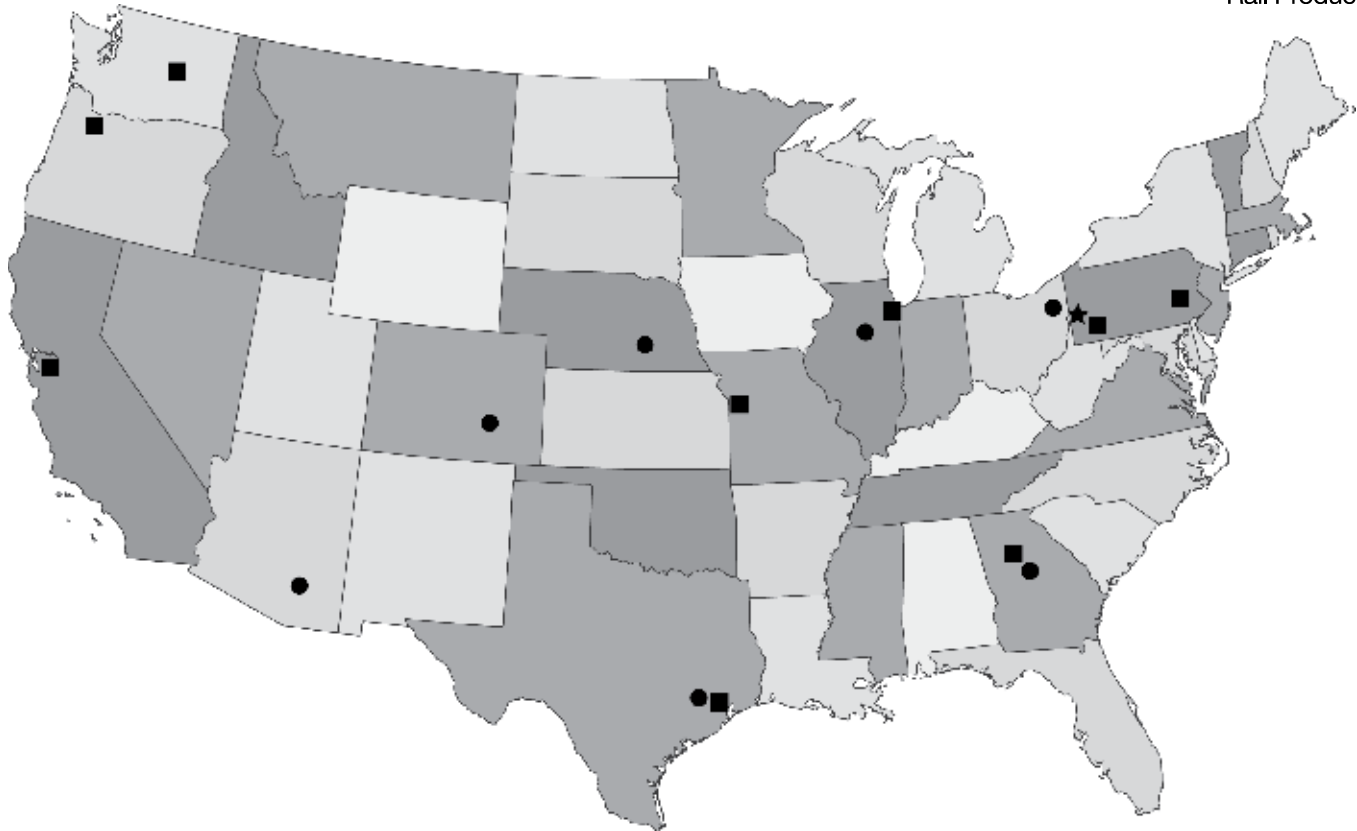




LB Foster
Rail Products

Trackwork



■ sales offices ● fabrication & distribution facilities ★ headquarters

District Sales Offices

California

32970 Alvarado Niles Road #736
Union City, CA 94587
P: 510.471.9840 / F: 510.471.9847

Georgia

130 Satellite Boulevard NE, Suite A
Suwanee, GA 30024
P: 678.714.6730 / F: 678.714.6773

Illinois

125 Windsor Drive, Suite 122
Oak Brook, IL 60523
P: 630.954.1450 / F: 630.954.1429

Missouri

4201 NE Lakewood Way
Lee's Summit, MO 64064
P: 816.795.5600 / F: 816.795.5674

Oregon

5335 SW Meadows Road, Suite 355
Lake Oswego, OR 97035
P: 800.824.2061 / F: 503.684.8489

Pennsylvania

961 Marcon Boulevard, Suite 445
Allentown, PA 18109
P: 610.266.1763 / F: 610.266.3534

415 Holiday Drive

Pittsburgh, PA 15220
P: 412.928.3400 / F: 412.928.7891

International

7015 Fairbanks North Houston Road
Houston, TX 77040
P: 713.466.2700 / F: 713.466.2709

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Juriquilla Queretaro 76230 Mexico
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Washington

3808 N. Sullivan, SIP Building 7
Spokane, WA 99216
P: 509.892.3202 / F: 509.892.8270

Trackwork

L.B. Foster provides a number of different trackwork products, supplied from our facility in Niles, Ohio.

Turnouts can be supplied to AREMA, Industrial, and Class I Railroad Industrial standards in fully assembled panels or as components. We offer our panelized trackwork in rail sections ranging from 12 lb. to 175 lb. Once the turnouts are panelized, they are labeled and numbered for installation, packaged and shipped to the customer to maximize the ease of installation at the job site and to minimize customer costs.

L.B. Foster offers a full array of accessories for sale as separate components. We can provide Manganese Insert, Solid Manganese Self Guarded, Solid Manganese Flat Top, and Rigid Bolted frogs. L.B. Foster can also supply non-reinforced, single, or double-reinforced switches designed specifically to carry light, moderate and heavy traffic. You can specify all individual components from fittings, switch rods, switch stands and replacement parts to complete switches with any selection of combination slide plates and braces, plain plates and accessories.

Frogs can either be furnished to AREMA and American Mining Congress specifications or modified to your specifications for industrial sidings and in plant trackage. All frogs are available with hook twin tie plates, flat Pandrol plates or without plates. Numerous designs of frogs and plating are available.

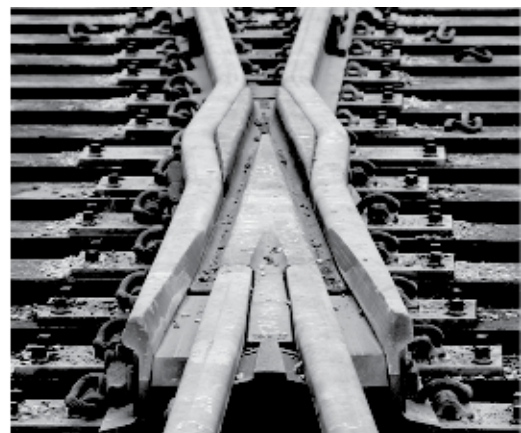
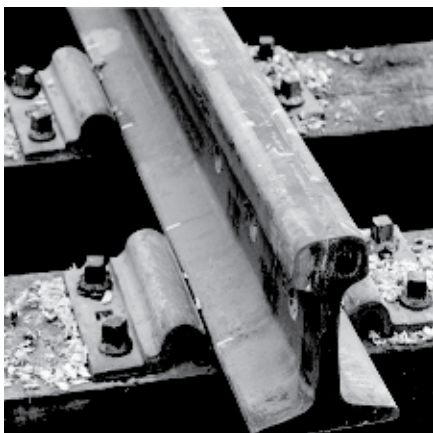
L.B. Foster can also supply transition rails used to safely connect two different rail sections. We can also provide various designs of restraining rails.

You can order light rail turnouts and accessories for 12 lb. through 85 lb. rail in any gauge. Where portability of trackage is required, some light rail turnouts and parts can be pre-assembled to provide this feature.

Special Trackwork is also available on L.B. Foster CXT® concrete ties for heavy and light haul applications and with our direct fixation fasteners for transit rail needs.

The convenience of single-source buying from L.B. Foster Company assures complete-package deliveries of every item needed, ready for installation. We can provide shipments of rail and trackwork in any gauge for:

- Industrial Sidings
- In-plant Trackage
- Crane Runways
- Mine Haulage Systems
- Construction
- Temporary Trackage



The background features a large, stylized graphic. On the left, there is a red shape with a white outline. To its right is a large black shape, also with a white outline. The remaining area on the right is white. The word "Turnouts" is written in red text on the white background.

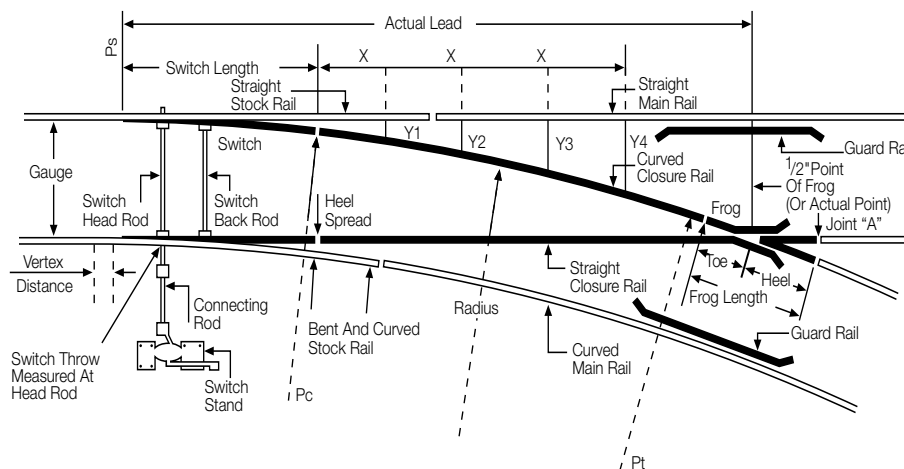
Turnouts

Turnout Data

The diagram illustrates the principal elements of a single turnout which consists of a frog, a switch, two guard rails, straight and curved closure rails, stock rails and switch stand.

Switch rods, combination slide plates, braces and accessories may be varied to meet your specific trackage requirements.

L.B. Foster Company can deliver a wide variety of frog and switch materials that meet every track requirement from light, medium to heavy traffic. Our warehouses, located throughout the U.S., offer shipments of light, standard, and heavy tee rail sections, crane rail, frog and switch material, tee and crane rail accessories, and tools.



Turnout Maintenance

Regular inspections should be scheduled to maintain correct line, gauge and surface of turnout tracks. It is especially important that the gauge be kept as accurate as possible to prevent excessive wear on frog and switch points and to prevent delays, and perhaps serious accidents caused by derailments. Preventive maintenance programs will save expensive repairs and replacements.

