

Flange-Bearing Technology in Frogs and Crossing Diamonds

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BNSF Railway**



Outline

- Why use flange-bearing surfaces
- FRA requirements for flange-bearing diamonds (pre 2010)
- New waiver requirements for diamonds
- Flange-bearing frogs for turnouts



The reasons behind flange bearing

- Flange-bearing surfaces reduce impact
 - Fewer broken subcomponents
 - Fewer track windows for maintenance
 - Longer life of frogs and crossings
- Smooth ride
 - Continuous surface
 - Less noise



Where are flange-bearing surfaces being used

- Crossing diamonds
 - Full flange bearing
 - 2 diamonds at Moorhead, Minn.
 - OWLS
 - 26 diamonds at 17 locations
 - 10 mph on restricted side
- Self-guarded frogs
 - 15 at 4 locations



FRA waiver on flange-bearing diamonds

- June 2000
 - FRA grants a waiver to AAR for installation of up to 5 flange-bearing frog (FBF) crossing diamonds
 - 2 FBF diamond locations, 3 total diamonds
 - Shelby, Ohio (CSX)
 - Moorhead Junction, Minn. (BNSF)



FRA waiver on flange-bearing diamonds

- Maximum speed under 80 mph (Docket FRA-1999-5104)
- Equipment inspection
 - 12 cars must be inspected
 - Each car must travel 5,000 miles/month
 - Each car must cross the FBF 10-15 times per month



FRA waiver on flange-bearing diamonds

(Equipment inspection continued)

- Cars inspected quarterly at TTCl in Pueblo
 - All truck components (including bolster, side frames, wheels, and axles) – Visual inspection
 - Wheel flange – Dye-penetrant inspection
 - Wheel tread and axle – Ultrasonic inspection
 - Wheel profile – Representative running surface cross-section profile taken with MiniProf™ profilometer
 - Wheel hardness – Representative hardness measurement taken on flange tip with Equotip™ device



FRA waiver on flange-bearing diamonds

- October 2010
 - New FRA waiver with more relaxed restrictions



FRA waiver on flange-bearing diamonds

- FBF diamonds can be installed in any track up to Class 5
- AAR must file planned install locations for FBF quarterly
- AAR/RR must submit selection criteria, plans, specs for each FBF 30 days prior to install
- On-foot inspections (submitted yearly to the FRA)
 - Daily for 2 weeks
 - Weekly for next 6 months
 - Bi-weekly for next 6 months
 - Monthly thereafter



FRA waiver on flange-bearing diamonds

- Maintenance manuals must be available to all who inspect/repair FBF
 - All repair/maintenance to FBF must be submitted yearly to the FRA
- AEI records of cars passing the FBF must be maintained
- Equipment Inspection
 - 5 cars to be visually inspected, measured, and photographed yearly
 - Each car must make 5 passes over the FBF
 - This only applies to the first 5 FBF installed



FRA waiver on flange-bearing diamonds

- Yearly, AAR will file with the FRA the total number of wheels removed for flange cracked or broken
- All derailments occurring within 500 feet of an FBF will be reported to FRA, regardless of monetary damage

