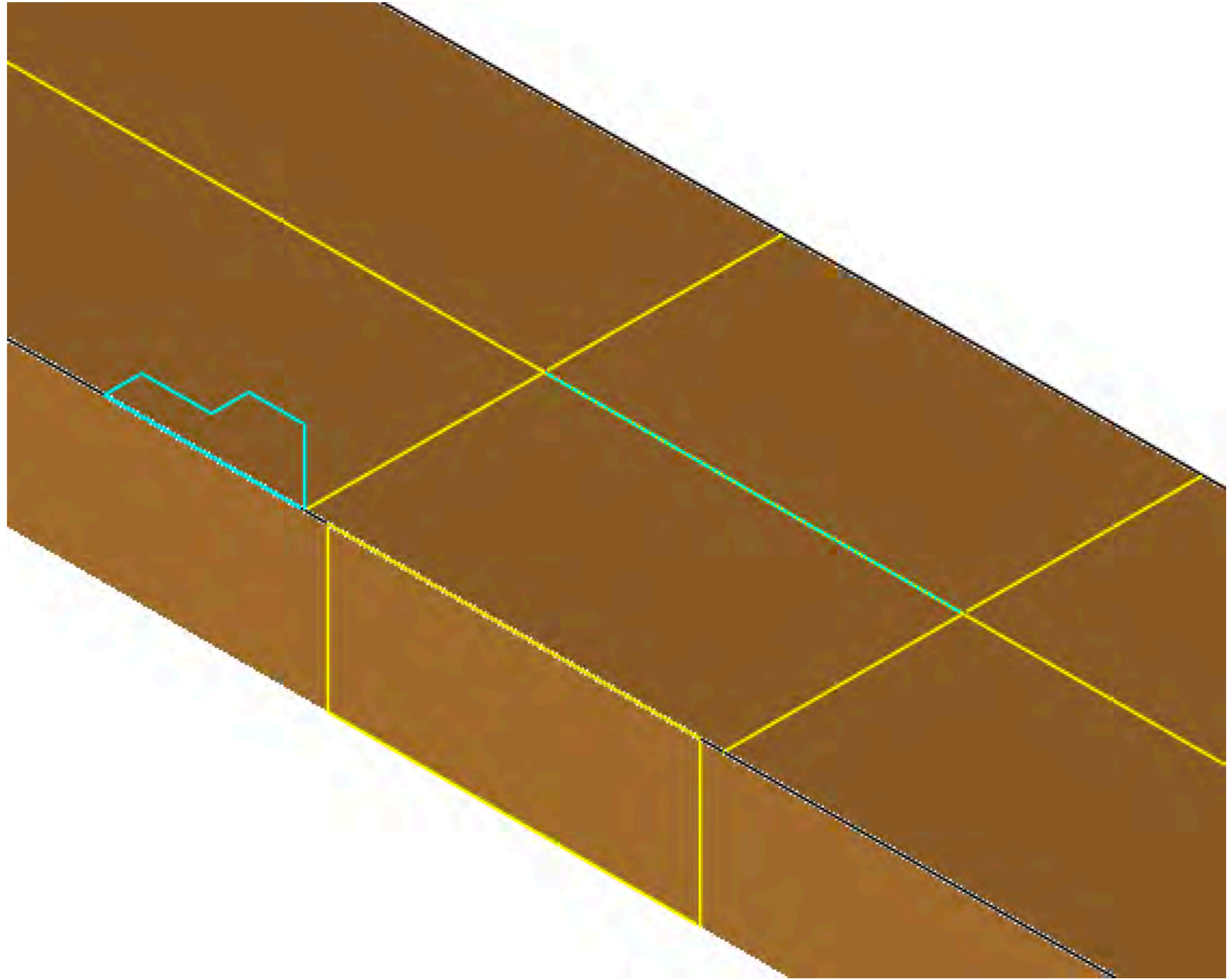
Web is 2/3 or head width

Height	Head Width	Web Width	Base Width	Base Height
.043	.018	.012	.040.	.008
.055	.027	.018	.053.	.011
.083	.040	.027	.080.	.016
.100	.045	.030	.090.	.018
.148	.066	.044	.132.	.016