Turnout Installation

1. Establish desired location of frog, cut existing rail, and position frog in this location. (When bolted rigid or manganese insert frogs are used, guard rails must be mounted opposite frog.)
2. Mark position of each point of switch making sure that sufficient rail remains ahead of the points to prevent joints in the stock rail area.
3. After locating frog and switch, place head block ties for the switch stand. Level roadbed where necessary and replace track ties with proper length switch ties.
4. Bend curved switch stock rail as shown on installation plan to allow a snug fit with switch point in closed position.
5. Loosely connect the heel of frog to main rail. Tightly connect the toe of frog to the straight closure rail.

6. Locate and drill holes for heel blocks in each stock rail. Pay special attention to the above base block dimensions. Position switch rails and install heel blocks. Pre-bent joint bar is provided to allow easy movement of switch rail after all bolts are tightened.
7. Bring switch point, straight closure rail, and frog to alignment. Spike frog and straight closure rail solidly to ties and tighten joint at heel of frog.
8. Join curved closure rail tightly to toe of frog and to heel of switch. To bring the curved closure rail to proper alignment measure the offsets from the gauge side of the stock rail to the gauge side of the curved closure rail (see offset diagrams) and spike solidly at these points.
9. Bolt switch rods to switch clips and spike plates and braces in position.
10. Spike inside main and switch stock rails to correct alignment by gauging from curved closure rail.
11. Connect switch stand to head rod of switch and open switch until points are equally spaced from main rails. Hold switch points in this position, bring switch stand lever to vertical (or neutral) position, and spike stand to ties. Each point should then lay snugly against each stock rail.

12. Final line and tamp turnout.

13. Inspect carefully before opening turnout to traffic.

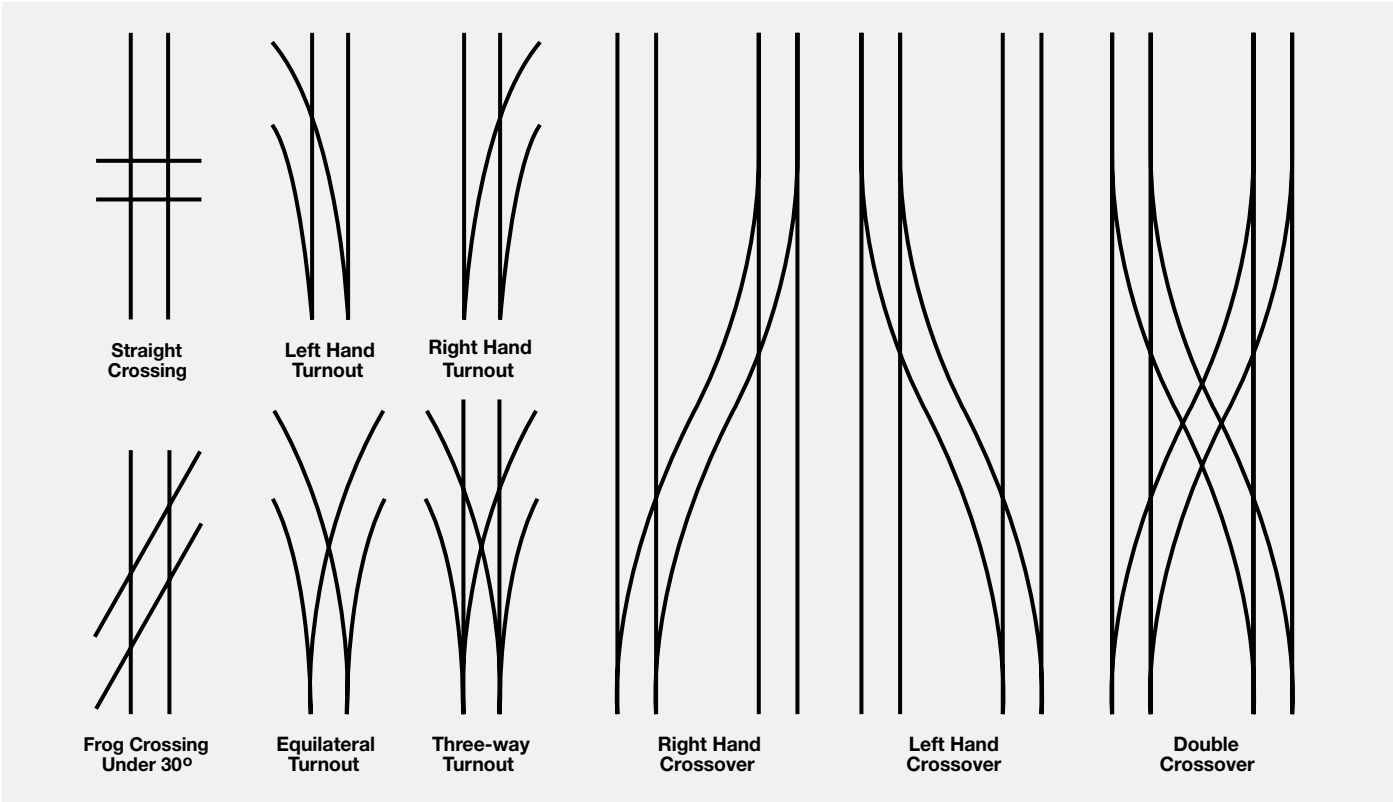
Frog and Switch Installation

The table on page 72 lists frog angles and gives, in a convenient manner, the measurements, gauge line offsets, angles and other data required to install L.B. Foster Standard Turnouts.

Obviously, a change in the length of the frog will result in a slight difference in these dimensions, but for all practical purposes, the figures can be adhered to.

Closures shown on L.B. Foster Standard Turnout Installation plans have been determined to minimize the cutting of rails. When it is desired to use rails of different lengths, this is permissible and can be done without serious alteration to alignment.

Turnout and Crossing Trackwork Formations





Switches and Accessories

Switch Components

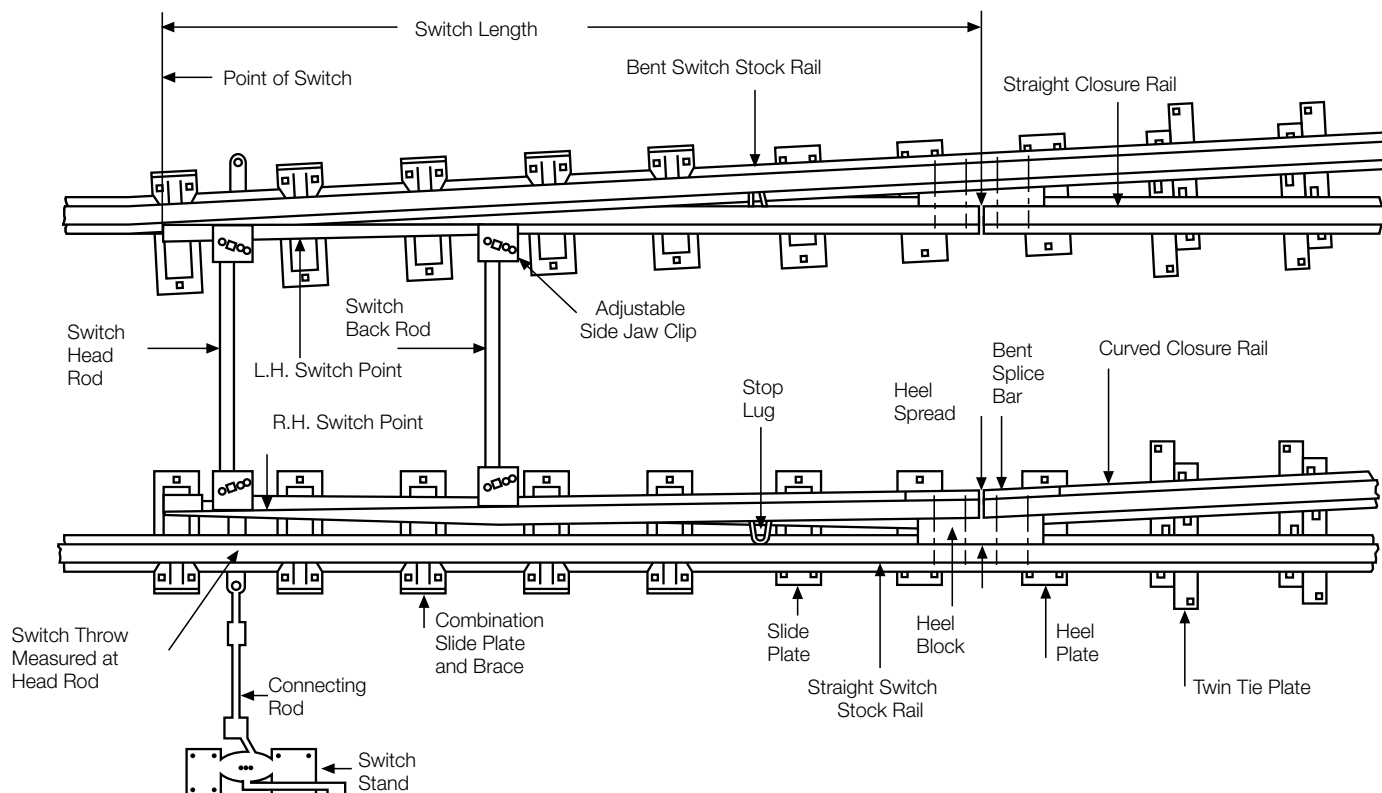


Diagram illustrates a split switch which consists of a pair of switch points with recommended number of rods and clips, combination plates and braces, plain slide plates, heel and twin tie plates, stop lugs, heel block assemblies and a switch stand.

L.B. Foster Company can supply non-reinforced, single reinforced and double reinforced switches designed to carry light, moderate or heavy traffic. Switches and accessory items shown on the following pages are those most commonly specified. Most of these comply with AREMA and industrial specifications and designs can be modified to meet any requirement.

You can specify all individual components from switch points, fittings, switch rods, stands and replacement parts, to complete switches and turnouts, with any selection of combination slide plates and braces, plain plates and accessories.

How To Order Straight Switches

Specify the following, and if possible, provide a sketch:

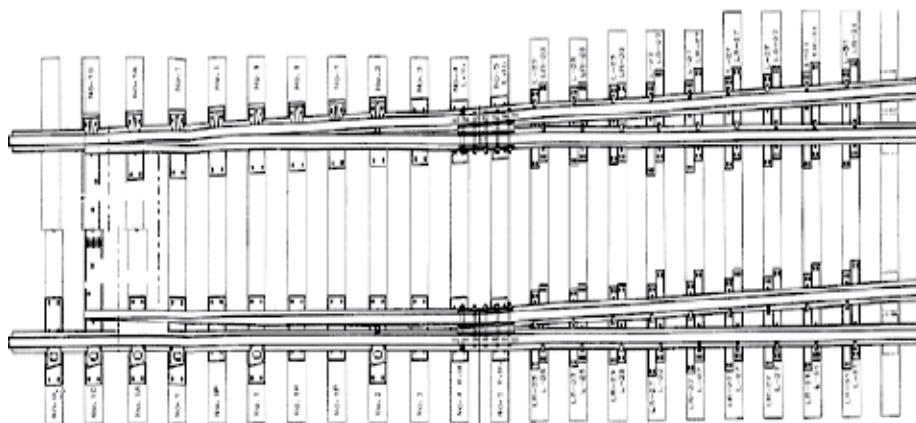
1. Design number, such as AREMA 112-03.
2. Double, single or non-reinforced .
3. Adjustable Side Jaw Clips, Transit Clips, or Open Side Jaw Clips and their locations
4. Switch Length
5. Track Gauge
6. Right or Left Hand Switch if Turnout is curved
7. Rail weight, section and drilling
8. Heel spread and type of heel block desired.
9. Switch stand design.