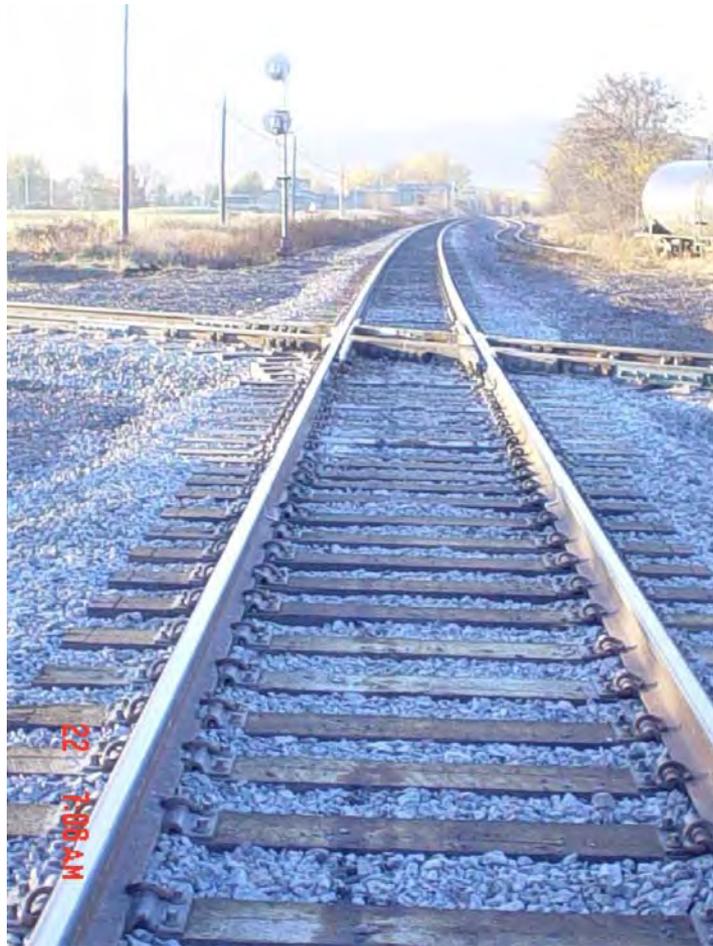


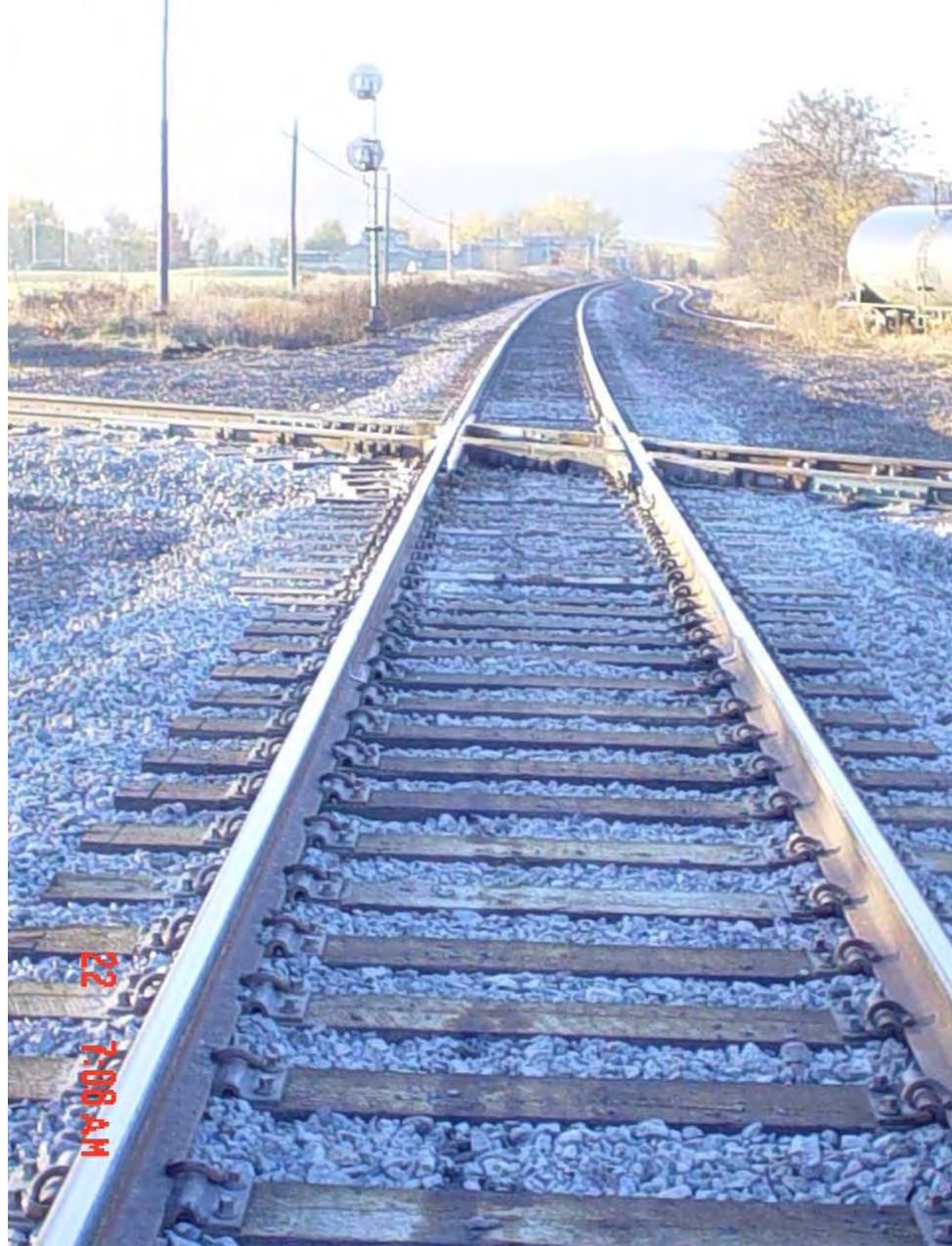
FRA waiver on flange-bearing diamonds

- Technically, the waiver allows OWLS diamonds to be used over Class 1 speeds in the flange-bearing direction
- OWLS diamonds have a break in the flange-bearing surface
- TTCI has studied full FBF up to Class 5, but has not studied OWLS



OWLS at Crawford, WI Installed August 2008





22
7:08 AM









Moorhead, Minn. January 2010



A high-angle, close-up photograph of railroad tracks. The tracks consist of two parallel steel rails supported by wooden ties. The ties are laid on a bed of coarse gravel. The tracks run diagonally from the bottom left towards the top right. In the center of the image, the text "EB NORTH RAIL" is overlaid in white, bold, sans-serif font. The lighting is bright, casting shadows on the gravel and ties.

EB NORTH RAIL



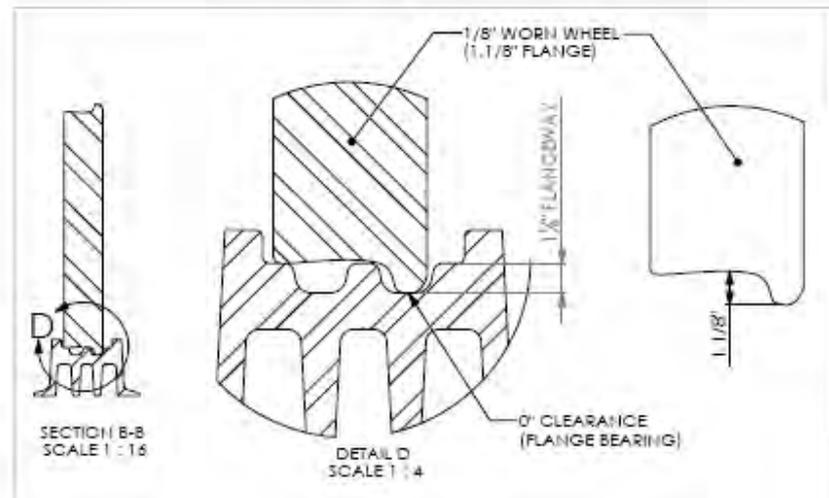
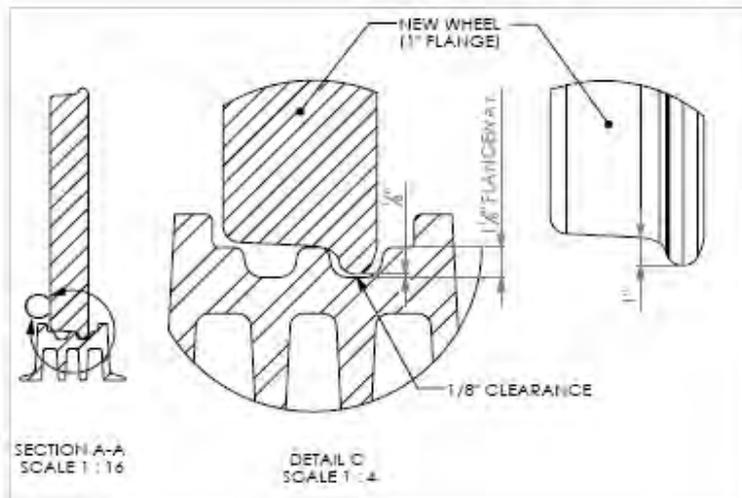
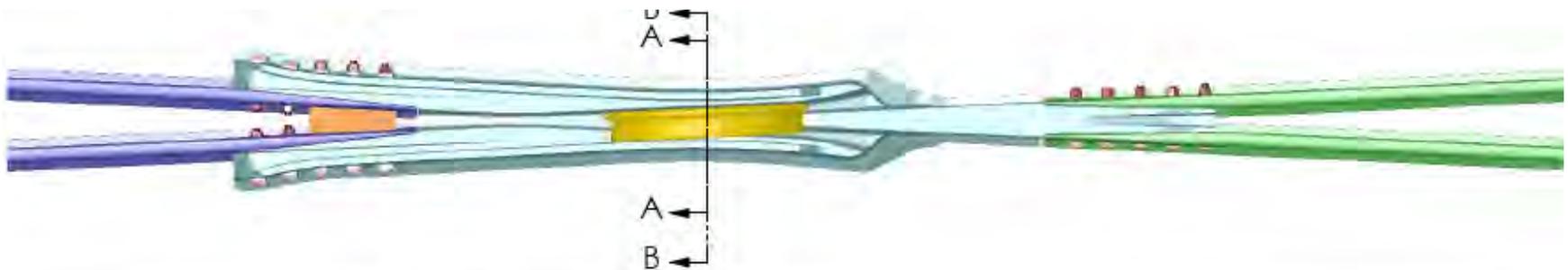
EB SOUTH RAIL