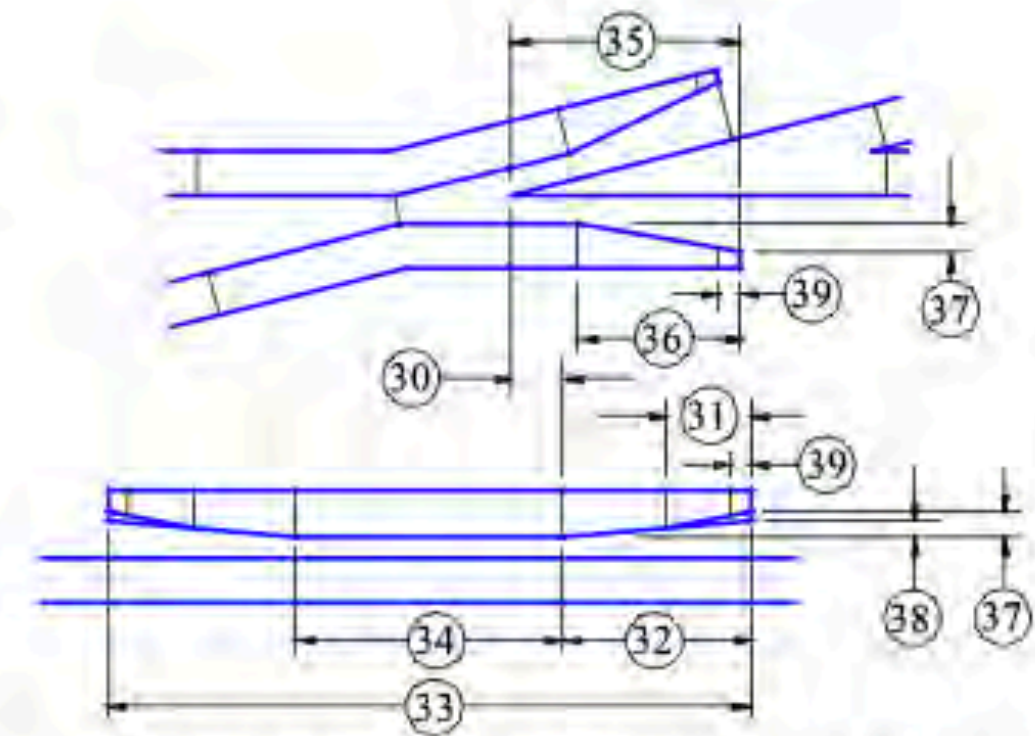


RP-12

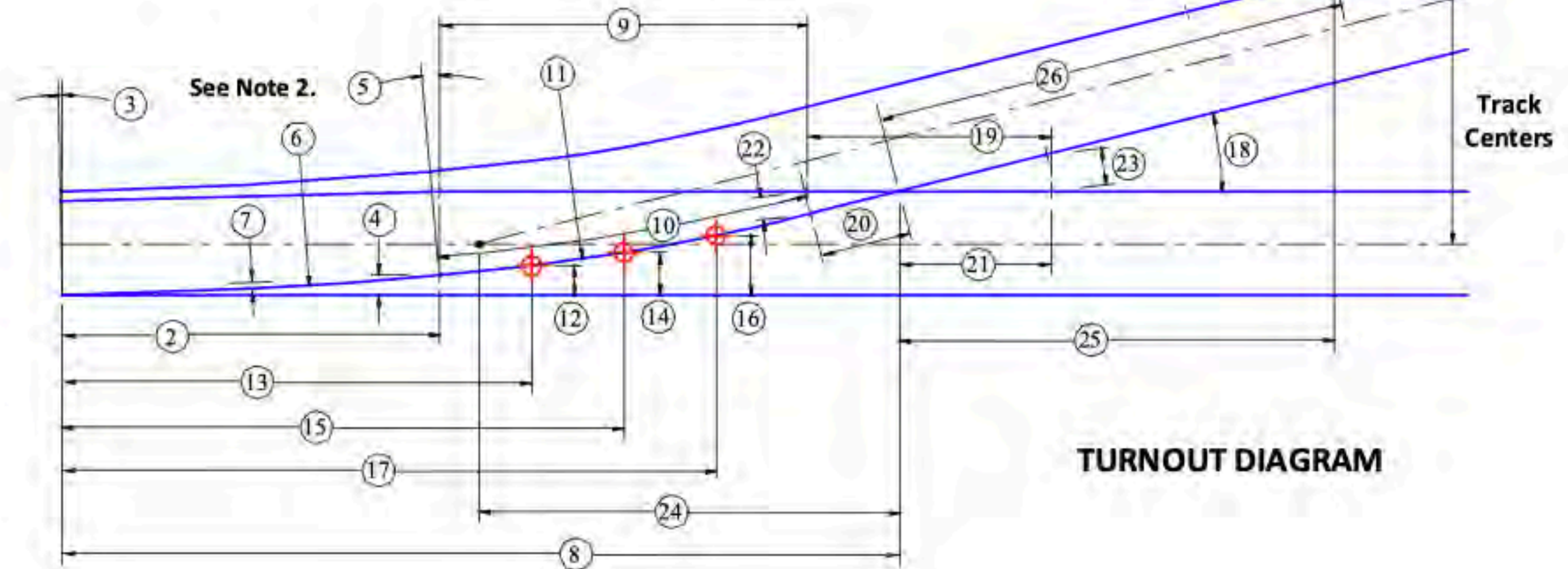
Page 3 of 3

DIAGRAM of TURNOUTS ALL TRACK GAUGES CURVED OR STRAIGHT SWITCH RAILS

1. The heavy lines of the Turnout Diagram represent the railhead gauge lines only. The Wing and Guard Rail Diagram includes an exaggerated railhead width to clarify the flare dimensions.
2. Circled numbers refer to the line numbers contained in parentheses in the **RP-12.x** series. Circle 3, circle 6 and circle 7 apply only to curved switch rails. For straight switch rails the Point Angle is the same as the Switch Angle, circle 5. All other circle numbers apply to turnouts with either type of switch rails.
3. Turnouts with continuous curved closure rail and switch rail use Rail Length (circle 2) for the straight leg only. All other dimensions apply with the switch in thrown position.
4. "High Speed" turnouts with closed frog points should follow these dimensions for the thrown position.
5. Stub switches are considered special work and are not covered by these specifications.
6. For the scales and frog numbers it includes, the **RP-13.x** series details alternate dimensions for wing rails, guard rails, and their flares, supplementing the **RP-12.x** series.