16' 6" Double-Reinforced AREMA Plan 112

This heavy-duty switch complies with American Railroad Engineering Maintenance-of-Way Association specifications for 90 lb. rail and heavier and is suitable for mainline use. Switch points are double-reinforced with steel strips accurately beveled to fit web on both sides of rail and through-bolted for a solid, durable construction.

Standard equipment includes heel block assemblies, stop lugs, switch rods, side jaw clips and recommended quantities of slide plates, 1/2"-thick rigid braces, gauge plates, heel plates and hook twin tie turnout plates. Solid base slide plates and heel plates are 7" wide for 90 lb. rail, 8" wide for 110 lb. and heavier.

L.B. Foster can supply alternate equipment to meet every requirement such as adjustable switch rods or transit clips, adjustable braces and combination braces and slide plates.



Standard Equipment

Switch Length	Switch Rods, Plates & Braces	Combination Slide Plates	Plain Slide	Heel Plates	Hook Twin Tie Plates	Gauge Plates & Braces
11'-0"	2	8	2	4	8	1
15'-0"	2	10	2	4	12	1
16'-6"	2	12	2	4	12	1

L.B. Foster Standard Turnout

The L.B. Foster Standard Turnout is designed for heavy duty service at the lowest possible cost with simple installation. L.B. Foster Standard Turnout consists of:

1 each	Frog with set of hook twin tie plates	2 each	Slide plates
1 pair	16' 6" double reinforced switch point with single hole side jaw clips	4 each	Heel plates
1 each	Switch stand	1 pair	Welded 5 hole heel blocks
14 each	Rigid combination plates and braces	1 set	Hook twin tie plates behind the heel (consists of 16 pieces)
1 each	Rigid gauge plate and braces		

Solid Manganese Self Guarded Frogs, Straight Split Switches, 4' - 8 1/2" Gauge

90# RAIL & HEAVIER

T.O. No.	Switch				Frog			Lead				Gauge Line Offsets				
	Sec	Length	Angle	Vertex Dist.	Angle	Length	Toe Length	Actual Lead	Straight Cl. Dist.	Curved Cl. Dist.	C.L. Rad.	X	Y1	Y2	Y3	Y4
6	A	11' 0"	2° 36' 19"	5 1/2"	9° 31'	5' 5"	1' 8"	47' 6"	34' 10"	35' 1 1/2"	254.48'	7' 8"	11 3/4"	20 1/8"	2' 7 1/4"	3' 9 1/4"
	B				38"	5' 8"	1' 9"		34' 9"	35' 1/2"						
	C					7' 4"	2' 11"		33' 7"	33' 10 9/16"						
7	A	16' 6"	1° 44' 11"	8 1/4"	8° 10'	6' 3"	1' 11"	62' 1"	43' 8"	43' 10 7/8"	361.66'	10' 1 1/2"	11 5/8"	20 3/8"	2' 8 5/8"	4' 1/4"
	B				16"	6' 7"	2' 0"		43' 7"	43' 9 7/8"						
	C					8' 1 1/2"	2' 11"		42' 8"	43' 9 7/8"						
8	A	16' 6"	1° 44' 11"	8 1/4"	7° 09'	7' 3"	2' 3"	68' 0"	49' 3"	49' 5 3/8"	494.167'	11' 8"	12 1/8"	21 1/4"	2' 9 3/4"	4' 1 1/2"
	B				10"	7' 7"	2' 4"		49' 2"	49' 4 3/8"						
	C					8' 11"	2' 11"		48' 7"	48' 9 3/8"						
9	A	16' 6"	1° 44' 11"	8 1/4"	6° 21'	8' 1"	2' 6"	72' 31/2"	53' 3 1/2"	53' 5 13/16"	605.40'	12' 2"	12 1/8"	21"	2' 8 3/4"	3' 11 1/2"
	B				35"	8' 5"	2' 7"		53' 2 1/2"	53' 4 13/16"						
	C					9' 9"	2' 11"		52' 10 1/2"	53' 13/16"						
10	A	16' 6"	1° 44' 11"	8 1/4"	5° 43'	8' 11"	2' 9"	78' 9"	59' 6"	59' 8 1/16"	824.26'	14' 3 1/2"	12 7/8"	22 5/8"	2' 11 1/4"	4' 2 7/8"
	B				29"	9' 4"	2' 10"		59' 5"	59' 7 1/16"						
	C					11' 4 1/2"	3' 9"		58' 6"	58' 8 1/16"						

Notes: Track gauge 4' 8 1/2"; Switch points 1/4" thick at P.S. ; Heel spread 61/4"; Lead distance measured from P.S. to half-inch-point of frog 1/8" allowance for joint gaps. Section A = 90#RA; Section B = 100#RA; 100#RE; Section C = 115#RE - 136#RE

Switches and Accessories

Racor Heavy Duty Automatic Safety Adjustable Switch Stand

Models 22E & 22-EH

The Model 22-E and 22-EH are ergonomically engineered, extra-heavy duty trailable switch stands. The low stand 22-E is for yard, ladder and busy switch turnouts, where trains often run through switches. The 22-EH is constructed of identical base housing and operating parts, but features a high mast and target, providing increases visibility where needed.

Ergonomic Design for Operator Safety

The distinct triangular hand lever has a grasp point that is 30" above ground, helping to prevent painful bending and lifting. Also, the typical 180° movement for the lever has been reduced to 125°, so the switch can be thrown with minimal operator motion. Together, these ergonomically engineered features will help to assure safety for the operator.

Automatic Operation for Accidental Trailing

The Models 22-E and 22-EH can be trailed or thrown manually. When a train runs through the switch, switch points are partially opened by the wheel flanges, and the throw is completed automatically. During automatic trailing, the target lamp rotates so that the switch point position is indicated, while the hand lever remains stationary.

Both models eliminate expensive repairs to stand, track and derailed equipment that result when a train runs through the switch with a rigid stand. An adjustable connecting rod and crank eye permit accurate setting of the points without respiking the stand.

Quality Components and Construction

The 22-E and 22-EH feature high quality components and construction, including extra heavy cast iron housings, as well as heat-treated working parts and oversized crank eye forged from SAE specification steel. The extra large bearing surfaces of the few wearing parts assure long life and a minimum of lost motion.

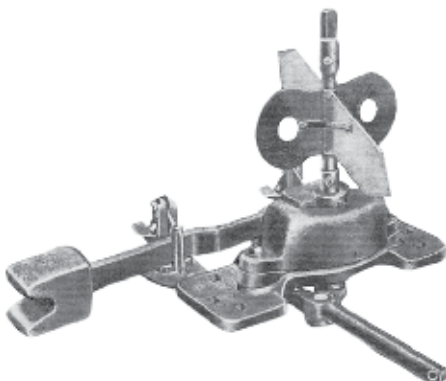
Parallel-Throw, Low-Type Design 51A

Positive-action switch stand, designed for general heavy rail application, has proved to be one of L.B. Foster's most popular models. Gear-type design provides for selective clearance adjustment of either switch point by means of shims, without disconnecting rods from stand.

Stand can also be made semi-automatic by use of spring connecting rod in place of rigid rod or by installation of spring head rod in switch. This permits wheels to trail through without damage to switch or stand. Reversible target or lamp can be supplied.

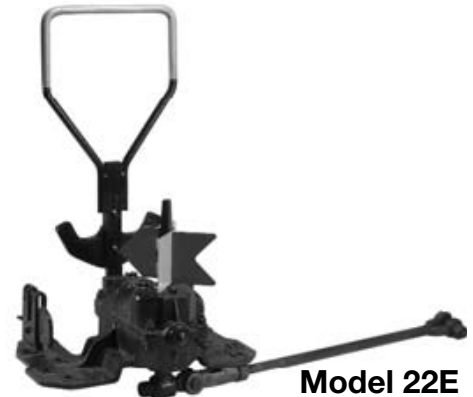
Standard Replacement Parts

All parts are of standard design and are carried in stock at all times. No special machining or fitting is required.



LB Foster

Rail Products

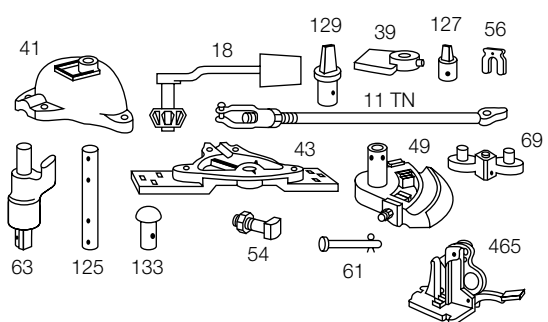


Model 22E



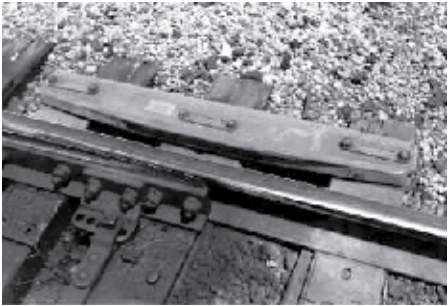
Model 22EH

No.	Name of Part
11	TN Adjustable Rod
18	Throwing Lever
39	Cover
41	Top
43	Bottom
49	Segment Gear
54	Bolt
56	Shim
61	Cross Pin
63	Spindle Lug
69	Double Crank
125	Mast
127	Socket Lamp Tip
129	Plug Lamp Tip
133	Dummy Plug
465	Latch

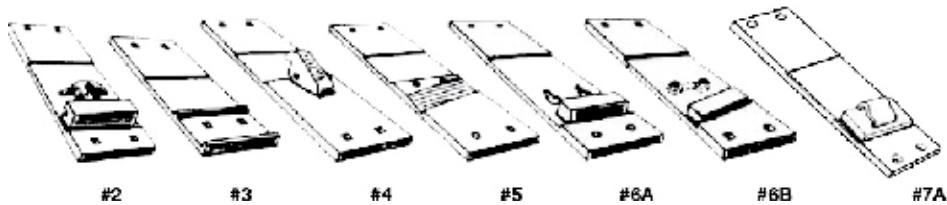


Switch Point Guard

A properly installed and well maintained switch point guard is a valuable maintenance aid and safety accessory. It will prolong the service life of any type of switch point, and can help prevent derailments caused by wheels “picking” the switch. Switch point guards are available in standard “T” rail sections, or the WCH Model FM (illustrated), and can accommodate most styles of gauge plates.