WB NORTH RAIL



SSG, combination tread and flange bearing #9

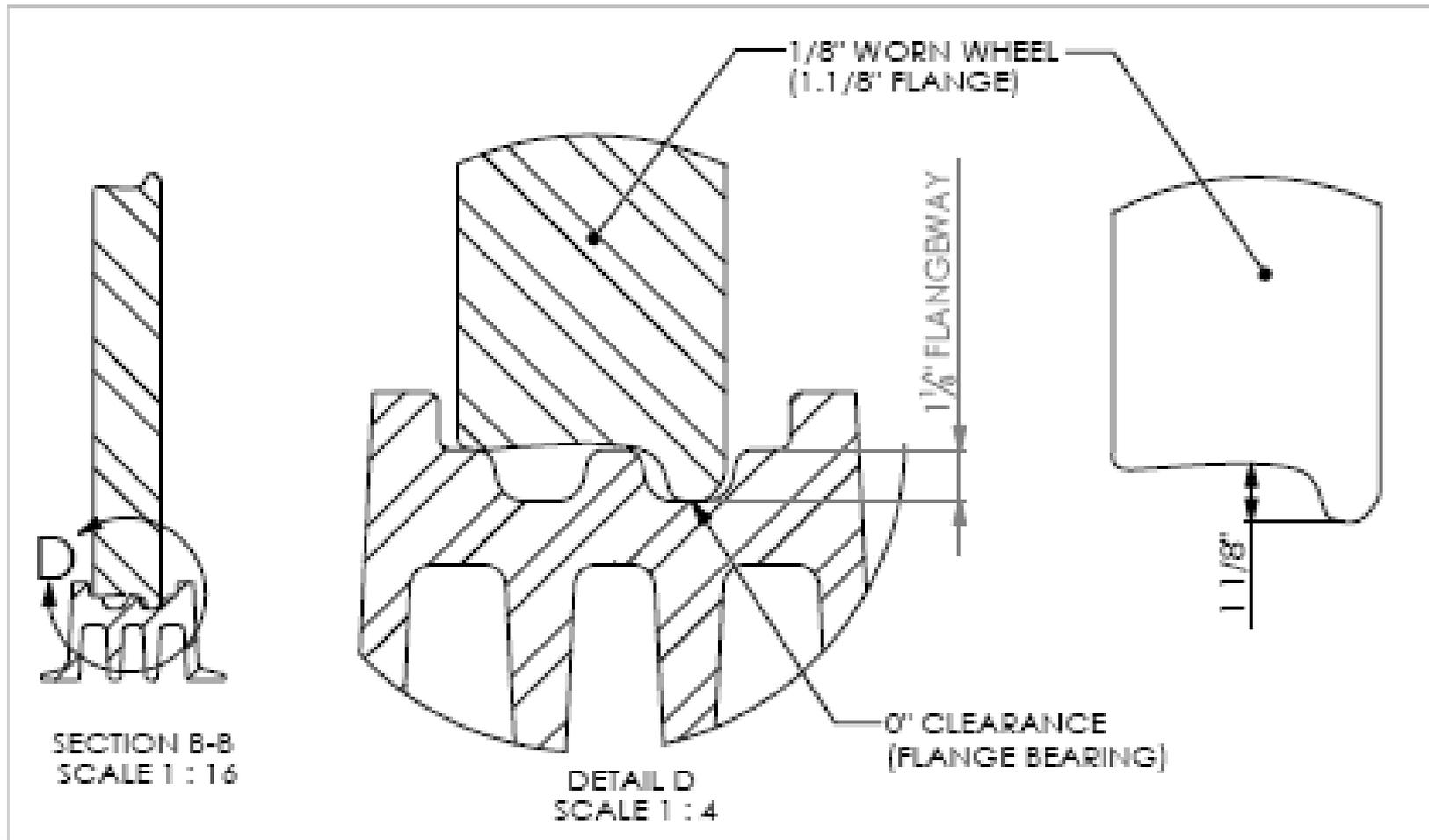


Features

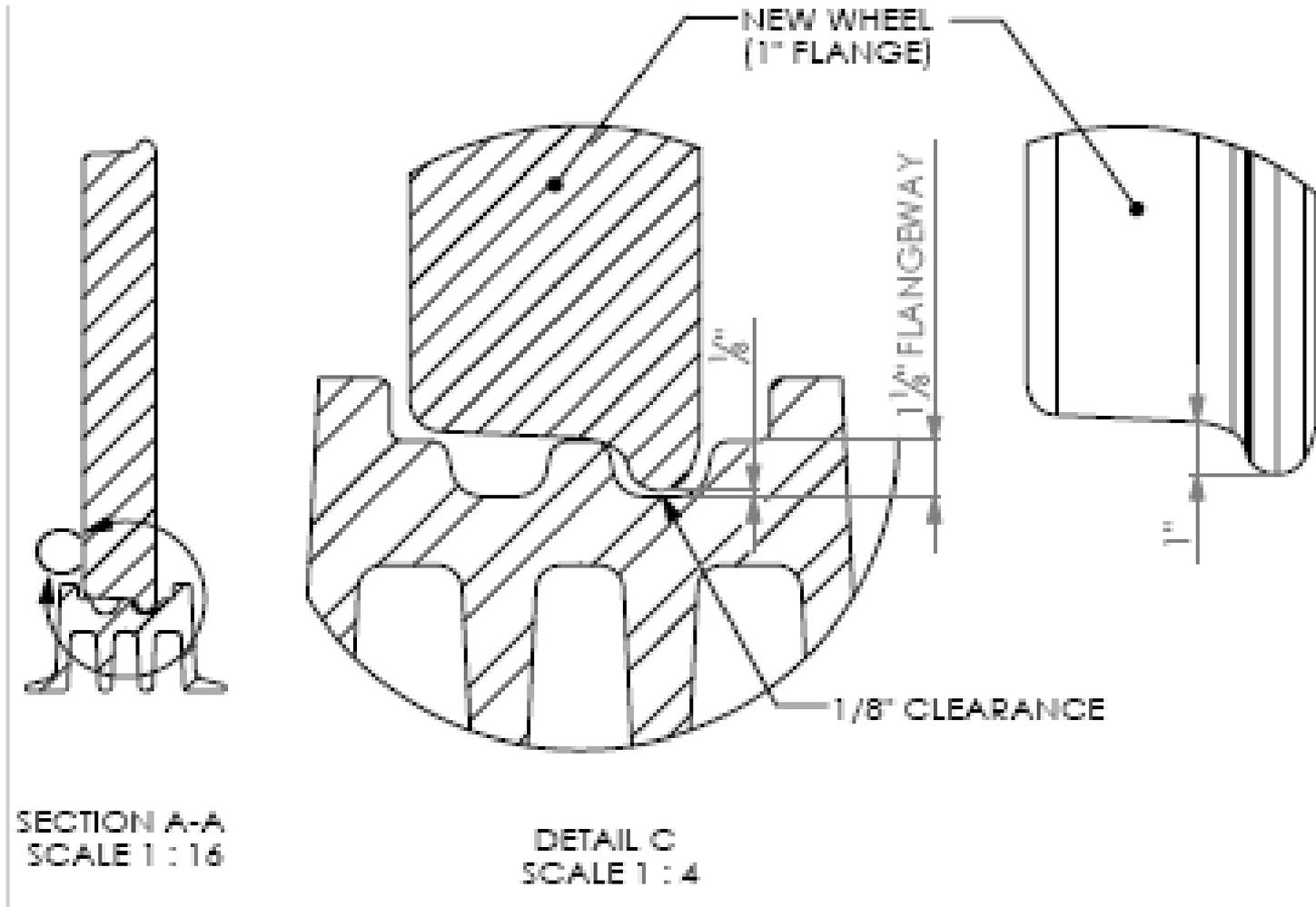
- Maximum speed 10 mph all directions
- No tonnage restriction
- Extended life of SMSG frogs
- Plan to grind away until it is a flat-top frog
 - **NO** welding
 - Grind