WING AND GUARD RAIL DIAGRAM



TURNOUT DIAGRAM

NMRA Recommended Practices

Z Scale

Straight Switch Turnout

TURNOUT DIMENSIONS

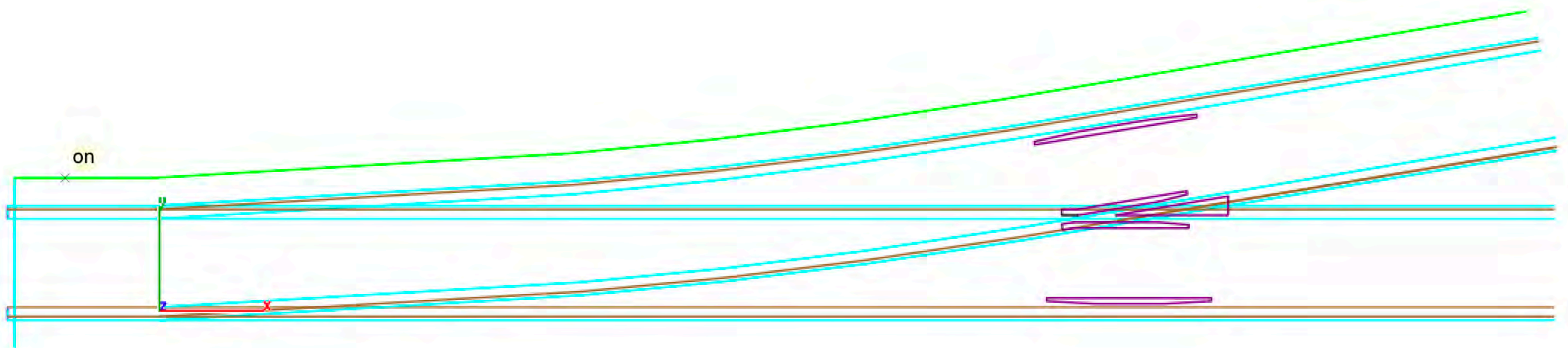
Revised: February 2015

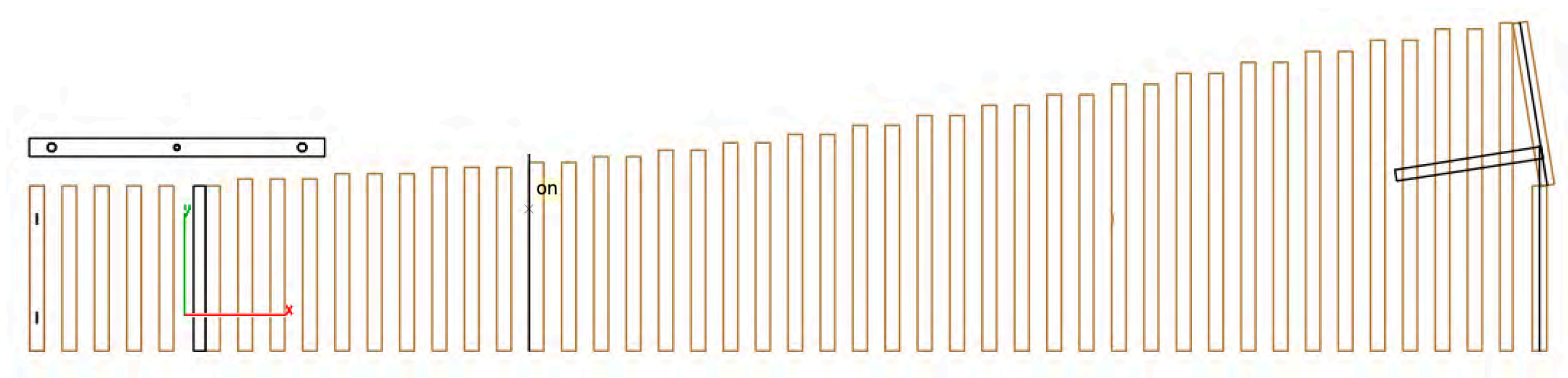
RP-12.37

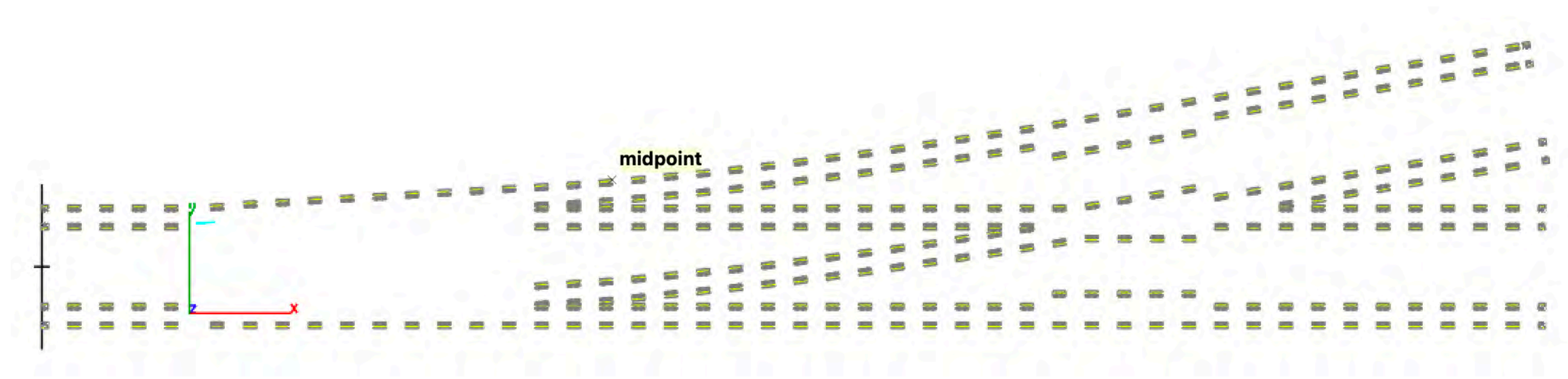
Design and calculations by Van S. Fehr

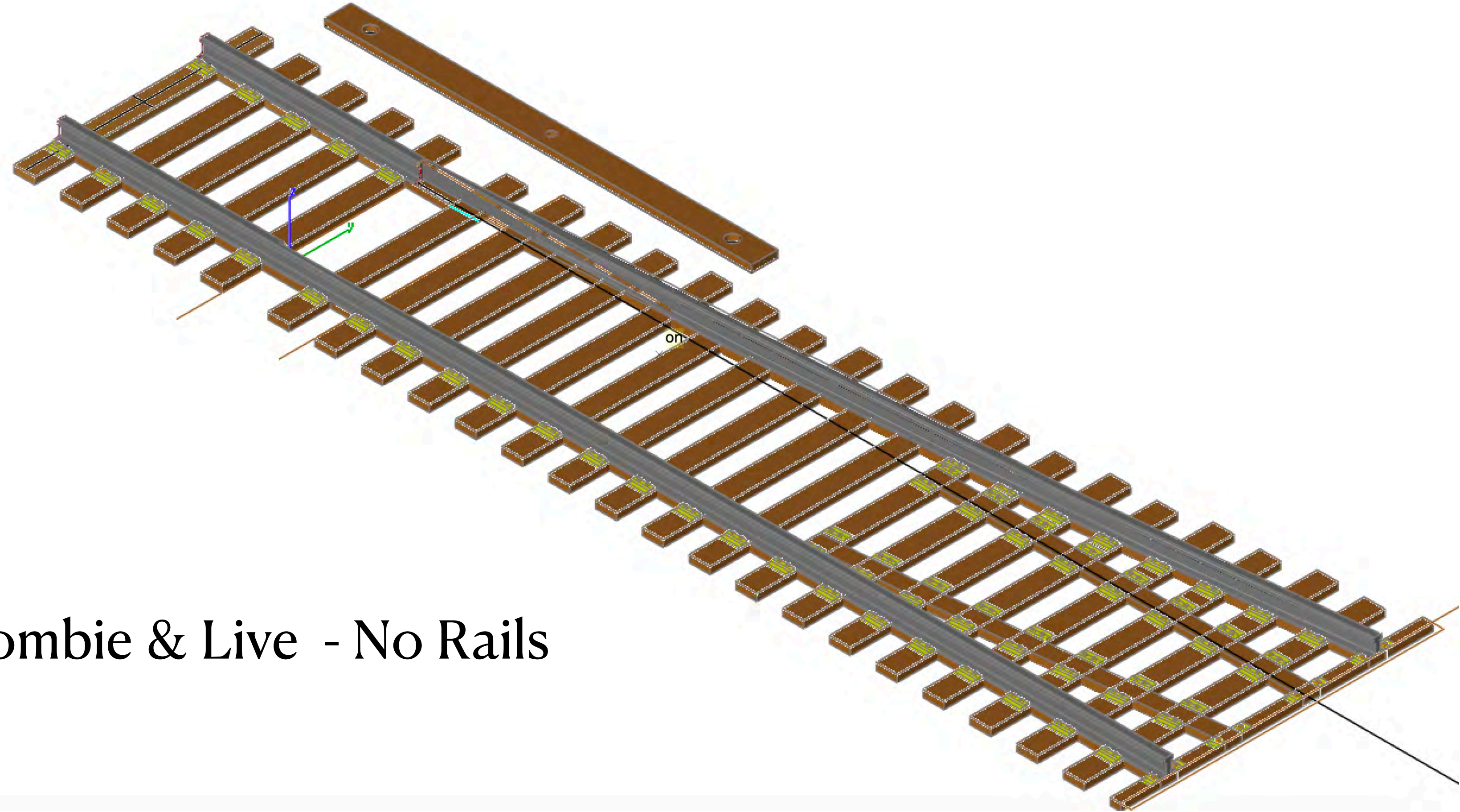
(1)	FROG NUMBERS	4	5	6	7	8	9	10	11	12
PROPERTIES OF STRAIGHT SWITCHES										
(2)	Switch Rail Length	0.851	0.854	0.871	1.293	1.347	1.359	1.436	1.784	1.808