Superstructure	Specify Tie Spacing (in inches)	Specify Rail Section
1- Basic unit (three fixed slide plates)	19 or 20 or 21	Specify
See Plates Below		
#2- Middle support to match Pettibone (adjustable rail brace)	20 (standard)	Preferred format
#3- Middle support to match AREA (fixed rail brace)	21	Weight and designator
#4- Bethlehem type adjustable gage/slide plate		Example: 90RA or 9020
#5 Middle support to match AREA (adjustable rail brace)		
#6A- ABEX/RACOR adjustable rail brace		
#6B- ABEX/RACOR slanted block (adjustable rail brace)		
#7A- Middle support to match Pandrol clip gage/plate		

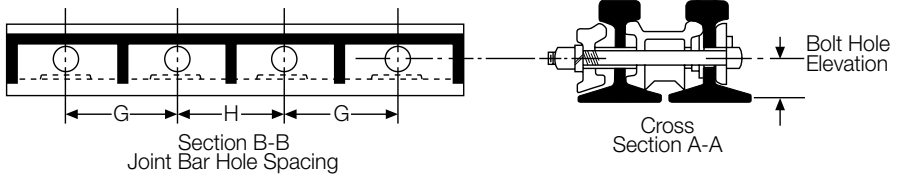


Switch Heel Block Assembly

AREMA Design 221

Heel blocks are installed at heel of switch point to maintain the stock rail and heel of switch point in perfect alignment horizontally and vertically under heavy traffic conditions. Can be furnished in cast steel, cast iron, or welded steel design.

When ordering heel blocks or assemblies separately, it is necessary to specify if switch points are level with stock rail at heel of switch, and if used with graduated or uniform risers. Also advise heel spread, length of point and switch design number, rail weight and section, diameter, elevation and spacing of holes (G-H-G) in joint bar. If not ordered in pairs, specify if for right or left hand point. Can be furnished as bolted type (illustrated) or floating type.



Switch Gauge Plate with Rigid Braces



Switch Gauge Plate with Adjustable Braces



Switch Gauge Plate: AREMA Design 223

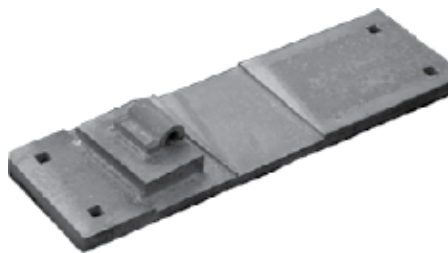
Specifically designed for holding switches to gauge, plates are positioned on the first tie at point of switch as shown on AREMA switch 112 and, in some cases, also placed on the first tie ahead of actual point. Available in insulated or non-insulated types.

Similar gauge plates can be furnished $\frac{5}{8}$ ", $\frac{3}{4}$ " or 1" thick and 6", 7" or 8" wide for use with rigid or adjustable braces. Risers are available in welded or solid type to meet your requirements.

Guard Rail

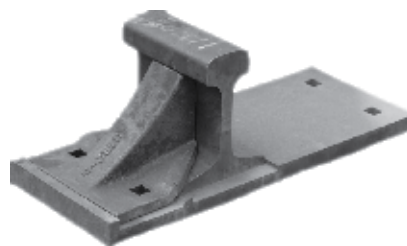
Heavy Duty Industrial Design AREMA Design 504

This heavy duty industrial guard rail has been designed for use with industrial turnouts. It includes all the required features of more expensive guard rails. Standard lengths are 8' 3", 11', 13' and 16' 6". All include three flangeway blocks and bolts, providing a positive guard rail application.



Adjustable Combination Solid Riser Slide Plate

This combination provides extra-strong support for stock rails in switches installed for heavy traffic conditions. Adjustable malleable iron brace is held in special milled seat in slide plate and driven-in to fit tightly into rail web, after rail is seated and plate spiked into position. May be adjusted to compensate for head wear on rail and to hold gauge.



Combination Solid Riser Slide Plate and Rigid Brace: AREMA Design 223

This plate is machined from solid steel and is specified with heavy-duty switches used with heavier rail sections. A shoulder provides a solid seat for the stock rail. Plates are furnished 7" and 8" wide, and are $\frac{3}{4}$ " in thickness through the rail seat. Suitable braces $\frac{3}{8}$ " or $\frac{1}{2}$ " thick are furnished as shown.



Combination Welded Plate and Rigid Brace: Industrial Design

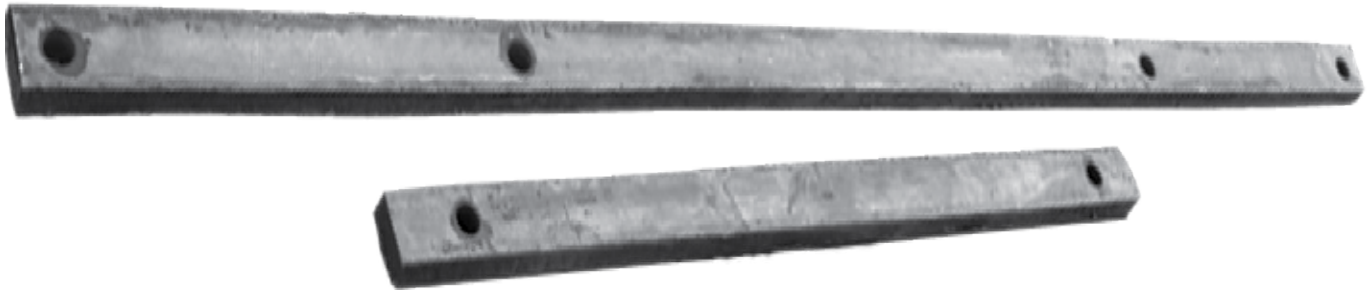
A popular combination slide plate and brace in wide use, furnished with most L.B. Foster switches for industrial application. Plates are furnished 7" and 8" wide, are $\frac{3}{4}$ " in thickness, and are equipped with $\frac{3}{8}$ " or $\frac{1}{2}$ " thick cast braces as ordered. Plates are furnished with $\frac{1}{4}$ " risers unless otherwise specified.

Switch Rods

(Furnished non-insulated unless otherwise specified.)

Non-Insulated Switch Rods

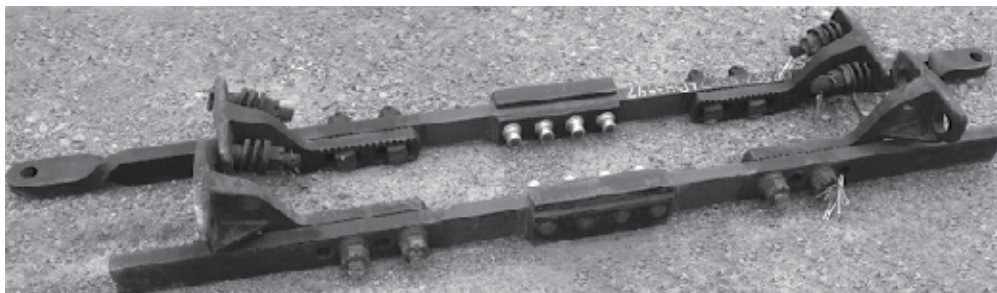
Illustrated are non-insulated head or No. 1 rods, for attachment to connecting rod of switch stand. Second or third rods are similar in construction but shorter in length. When ordering separately, specify Head Rod (No. 1) or Back Rod (No. 2 or 3), gauge of track, size of rail, and if used for double, single or non-reinforced switch points. All switch rods can be furnished insulated when required. Clips and vertical bolts are not furnished as part of rods and must be specified.



Adjustable Side Jaw Clip



Single Hole Side Jaw Clip



Rocker Clips with Insulated Vertical Switch Rods

The background of the page is a large, stylized letter 'F'. The left vertical bar of the 'F' is filled with a vibrant red color. The top horizontal bar and the right vertical bar are filled with a solid black color. The interior of the 'F' is white. The word 'Frogs' is written in a red, sans-serif font within the white interior of the letter.

Frogs

Spring-Rail Frogs

- May be used in main track where traffic is predominantly on the main-track side of the frog.
- May be used in yard tracks, but only when rigid frogs are not available.

Rail-bound Manganese Steel Frogs

Shall be used on heavy traffic lines where traffic is approximately equal on both sides of the frog.

Solid Manganese Flat Top Steel Frogs

May be used as alternative to rail-bound manganese steel frogs.

Self Guarded Solid Manganese Frogs

- Shall be used in yard tracks.
- May be used in main tracks where speed does not exceed 30 mph.

Note: Guard rails may be used with self-guarded frogs when conditions justify.

Bolted Rigid Frogs

May be used in yard and industry tracks where traffic is light on both sides of the frog, but only when self-guarded frogs are not available, or when desirable to utilize available secondhand frogs.

Frog Data

Frogs described and illustrated on the following pages are those most commonly specified. Frogs can be supplied to other AREMA and A.M.C. specifications or the design can be varied to meet most any requirement. Also, various designs of frog plating can be supplied.

How To Identify Frog and Turnout Number

Divide the overall length on center line by the sum of toe and heel spreads, measured on the gauge side of rail.

For Example:

Center Line Length 10'-0"	= 120"
Toe Spread 5 1/2"	+ Heel
Spread 9 1/2"	= 15"
120" divided by 15"	= 8"

The Frog Number is 8.

IMPORTANT: This applies to straight frogs only. If one or both tracks are curved, send a sketch indicating lengths, angles, radius and direction of curve. Frogs can be supplied to fit any requirements.

Frequently, field measurements do not appear exact, which may be the result of severe wear or frog may be curved. As a precaution, the following method will serve as a double check:

Theoretical Toe Length	44"
divided by Toe Spread 5 1/2"	= 8"
Frog number 8 should equal:	
Theoretical Heel Length	76"
divided by Heel Spread 9 1/2"	= 8"



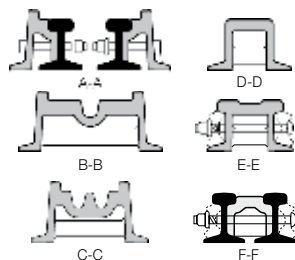
If these figures do not check, a special condition must exist. Therefore, the middle ordinate must be determined.

This may be done by stretching a string at point of gauge lines at toe and heel on the curved run and measuring the distance from the string to the gauge line, at a point midway between toe and heel, which is sufficient. Make a sketch and indicate the direction of the curve.