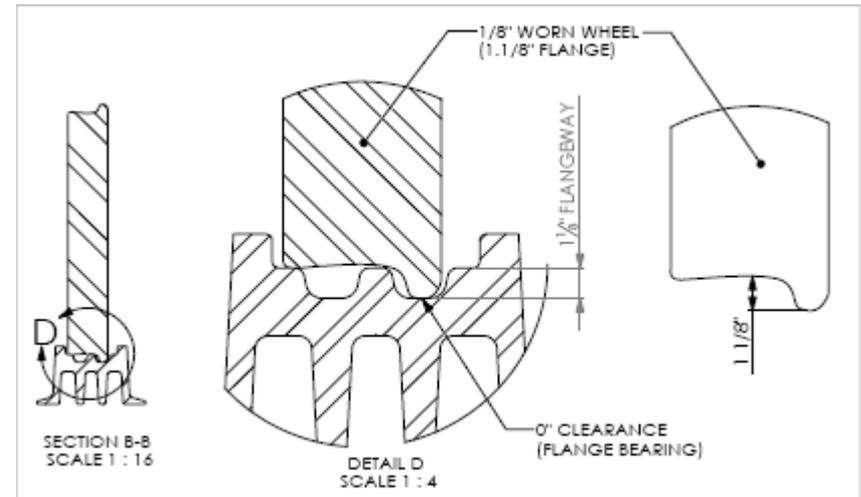
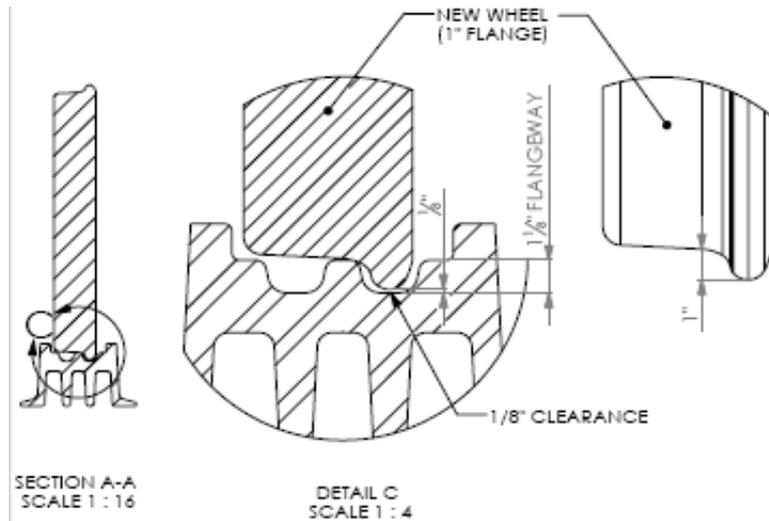
Worn wheel (1-1/8" flange)

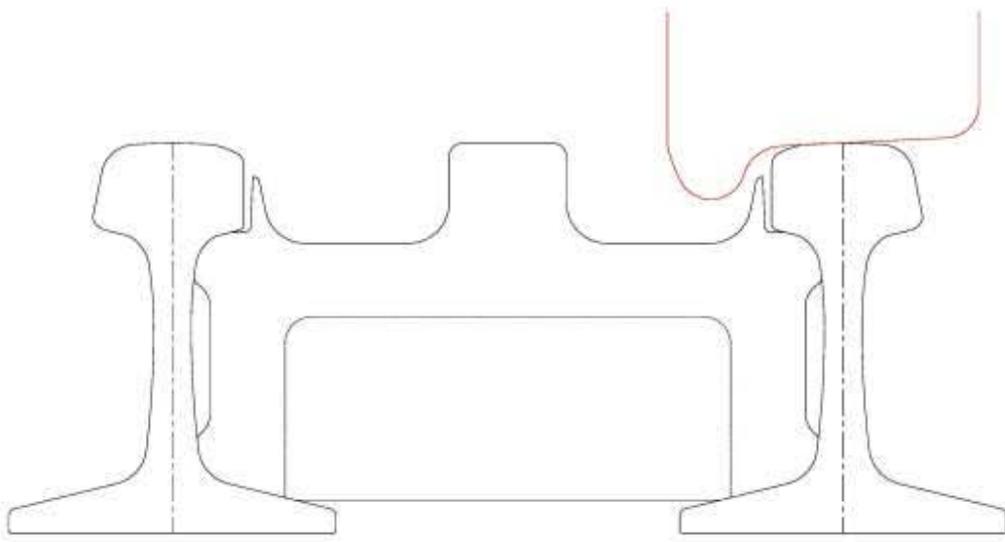
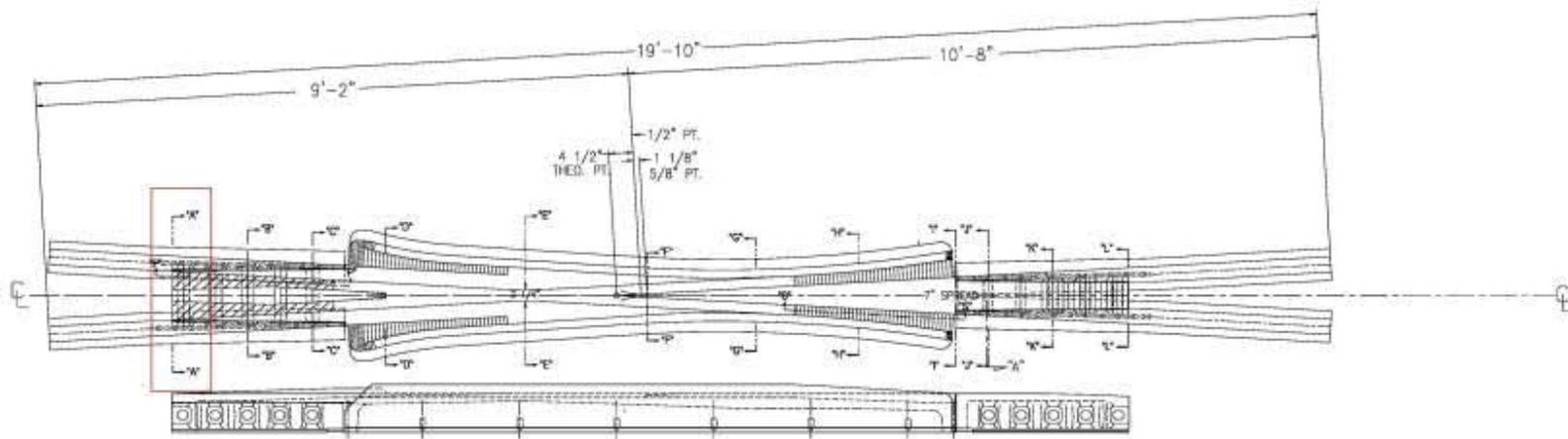


New wheel (1" flange)