(4)	Switch Heel Spread	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
(5)	Switch Heel Angle (deg.)	3.351	3.338	3.272	2.204	2.116	2.097	1.985	1.598	1.576
LEAD TO THEORETICAL POINT OF FROG										
(8)	Lead	2.041	2.309	2.577	3.370	3.691	3.923	4.273	4.985	5.245
CLOSURE DISTANCE										
(9)	Straight Rail Length	0.950	1.190	1.415	1.721	1.953	2.087	2.345	2.663	2.842
(10)	Curved Rail Length	0.971	1.206	1.429	1.732	1.963	2.097	2.353	2.671	2.849
(11)	Curved Rail Radius	5.103	8.550	13.089	16.633	22.328	28.179	36.046	42.416	51.074
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL										
(12)	1st Point Y1	0.069	0.072	0.075	0.072	0.073	0.074	0.075	0.074	0.074
(13)	1st Point X1	1.088	1.152	1.225	1.723	1.835	1.881	2.022	2.449	2.518
(14)	Mid-Point Y2	0.100	0.105	0.109	0.105	0.107	0.107	0.109	0.108	0.109
(15)	Mid-Point X2	1.326	1.449	1.579	2.153	2.323	2.403	2.608	3.115	3.229
(16)	3rd Point Y3	0.142	0.149	0.154	0.150	0.152	0.151	0.154	0.153	0.153
(17)	3rd Point X3	1.564	1.747	1.933	2.583	2.811	2.925	3.194	3.781	3.939
PROPERTIES OF FROGS										
(18)	Frog Angle (deg.)	14.250	11.421	9.527	8.171	7.153	6.360	5.725	5.205	4.772