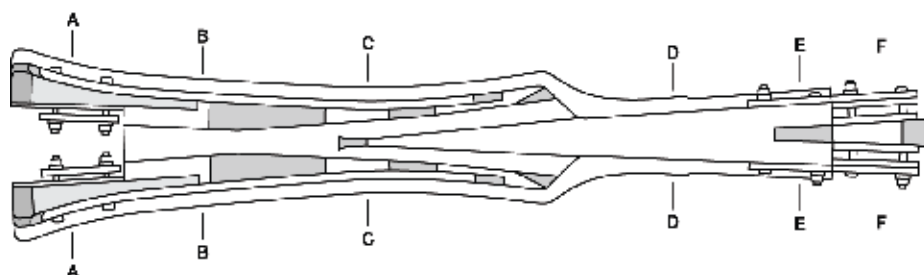
Manganese Steel Frog

Solid, Self-Guarded Frog

AREMA 641



Cross Sections

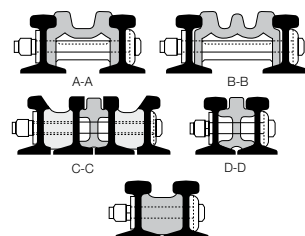


This American Railway Engineering Maintenance-of-Way Association design is the frog used in the L.B. Foster Standard Turnouts. A guard member cast integrally with the frog meets the wheel tread rim and leads the flange beyond the frog point, making separate guard rails unnecessary. The heel and toe extension are cored to coincide with standard angle bar drilling. Note: When ordering frogs, please specify with or without plates, bars, bolts and toe straps.

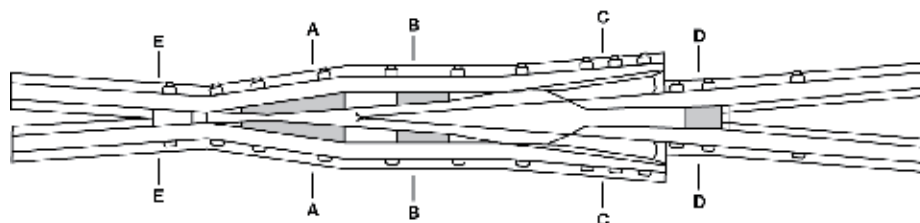
Manganese Steel Frog

Rail-Bound

AREMA 616



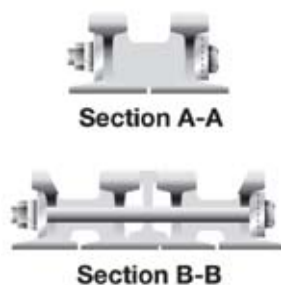
Cross Sections



This popular design of manganese insert frog combines the thinking of many prominent railway engineers. Design is AREMA, and it can be used for heavy traffic conditions in many industrial plants. The bolts are of heat-treated steel fitted with malleable bearing washers and high chrome spring washers and extra-heavy nuts. Flares are beveled. This is a rugged frog in cast manganese steel construction with $\frac{3}{4}$ " thick side walls. Also available in heavy and medium wall construction.

Bolted Frog

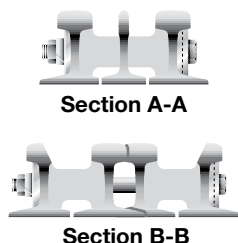
AREMA Design No. 11



This is a heavy duty bolted type frog built to the designs of AREMA. It is a frog of the most substantial and durable construction, provided with extra long rolled steel fillers, long toe block and heel block, rail heel riser, steel point filler and notched point. The wings are planed out to a long, easy beveled entrance slope. The frog is provided with a liberal number of large size, heat treated, steel bolts having head locks and fishing fit washers under both head and nut, extra thick nuts and spring lock washers. The frogs are drilled solid and the bolts are a driving fit in the holes. Flare ends of wings may be beveled to a 45 degree angle when specified.

Bolted Frog

Heavy Duty Industrial Design No. 13



Illustrated, is our heavy-duty type of industrial frog. This design is widely used in mill and warehouse track layouts. This design follows the suggestions of a track committee of frog and switch manufacturers for a moderate priced durable frog suitable for industrial, warehouse and yard tracks. Lengths are manufactured to AREMA specifications.

Frog Specifications and Hook Twin Tie Plate Application

Data for AREMA Solid Manganese Self-Guarded Frogs

Frog No.	4	5	6	7	8	9	10
AREMA Plan Reference	641-00	641-00	641-00	641-00	641-00	641-00	641-00
Angle	14° 15' 00"	11° 25' 16"	9° 31' 16"	8° 10' 16"	7° 09' 10"	6° 21' 35"	5° 43' 29"

Type 1 Rail — Rails having base up to 5 3/16" and head 2 9/16" inclusive.

Type 2 Rail — Rails having base up to 5 1/2" and head 2 3/4" inclusive.

Type 3 Rail — Rails having base up to 6" and head 3" inclusive.

Quantities of Hook Twin Tie Plates

Frog No.	Type I Rails								
	L-23	L-27	H-23	H-27	H-31	H-35	LR-23	LR-27	LR-31
4	2	4	4	2	0	0	0	0	0
5	4	2	4	2	0	2	0	2	0
6	4	2	4	2	0	2	0	2	0
7	4	4	2	4	0	2	2	2	0
8	6	2	2	4	2	0	2	4	0
9	8	2	2	4	2	0	2	4	0
10	8	2	4	6	0	0	4	4	0
Frog No.	Type II Rails								
	L-23	L-27	H-23	H-27	H-31	H-35	LR-23	LR-27	LR-31
4	2	4	4	2	0	0	0	0	0
5	4	2	4	2	0	2	0	2	0
6	4	2	4	2	0	2	0	2	2
7	4	4	2	4	0	2	2	2	2
8	6	4	4	4	2	0	0	4	2
9	6	4	4	6	0	0	2	4	2
10	6	4	6	6	2	0	2	4	2
Frog No.	Type III Rails								
	L-23	L-27	H-23	H-27	H-31	H-35	LR-23	LR-27	LR-31
4	2	2	4	2	0	2	0	0	0
5	4	2	4	2	0	2	0	2	0
6	4	2	4	2	2	2	0	2	2
7	4	2	4	4	2	2	0	2	2
8	4	4	4	4	2	2	0	4	2
9	4	4	6	6	2	0	0	4	2
10	6	4	6	6	2	0	2	4	2

Frog Specifications and Hook Twin Tie Plate Application

Data for AREMA Rail Bound Manganese Frogs

Frog Number	6	7	8	9	10	11
AREMA Plan Reference	617-00	617-00	617-00	618-00	618-00	618-00
Angle	9° 31' 38"	8° 10' 16"	7° 09' 10"	6° 21' 35"	5° 43' 29"	5° 12' 18"
Frog Length	11'- 0"	12'- 0"	13'-0"	16'-0"	16'-6"	18'-8 1/2"
Toe Length	3'- 9"	4'- 8 1/2"	5'-1"	6'- 4 1/2"	6'-5"	7'- 0"
Heel Length	7'- 3"	7'- 3 1/2"	7'-11"	9'-7 1/2"	10'-1"	11'- 8 1/2"

Frog Number	12	14	15	16	18	20
AREMA Plan Reference	619-00	619-00	619-00	620-00	620-00	620-00
Angle	4° 46' 19"	4° 05' 27"	3° 49' 06"	3° 34' 47"	3° 10' 56"	2° 51' 51"
Frog Length	20'- 4"	23'-7"	24'- 4 1/2"	26'- 0"	29'- 3"	30'-10 1/2"
Toe Length	7'- 9 1/2"	8'- 7 1/2"	9'-5"	9'-5"	11'-0 1/2"	11'- 0 1/2"
Heel Length	12'- 6 1/2"	14'-11 1/2"	14'-11 1/2"	16'-7"	18'-2 1/2"	19'-10"

Quantities of Hook Twin Tie Plates

Frog No.	Type II Rails						Frog No.	Type III Rails						Frog No.
	L-23	L-27	L-31	LR-23	LR-27	LR-31		L-23	L-27	L-31	LR-23	LR-27	LR-31	
6	4	8	2	2	2	2	6	4	8	2	2	2	2	617-00
7	4	10	2	2	2	2	7	4	10	2	2	2	2	617-00
8	6	10	2	2	4	2	8	6	10	2	2	4	2	617-00
9	8	10	2	2	4	2	9	8	10	2	2	4	2	618-00
10	10	10	2	2	4	2	10	10	12	2	2	4	2	618-00
11	10	12	2	4	2	2	11	10	14	2	4	2	4	618-00
12	10	14	2	4	4	2	12	10	14	2	4	4	4	619-00
14	10	18	2	4	6	2	14	10	18	2	4	6	4	619-00
15	12	18	4	4	6	2	15	12	18	4	4	6	4	619-00
16	12	20	2	6	6	2	16	12	22	2	6	6	4	620-00
18	16	22	2	6	8	2	18	16	22	2	6	8	4	620-00
20	16	28	2	4	8	4	20	16	28	2	4	8	6	620-00

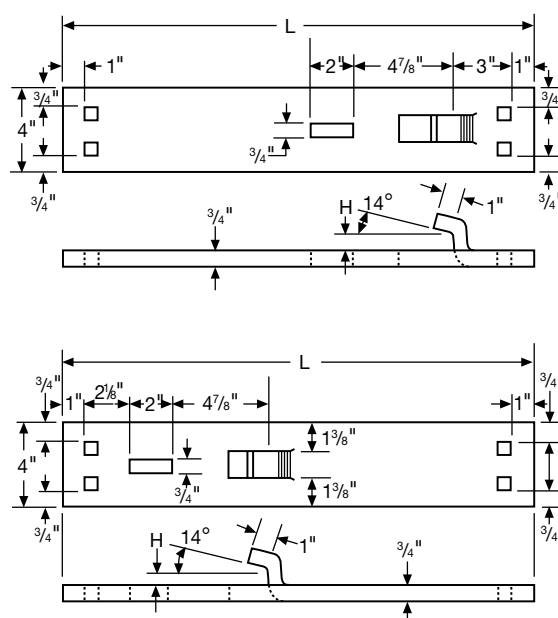
Twin Tie Plates

Hook Plates: AREMA 241-03

Mark L and H

Mark LR

Mark	L	H
L23	23"	9/16"
L27	27"	9/16"
L31	31"	9/16"
H23	23"	15/16"
H27	27"	15/16"
H31	31"	15/16"
H35	35"	15/16"
LR23	23"	9/16"
LR27	27"	9/16"
LR31	31"	9/16"



An abstract graphic design featuring a large, stylized white shape on a black background. The white shape has a thick red outline and a red-filled area on the left side. The text "Transition and Restraining Rails" is written in red on the white background.