Side by side

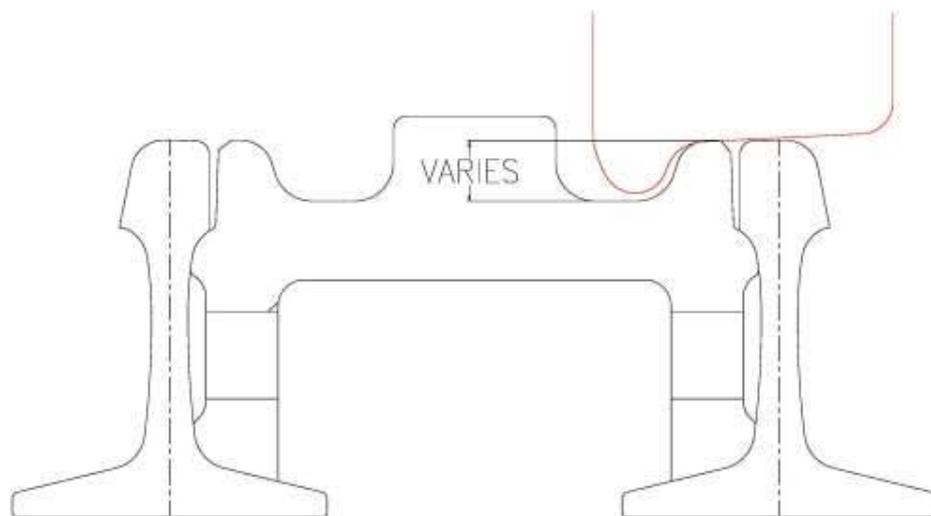
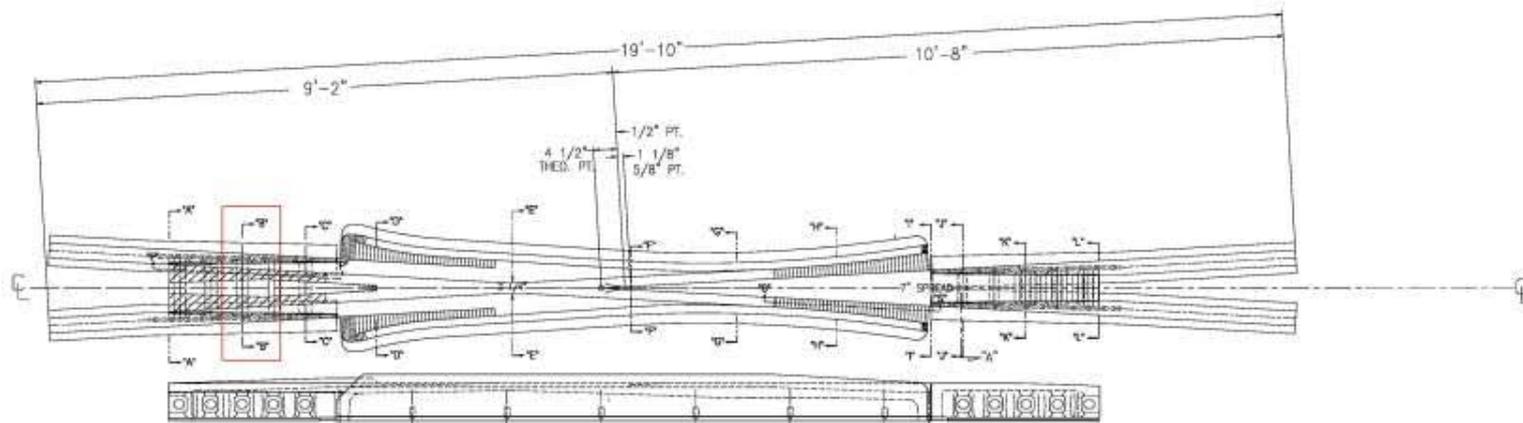




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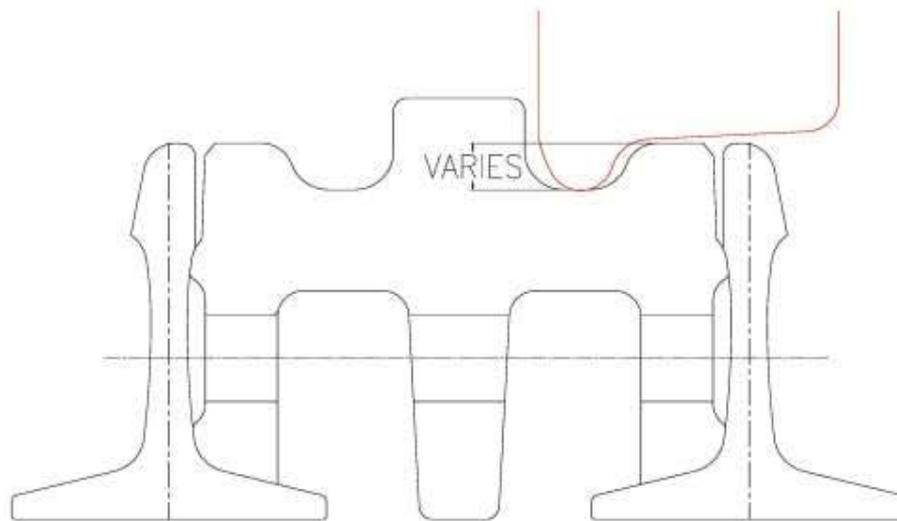
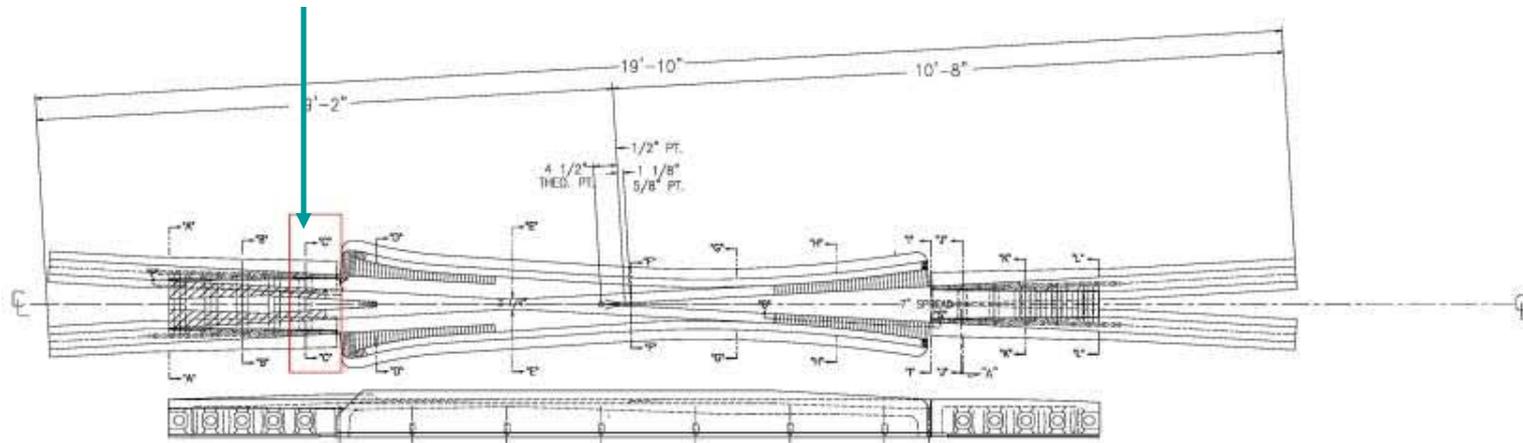