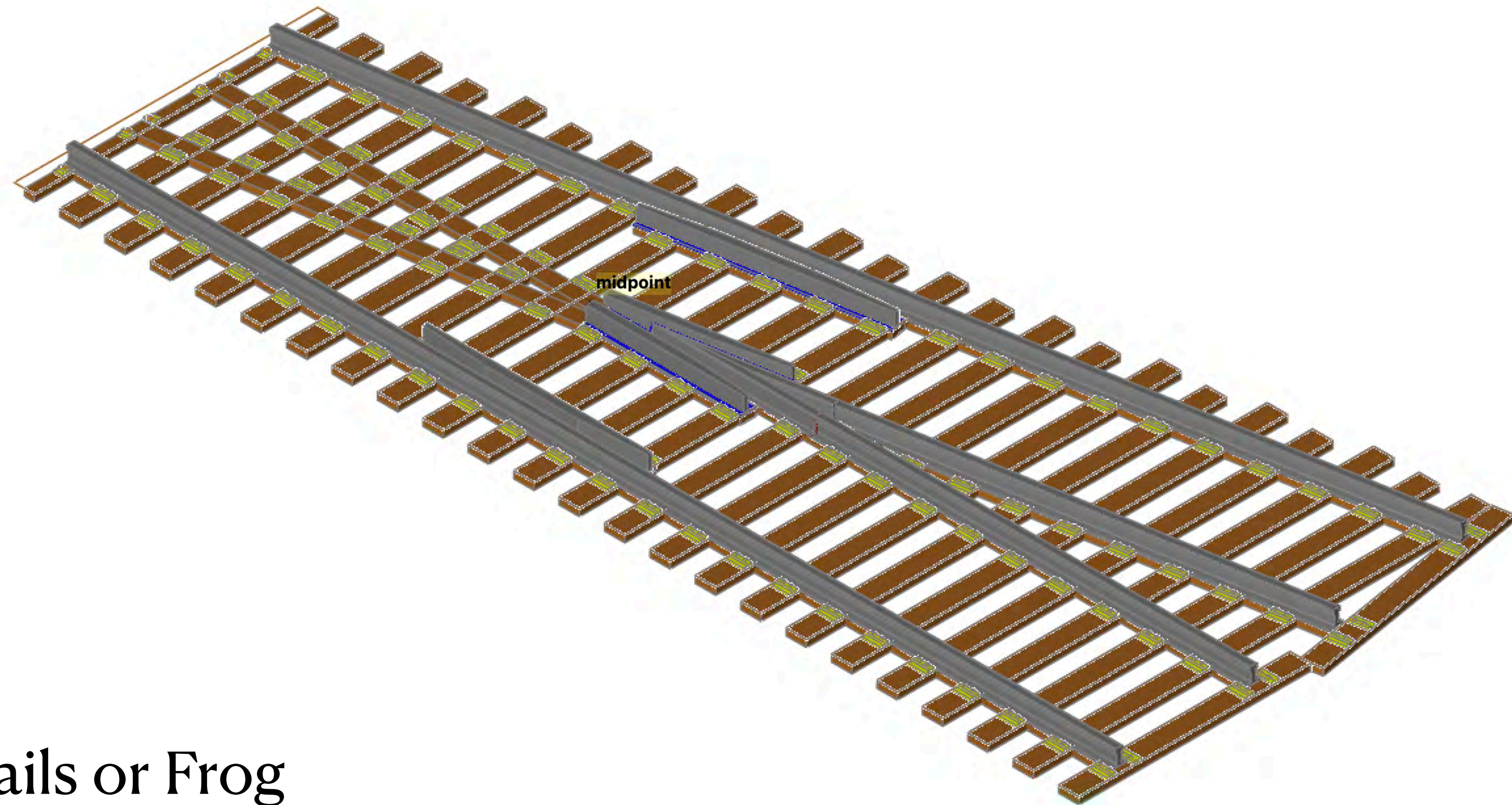






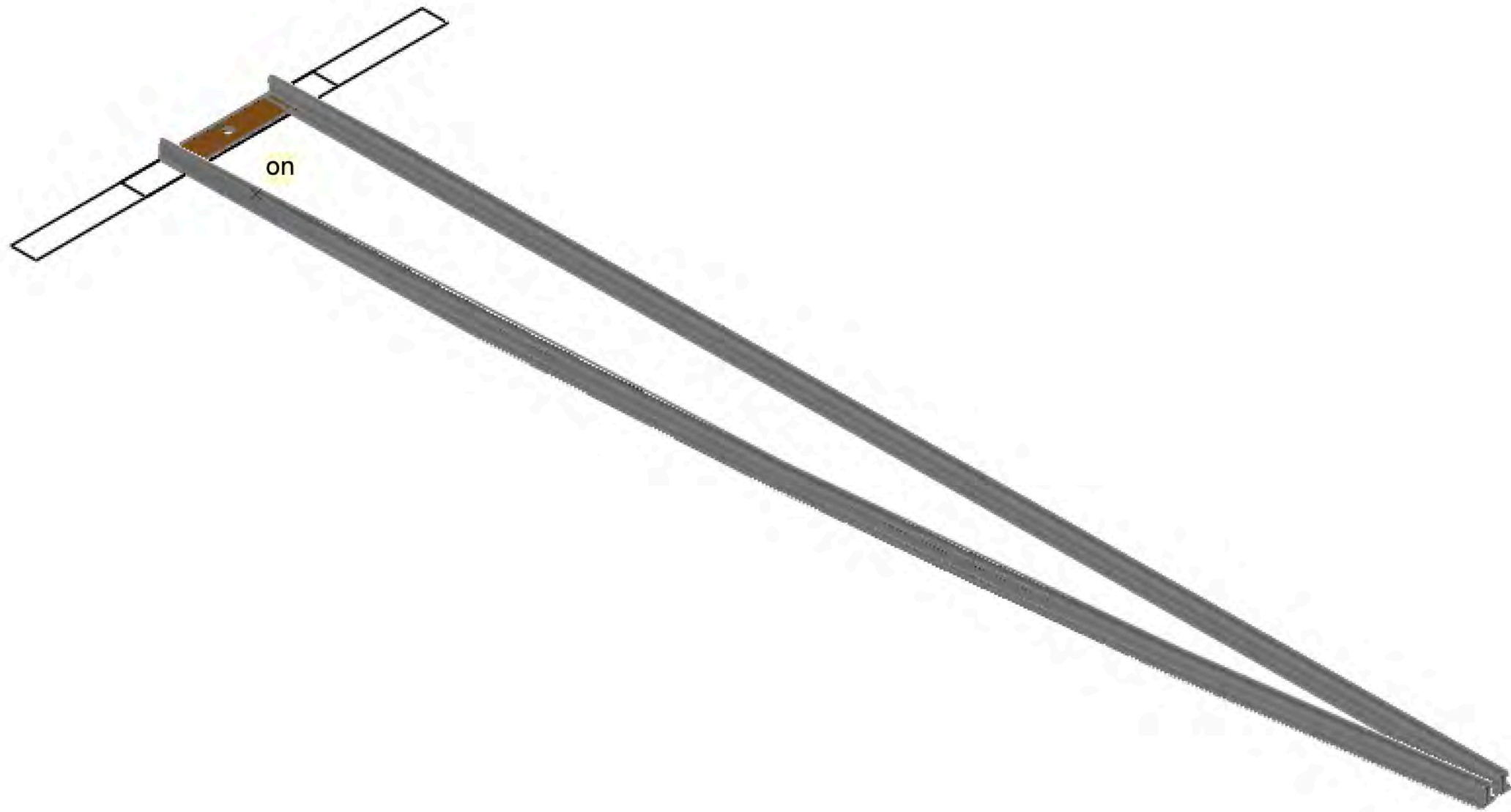


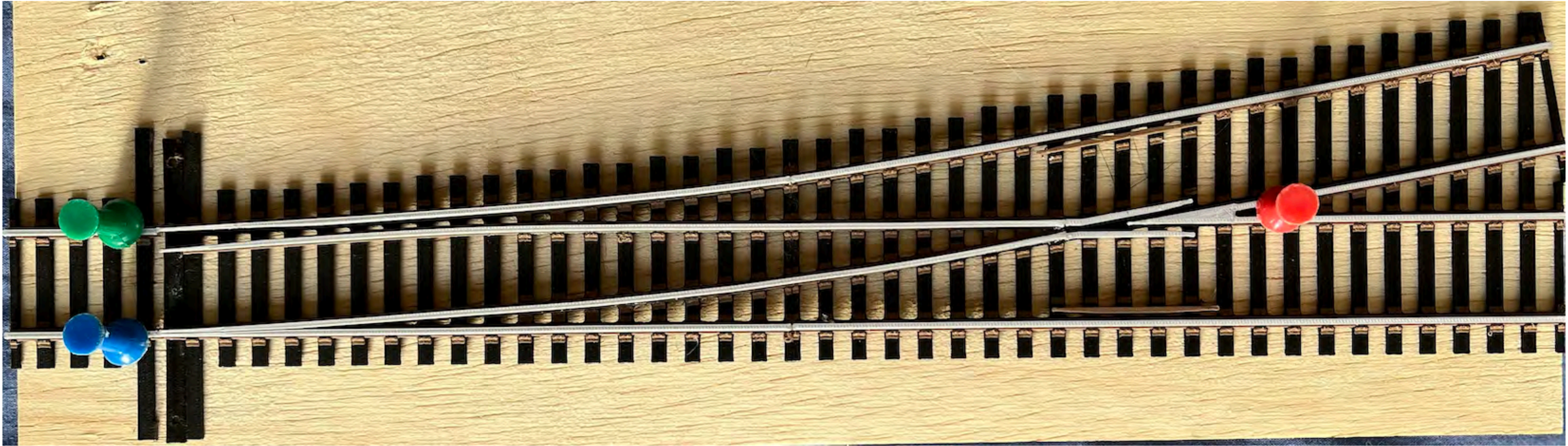
Zombie & Live - No Rails



Live - No Rails or Frog

Zombie - No Rails, Leave the Frog and Wing Rails





Ancillary - Adhesives

CA (Cyanoacrylate): PLA to nickel silver and PLA to PLA

IPS Weld-On 16: PLA to PLA (Does not stick to metal)

Pliobond: PLA to nickel silver (weaker than CA)

Aluminum foil under Weld-On 16 joints

Ancillary - Cutting

Fine tooth razor saw

Rips the bond between layers if vertical rail

Works if careful and horizontal rail

Razor blade or guillotine (Chopper) works well

- cut area supported, no bridge

Closing Comments

Make unique track (cobblestone, curved bridge, log etc.)

Economics of dead rail

Download and print

Design you own and, hopefully, share

Dead Rail groups.io

Further Research

Concrete looking ties

Black with single broken layer of gray (aged ties)

Stain wood filled PLA (could be more brittle)

One black layer between rail head and web

What could work outside?

YouTube - We 3D Printed a Model Train Switch

Help You

I will help you individual or group - Zoom, email or phone

Help You

I will help you individual or group - Zoom, email or phone

I will explain the CAD functions you need

Help You

I will help you individual or group - Zoom, email or phone

I will explain the CAD functions you need

I will not learn you CAD software

Help You

I will help you individual or group - Zoom, email or phone

I will explain the CAD functions you need

I will not learn you CAD software

You are not Tom Sawyer and I will not paint your fence

Help Each Other

If you have a printer

Down load and try (do not worry about color for now)

Comment of Dead Rail groups.io