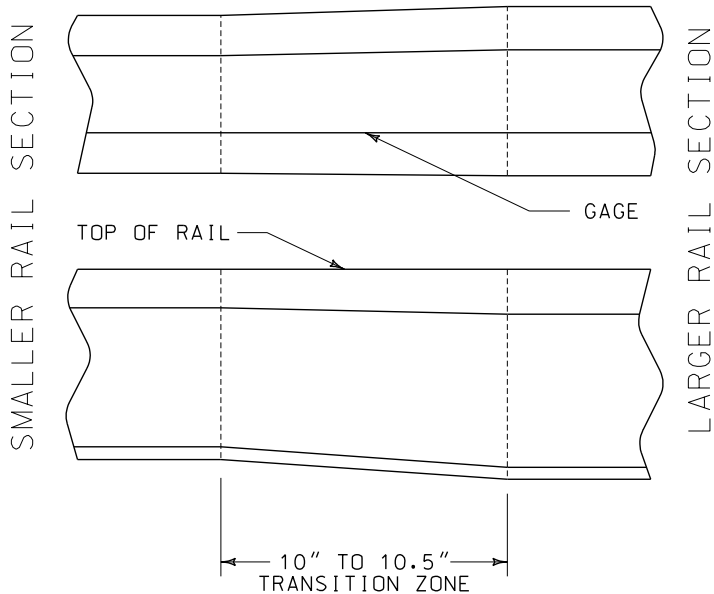
Transition and Restraining Rails

Transition Rails

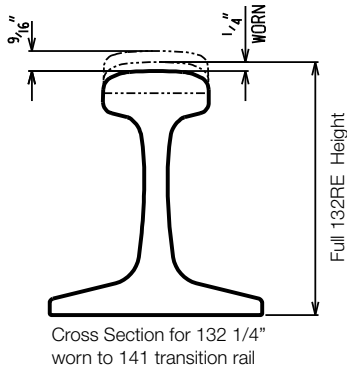
Transition and compromise transition rails are specially manufactured track components that allow the safe and efficient connection of two different rail sections. Normally transition rails are used to connect new rail to rail of a different rail section with head wear.

Transition rails are fabricated from one rail section with the railhead planed or machined to conform to the worn rail section.

Compromise transition rails are fabricated from two rail sections with a special forging joining the two rail sections. This forging occurs on the end of one of the two rail sections being joined. Transition and compromise transition rails are used to replace both compromise welds and bolted compromise joints.



GENERAL ARRANGEMENT FOR
COMPROMISE TRANSITION RAILS

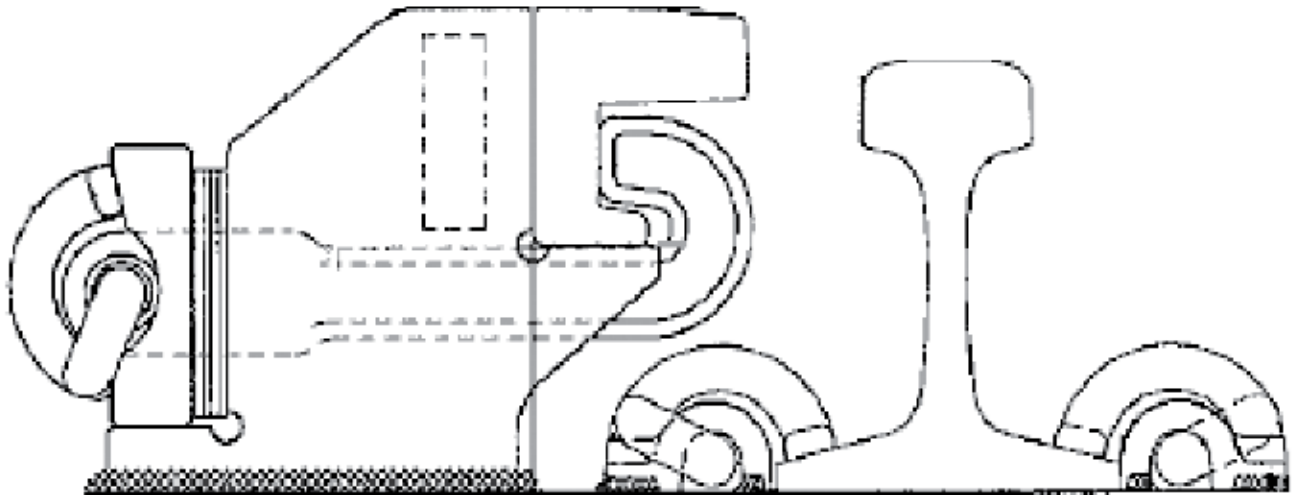


GENERAL ARRANGEMENT FOR
TRANSITION RAILS

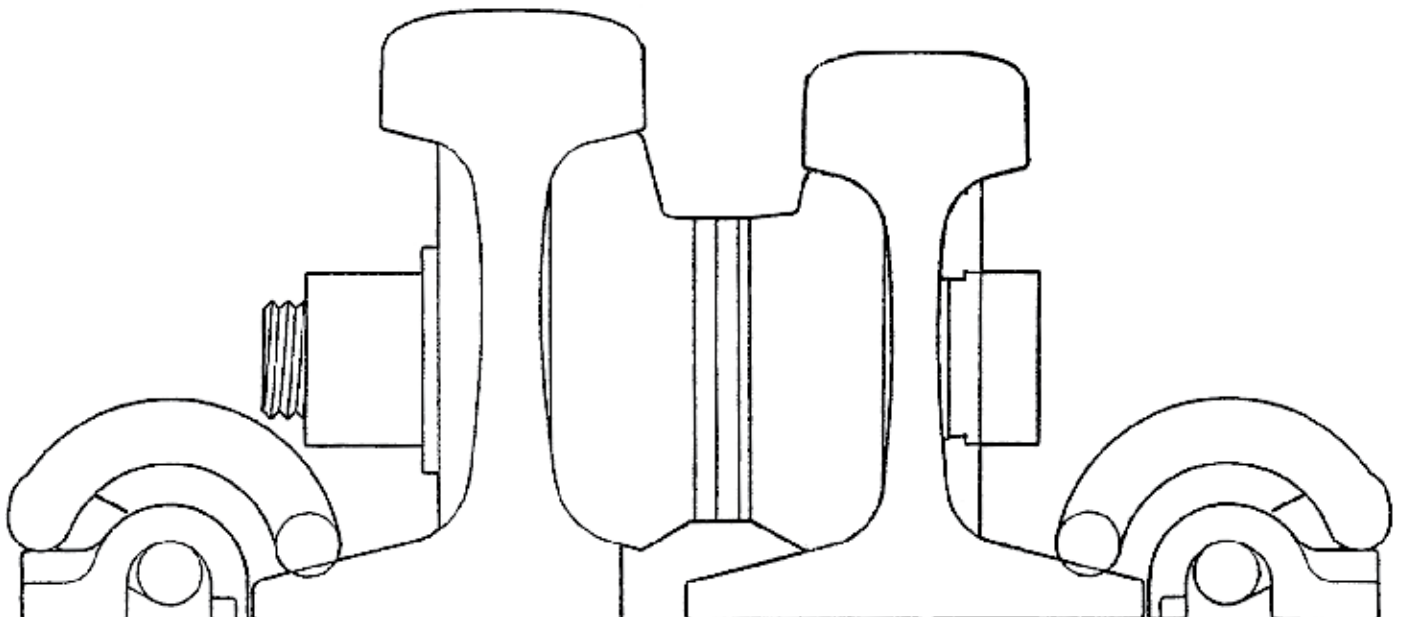
Restraining Rails

Restraining rails are used to improve vehicle curving performance, reduce the risk of a flange climb derailment and to control wheel and rail wear.

L.B. Foster Company can provide various designs of restraining rails. Common designs are U-69 and T-Rail.



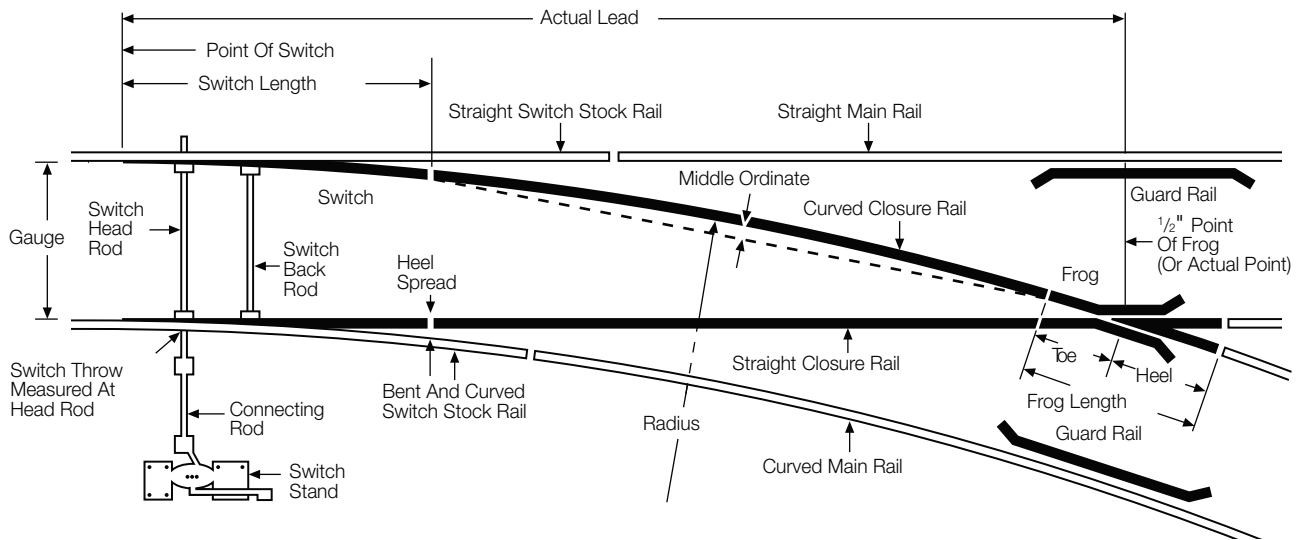
U-69 Design



T-Rail Design

The background features a large, stylized graphic. On the left, there is a red shape with a white outline. To its right is a large black shape, also with a white outline. The remaining area on the right is white.

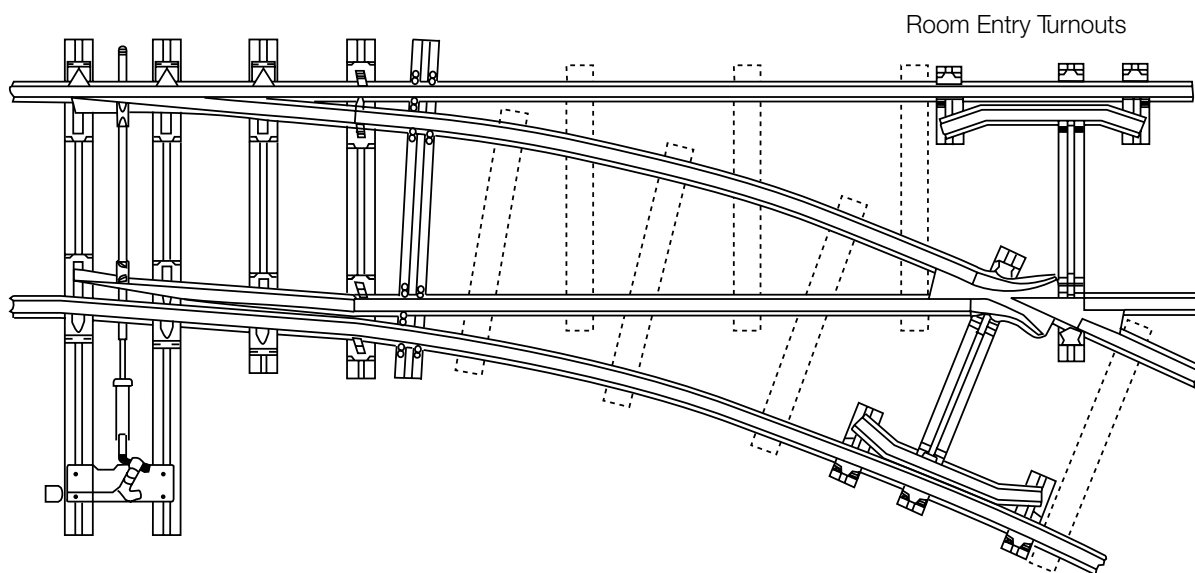
Light Trackwork



Turnout Data

Diagram illustrates the principal elements of a turnout which consists of a frog, a switch, two guard rails, straight and curved closure rails, stock rails and a switch stand.