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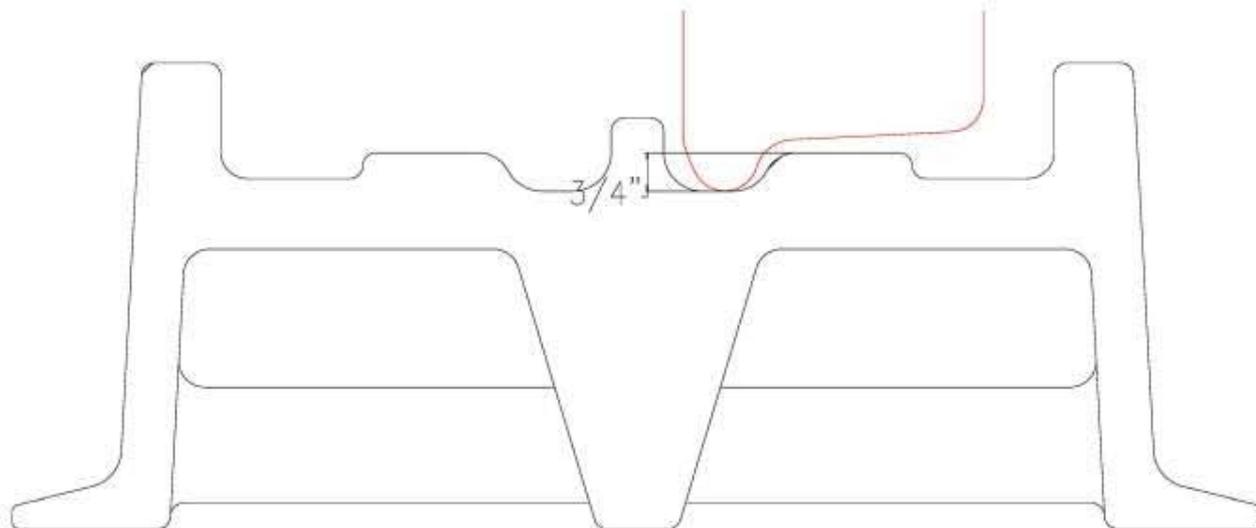
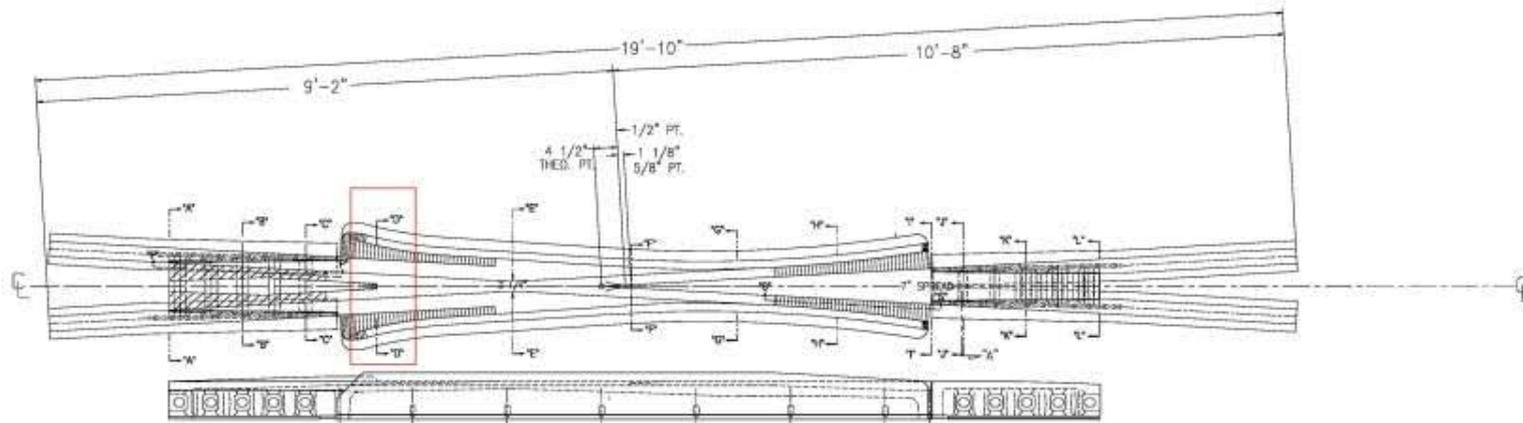




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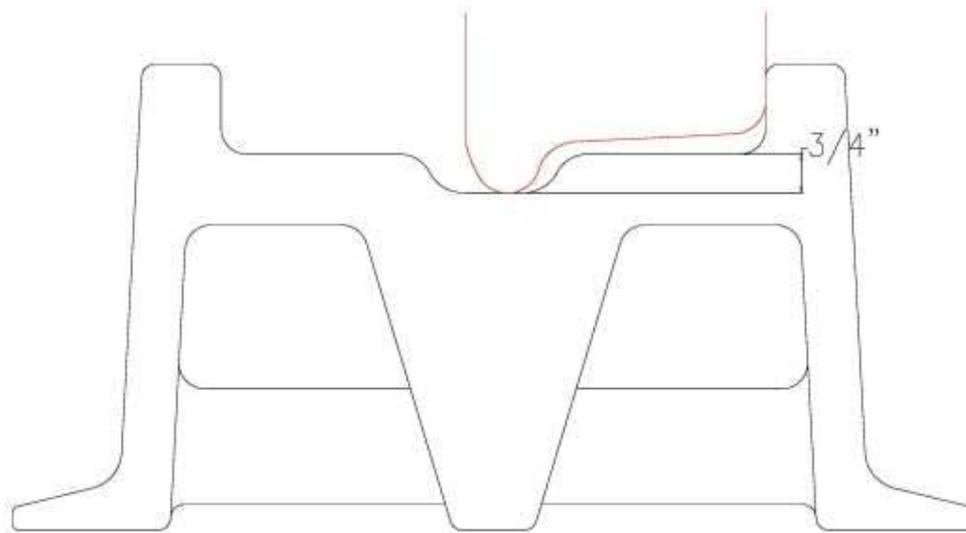
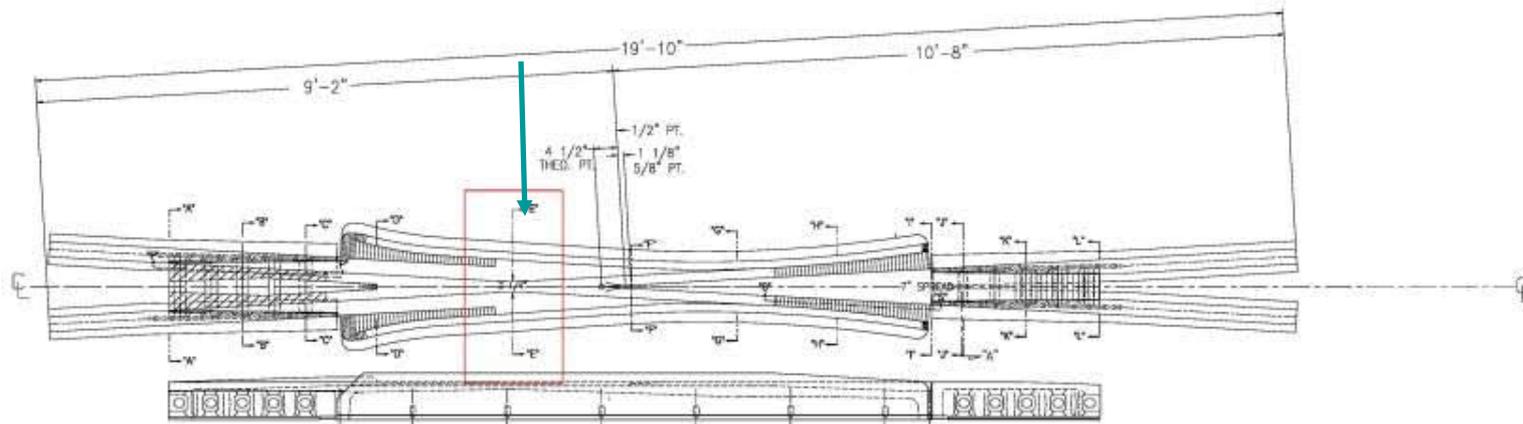