L.B. Foster Company can supply turnouts, rails and accessories for 20 lb. to 85 lb. light rail trackwork in any gauge. Our single-source service offers savings in initial cost, in installation and in efficient track operations. Where trackage is used in one location, then moved as work progresses, some light rail turnouts and parts can be pre-assembled for portability. Components illustrated are manufactured to American Mining Congress Standards or modified for industrial applications.



Narrow Gauge Turnout And Steel Tie Sets Can Easily Be Moved

Connecting Rods



Adjustable Connecting Rod

L.B. Foster's Adjustable Connecting Rods are furnished with a threaded clevis on each end to allow greater adjustment. Rods are furnished with bolts as standard equipment. The connecting rod design for the corresponding switch stand is as follows: Design 8 rod with Design 10 stand; Design 10 rod with Design 11 stand; Design 11UA rod with Design 1222 stand; and Design 11HU rod with Design 1217 stand.



11SFU Spring Connecting Rod

L.B. Foster's Spring Connecting Rods are of direct-acting concentric design with all working parts fully enclosed. They are made of steel and malleable iron and so designed that all thrusts are transmitted in a straight line. This design gives a strong structure as well as giving protection from any foreign substances that might hinder operation. By removing two screw dowels, working parts can be removed for inspection without disturbing any adjustments. The length of any rod is adjustable by means of a clevis. Design 8 rod is for use on Design 10 stand and is 30" long. Design 9 rod is 38" long and for use with Design 11 switch stand. Design 829 rod is 29 1/2" long and is for use on Design 1217 switch stand. Design 11SFU is also for use on Design 1217 switch stand and is 46 1/2" long.

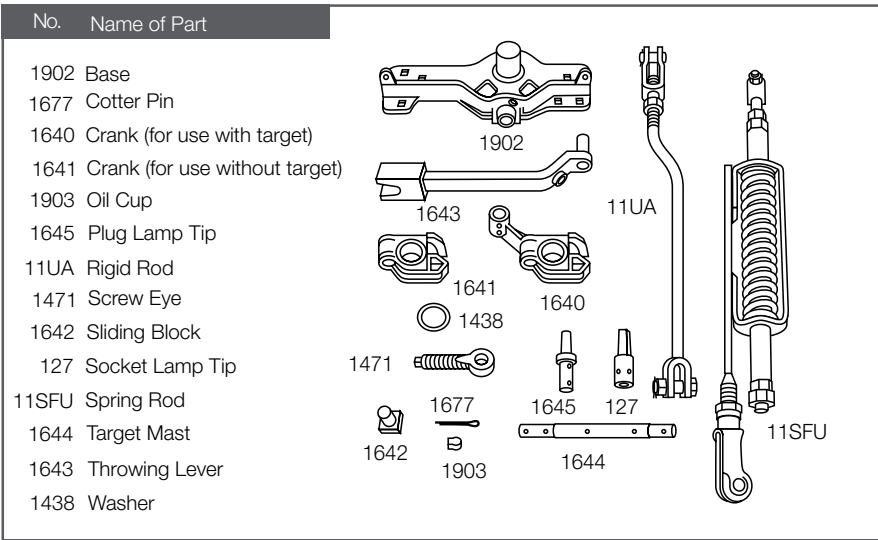
Parallel Throw, Low-Type

Design 1222 Switch Stand

Adjustable, positive-action stand provides maximum safety and easy operation of switches constructed of 70 lb. rail and heavier.

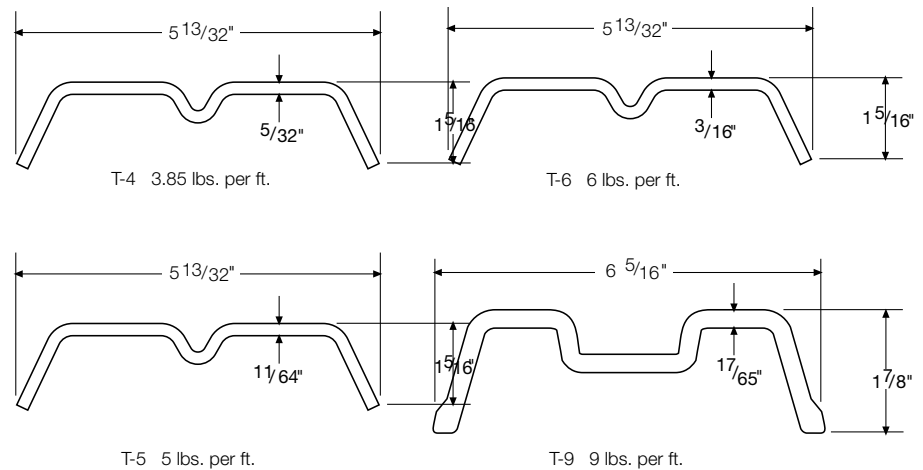
Screw-eye-type crank permits fast, easy adjustment of switch throw from 3 1/2" to 6". Overall height from top of ties to bearing flange of lamp tip is just 3 3/4", making it adaptable for use in confined areas. Gearless type construction uses just three moving parts without rivets, bolts or set screws, provides high leverage and throws easily. Weighted throwing arm will not move when in down position unless thrown manually; does not require latches.

L.B. Foster can supply this stand with rigid or spring connecting rods, with or without targets or lamp tips.



Steel Tie Sections and Accessories

Shown here are L.B. Foster's tie sections available in bolted or riveted design for use in straight track or within various types of turnouts. Tie sections are generally recommended for the corresponding rail sizes as follows: T-4 section for use on rails weighing up to and including 40 lbs. per yard, T-5 for 30 to 60 lbs., T-6 for 40 to 85 lbs. and T-9 for rail sizes 60 to 100 lbs. per yard.



Steel Ties

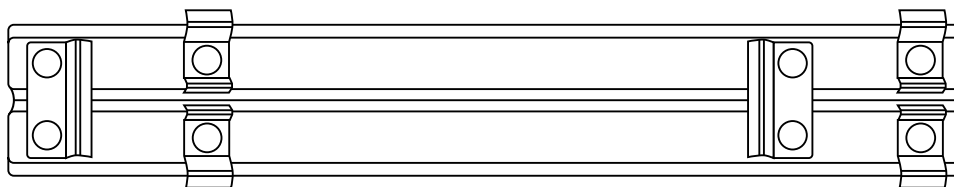
The ties illustrated can be made to fit any rail section, to suit any gauge of track, and are fabricated from any of the four rolled tie sections shown above. L.B. Foster steel ties are durable, easily installed and may be removed as needed for various types of mining, tunnel construction and industrial applications.

Design 7 with the staggered clips—riveted design—ties can be put into or taken out of

existing track without springing the rails. The tie is slid under the rails, lifted up, moved slightly endwise to engage the fixed clips, after which the rotary clips are turned to closed position. Convenient hammering lugs on the rotary clips make them easy to turn.

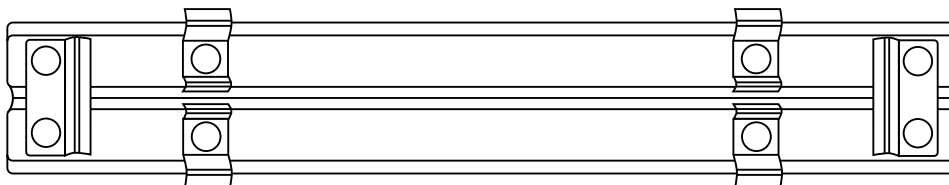
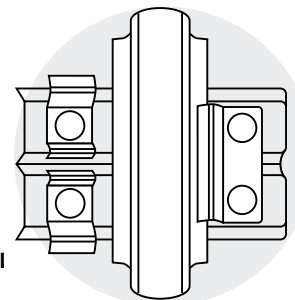
Design 8 with outside stationary clips—riveted design—is our most popular tie for general service in mines and industrial trackage. The stationary clips with full tie

width square flange bearing shoulders are riveted in place on the outer ends of the tie and hold the rails securely to gauge. The rotary clips have convenient hammering lugs and are easily driven in place. A quarter turn of these clips securely locks the rails in place. Provided with hot driven large size rivets, the ties are shipped in convenient size bundles with rotary clips in open position, ready to install.



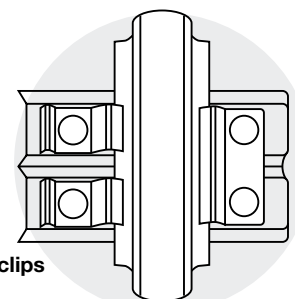
Design 7—Staggered Clips

Rail seated on steel tie with rotary clips in open position.



Design 8—Outside Stationary Clips

Rail installed after hammering rotary clips to closed position.



Definition of Terms Relating to Trackwork

LB Foster

Rail Products

Alignment. The horizontal location of a railroad as described by curves and tangents.

Branch Line. The secondary line or lines of a railway.

Closure Rails. The rails between the parts of any special trackwork layout, such as the rails between the switch and the frog in a turnout (sometimes called Lead Rails or Connecting Rails). Also the rails connecting the frogs of a crossing or of adjacent crossings, but not forming parts thereof.

Compromise Rail. A relatively short rail, the two ends of which are of different sections, corresponding with the sections of the rails to which they are to be joined. It provides the transition from one section to a different rail section.

Compromise Joint (Rail). A joint for uniting the abutting ends of contiguous rails of different sections, or of rails of the same section but of different joint drillings.

Connecting Track. Two turnouts with the track between the frogs arranged to form a continuous passage between one track and another intersecting or oblique track or another remote parallel track.

Crossing (Track). A structure used where one track crosses another at grade, and consisting of four connected frogs.

Crossover. Two turnouts with the track between the frogs arranged to form a continuous passage between two nearby and generally parallel tracks.

Curve, Simple. A continuous change in direction of alignment by means of an arc of a single radius.

Curve, Degree of. The angle subtended at the center of a simple curve by a 100 ft. chord.