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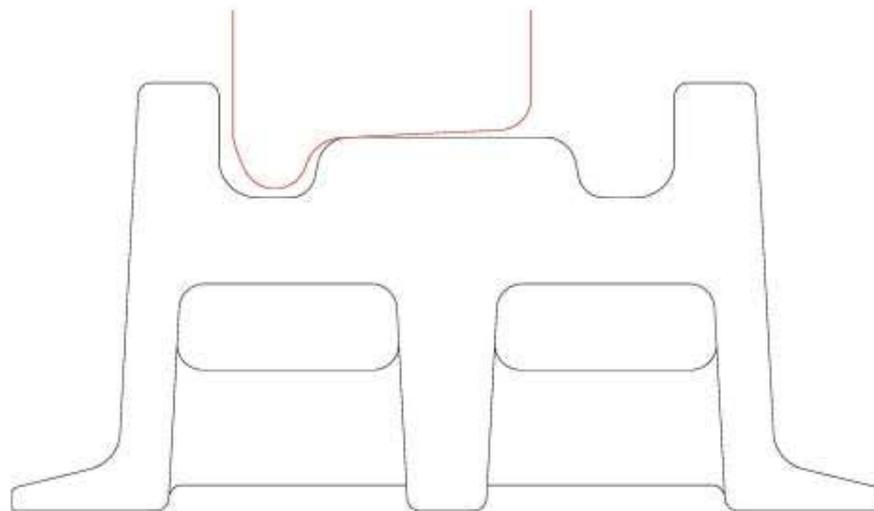
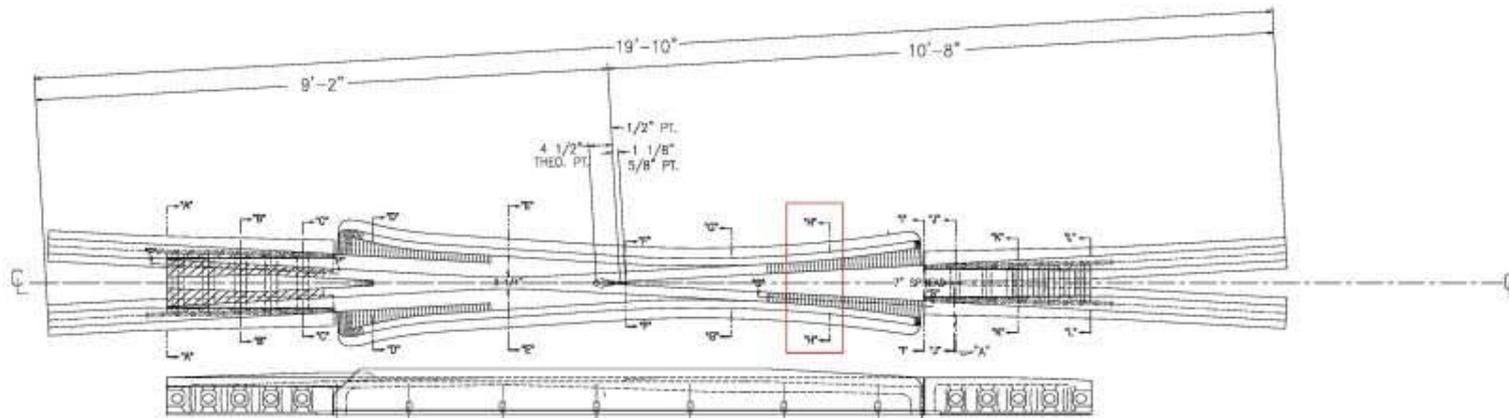




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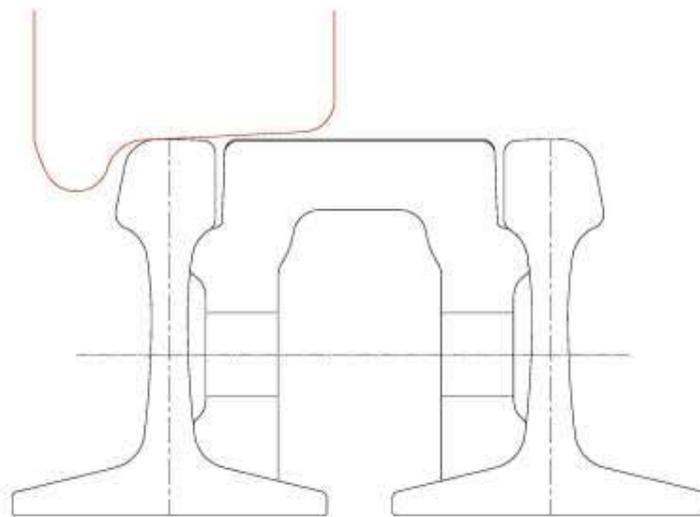
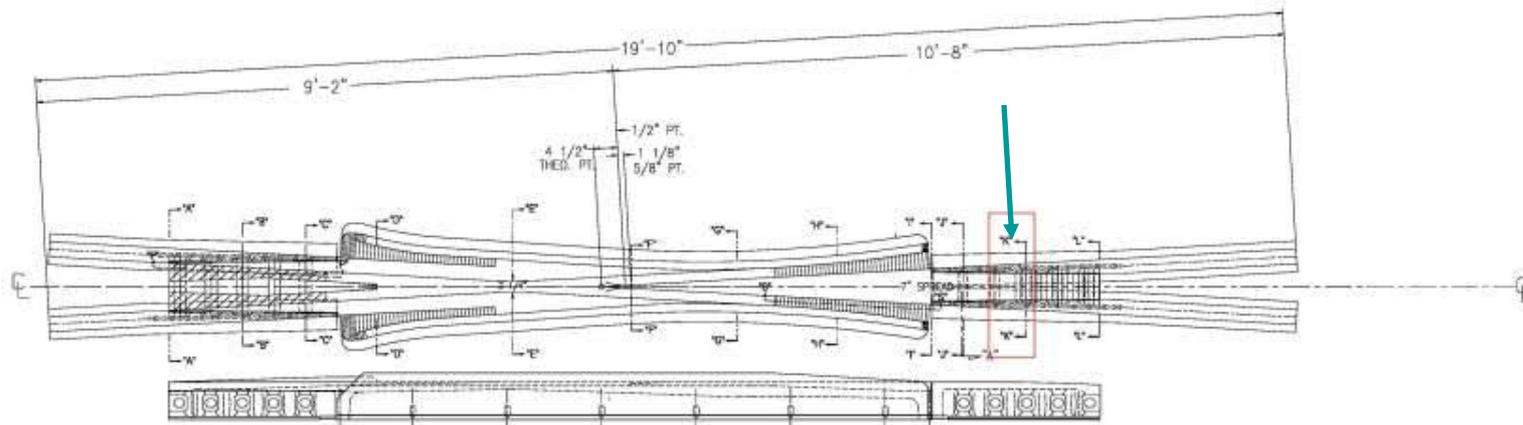
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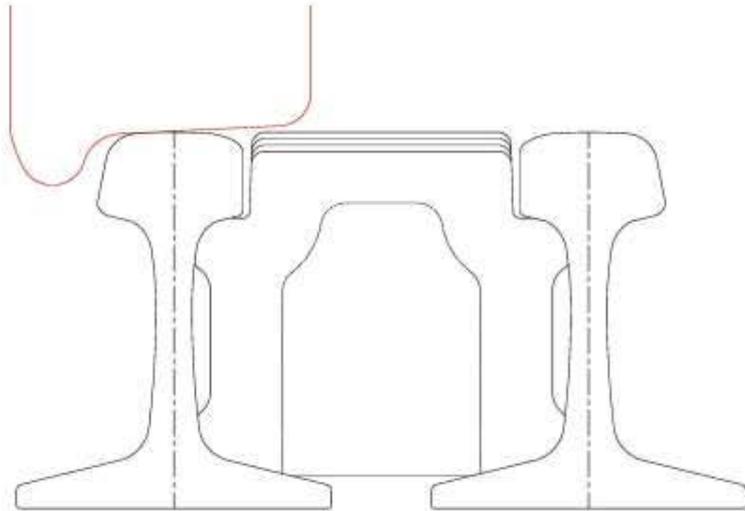
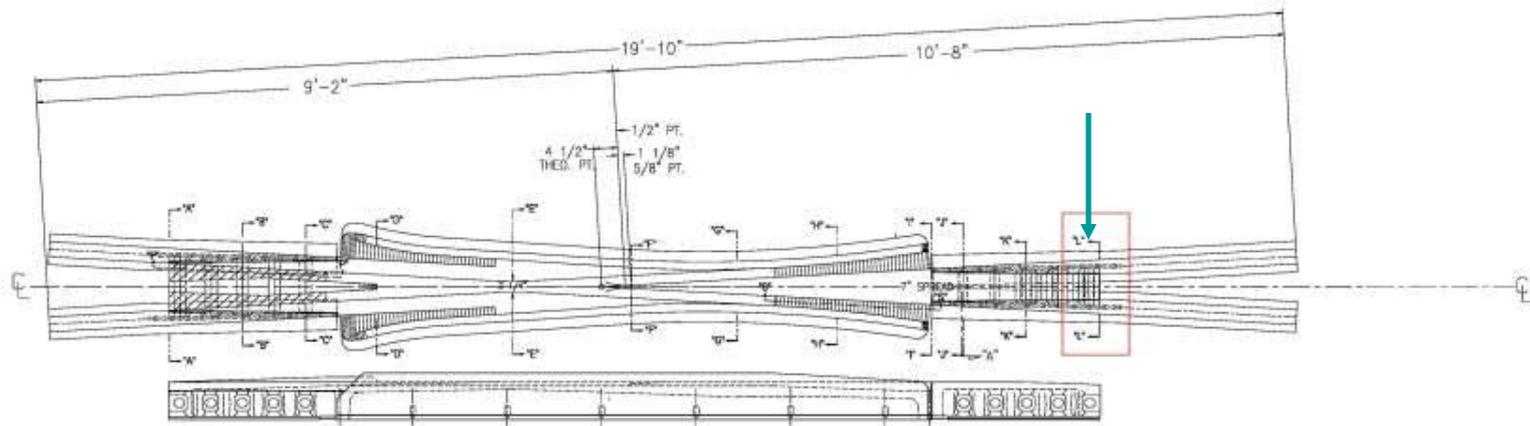




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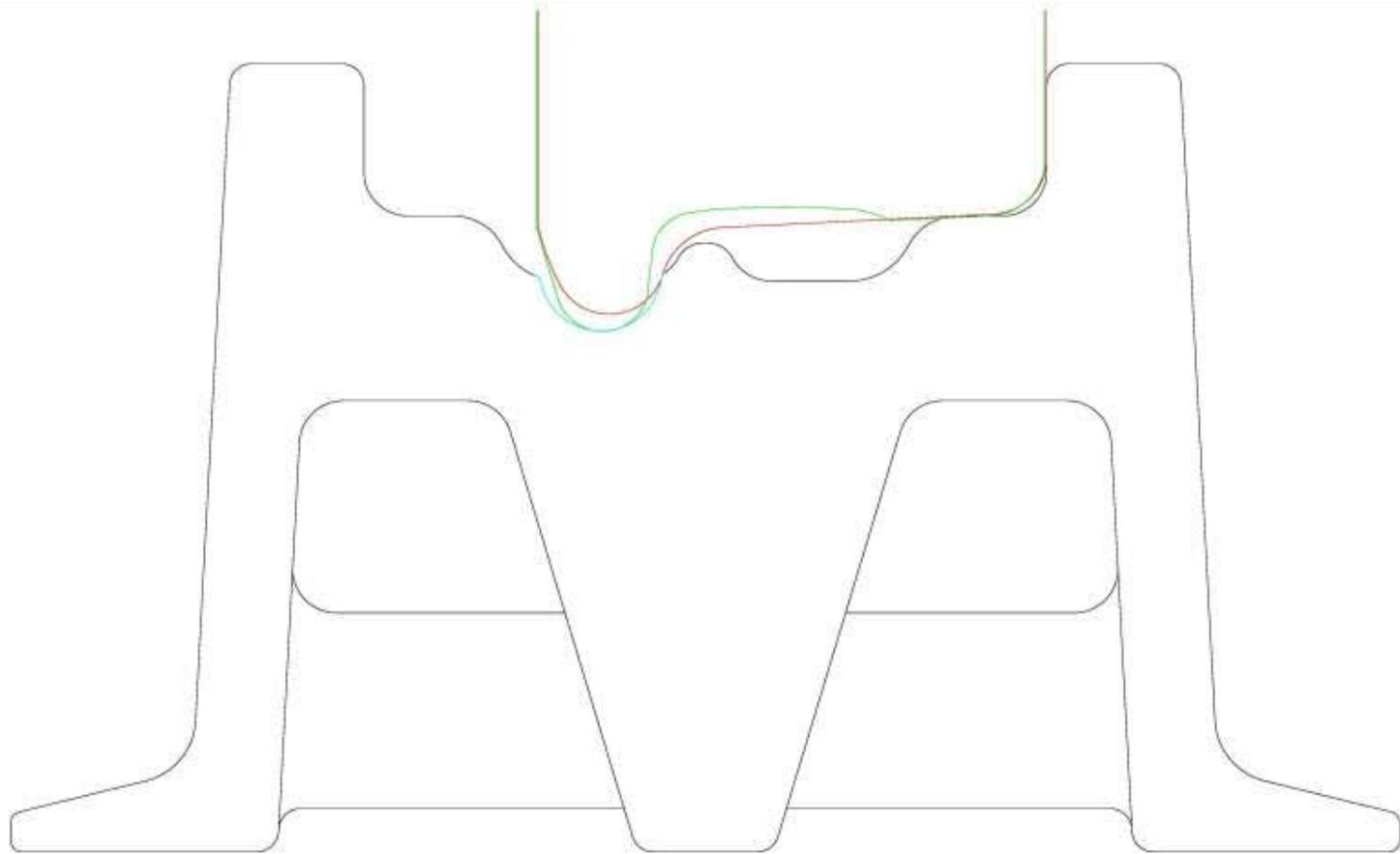




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AS THE GROOVE DEEPENS AND DEPENDING ON THE FLANGE HEIGHT, THERE WILL BE A COMBINATION OF







3/4" when new



Thank you

Seth Ogan

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