Derail. A track structure for derailing rolling stock in case of an emergency.

Electric Railway (Track). Electric Railway denotes trackwork which accommodates rolling stock: the wheels have smaller flanges and/or narrower treads. The motive power is immaterial.

Elevation (of Curves) (Superelevation). The vertical distance between the outer rail and the inner rail.

Fastenings. Joint bars, bolts and spikes.

Fastenings, Auxiliary. Nutlocks, spring washers, tie plates, rail braces and anti-creeping devices.

Flangeway. The open way through a track structure which provides a passageway for wheel flanges.

Flangeway Depth. The depth of the wheel flange passageway, or the vertical distance from the top of the tread surface to the top of the filler or separator introduced between the tread portion and the guard portion of a track structure.

Flangeway Width. The distance between the gauge line and the guard line of a track structure, which provides a passageway for wheel flanges.

Flare. A tapered widening of the flangeway at the end of the guard line of a track structure, as at the end of a guard rail or at the end of a frog or crossing wing rail.

Flare Opening. The distance between the gauge line and the guard line of a track structure at the wider end of the flare.

Foot Guard. A filler for the space between converging rails to prevent a person's foot from becoming accidentally wedged between the rails.

Frog. A track structure used at the intersection of two running rails to provide support for wheels and passageways for their flanges, thus permitting wheels on either rail to cross the other.

Gauge (Track Tool). A device by which the gauge of a track is established or measured.

Gauge (of Track). The distance between the gauge lines, measured at right angles. (The standard gauge is 4 ft 8-1/2 in.)

Gauge Line. The gauge line can be determined in two ways: (1) A line 5/8 in. below the top of the center of the running rail head, or (2) the corresponding location of tread portion of other trackwork along the side nearer the track center.

Guard Rail. A rail or other structure laid parallel with the running rails of a track. Used to prevent wheels from being derailed or to hold wheels in correct alignment to prevent their flanges from striking either the points of turnout, the crossing frogs or the points of switches.

Insulation. A device or material that prevents the flow of electric current in a track circuit from passing from one rail to the other or through switches and other track structures.

Joint Bar. A steel member embodying beam-strength and stiffness in its structural shape and material. Commonly used in pairs for the purpose of joining rail ends together, and holding them accurately, evenly and firmly in position with reference to surface and gaugeside alignment.

Joint Drilling. The spacing of holes in the ends of rails or other track structures to receive the bolts for the fastening of joint bars. Joint, Rail, fastening designed to unite the abutting ends of contiguous rails.

Joint, Insulated. A rail joint designed to arrest the flow of electric current from rail to rail by means of insulations, placed so as to separate the rail ends and other metal parts connecting them.

Main Line. The principal line or lines of a railway.

Main Track. A track extending through yards and between stations, upon which trains are operated by timetable or train order, or both, or the use of which is governed by block signals.

Mate. A track structure having a fixed or immovable point and used on the opposite side of the track from a tongue switch, as its companion piece. (A mate is termed "outside" or "inside" depending upon whether it is placed on the outside or inside of the curve, the "inside mate" being comparatively little used.)

Passing Track. A track which is auxiliary to the main track, for meeting or passing trains. Same as a siding.

Rail, Track. A rolled steel shape, commonly a T-section, designed to be laid end to end in two parallel lines on cross ties or other suitable supports to form a track for railway rolling stock.

Slip Switch, Single. A combination of a crossing with one right-hand and one left-hand switch and curve between them within the limits of the crossing and connecting the two intersecting tracks without the use of separate turnout frogs.

Slip Switch, Double. A combination of a crossing with two right hand and two left-hand switches and the curved rails between them within the limits of the crossing, and connecting the two intersecting tracks on both sides of the crossing without the use of separate turnout frogs.

Special Trackwork. All rails, track structures and fittings, other than plain unguarded track, which are neither curved nor fabricated before laying.

Spur. A stub track diverging from a main or other track. Steam Railroad (Track). Steam railroad denotes track for rolling stock which has wheels and treads substantially in agreement with AAR standard wheels. The motive power is immaterial.

Switch. A track structure used to divert rolling stock from one track to another.

Switch, Split. A switch consisting essentially of two movable point rails with the necessary fixtures.

Switch, Spring. A switch with automatic spring device incorporated in the operating mechanism. This device returns the points to their original positions after the trailing wheels have passed over the flanges.

Switch, Tongue. A switch piece consisting essentially of a movable tongue with a suitable enclosing and supporting body structure, designed for use on one side of the track, while on the other side there is used either a mate or another tongue switch. (A tongue switch is termed "inside" or "outside" depending on whether it is placed on the inside or on the outside of the curve, the "outside tongue switch" being comparatively little used.)

Switch Point Derail. A derail consisting essentially of a split switch point with the necessary fixtures.

Switch Stand. A device for the manual operation of switches, or of movable center points.

Tangent. Any straight portion of a railway alignment. Tie Plate. A plate interposed between a rail or other track structure and a tie.

Track. An assembly of rails, ties and fastenings over which cars, locomotives and trains are moved.

Track Bolt. A bolt with a button head and oval or elliptical neck and a threaded nut designed to fasten together rails and joint bars.

Turnout. An arrangement of a switch and a frog with closure rails, by means of which rolling stock may be diverted from one track to another.

Wye. A triangular arrangement of tracks on which locomotives, cars and trains may be turned.

Split Switch Terms

Split Switch with Uniform Risers. A split switch in which the switch rails have a uniform elevation on riser plates for the entire length of the switch. Since there is no heel slope, the point rail rise runs off the back of the switch in the closure rails.

Split Switch with Graduated Risers. A split switch in which the switch rails are gradually elevated by means of graduated riser plates until they reach the required height above the stock rail, and therefore have a heel slope.

Manganese Tipped Switch. A split switch in which the head of one or both of the switch rails is cut away in the point portion and manganese steel pieces fastened to the rail to form the point.

Insulated Switch. A switch in which the fixtures, principally the gauge plates and the switch rods connecting or reaching from one rail to the opposite rail, are provided with insulation so that the electric track circuit will not be shunted.

Heel of Switch. That end of a switch rail which is the farther from its point, and nearer the frog.

Heel Spread. The distance, at the heel, between the gauge line of a switch rail and the gauge line of its stock rail. (This has been standardized at 6 1/4 in. for straight switches.)

Heel Slope. The inclination produced by graduated risers in that part of the switch which reduces the elevation (as the height of the risers decreases) toward the heel of the switch.

Point of Switch (Actual). That end of the switch rail which is the farther from the frog; the point where the spread between the gauge lines of the stock rail and the switch rail is sufficient for a practicable switch point.

Point of switch (Theoretical) or vertex. The point where the gauge line of the switch rail, if produced, would intersect the gauge line of the stock rail.

Point Rail, Switch Rail or Switch Point. The tapered rail of a split switch.

Planing, Bottom. The cut planed at an angle on the bottom of the

base of the switch rail from the point and towards the heel to allow the switch rail to rest on the top of the base of the stock rail when the switch rail is closed.

Planing, Side. The cuts made on the sides of the head of the switch rail to form the taper.

Planing, Top. The cut made on the top of the head of the switch rail from the point and approximately to the head separation.

Planing, Chamfer Cut. The vertical beveling of the gauge side of the switch point to produce a sharp edge, so as to prevent wheel flanges from striking the point.

Rail Brace (Switch). A metal shape designed to fit the contour of the side of the stock rail and extend over the switch plate, with provision for fastening through the plate to the tie, to restrain the movement of the stock rail.

Rail Brace, Adjustable (Switch). A rail brace which maybe adjusted laterally with respect to the stock rail, to compensate for variation in the dimensions of the rail and to permit adjustment for wear.

Stock Rail. A running rail against which the switch rail operates. Stock Rail Bend. The bend or set which must be given the stock rail at the vertex of a switch to allow it to follow the gauge line of the turnout.

Switch Angle. The angle included between the gauge lines of the switch rail at its point and the stock rail.

Throw of Switch. The distance through which the points of switch rails are moved sidewise, measured along the center line of the No. 1 switch rod or head rod.

Frog Terms

Bolted Rigid Frog. A frog built essentially of rolled rails, with fillers between the rails, and held together with bolts.

Spring Rail Frog. A frog having a movable wing rail which is normally held against the point rail by springs, thus making an unbroken running surface for wheels using one track. The flanges of wheels on the other track force the movable wing rail away from the point rail to provide a passageway.

Railbound Manganese Steel Frog. A frog consisting essentially of a manganese steel body casting fitted into and between rolled rails and held together with bolts.

Solid Manganese Steel Frog. A frog consisting essentially of a single manganese steel casting.

Self-Guarded Frog (Flange Frog). A frog provided with guides or flanges, above its running surface, which contact the tread rims of wheels for the purpose of safely guiding their flanges past the point of the frog.

Frog Angle. The angle formed by the intersecting gauge lines of a frog.

Frog Number. One-half the cotangent of one-half the frog angle, or the number of units of center line length in which the spread is one unit.

Frog Point. That part of a frog lying between the gauge lines extending from their intersection toward the heel end.

(a) Theoretical Point

The point of intersection of the gauge lines of a frog.

(b) Half-Inch Point

A point located at a distance from the theoretical point towards the heel equal in inches to one-half the frog number, and at which the spread between the gauge lines is one-half inch. It is the origin from which measurements are usually made.

Heel End of Frog. That end of a frog which is the farther from the switch, or the end which has both point rails or other running surfaces between the gauge lines.

Heel Length. The distance between the heel end and the half-inch point of a frog, measured along the gauge line.

Heel Spread. The distance between the gauge lines at the heel end of the frog.

Throat of Frog. The point at which the converging wings of a frog are closest together.

Toe End of Frog. The end of a frog which is nearer the switch or the end which has both gauge lines between the wing rails or other running surfaces.

Toe Length. The distance between the toe end and the half-inch point of a frog, measured along the gauge line.

Toe Spread. The distance between the gauge lines at the toe end of the frog.

Wing Wheel Risers. Raised portions provided on the top surfaces of the wings of a frog, more particularly when of manganese steel design, directly opposite the point and gradually sloping down to the general level of the running surface, thereby providing additional metal at those parts of the frog which usually wear out first, and also making the transverse contour conform more closely to that of the tread of a tapered wheel.

Guard Rail Terms

Guard Rail (Frog). A rail or other device to guide the wheel flange so that it is kept clear of the point of the frog.

Guard Rail (Switch). A rail or other track structure laid parallel with the running rail ahead of a split switch and forming a flangeway with the running rail, to hold the wheels of rolling stock in correct alignment when approaching the switch.

Adjustable Separator. A metal block of two or more parts acting as a filler between the running rail and the guard rail and so designed as to provide varying widths of flangeway.

Guard Rail Brace. A metal shape designed to fit the contour of the side of the guard rail and extend over the tie. Has provisions for fastening in order to restrain the moving or tilting of the guard rail away from the running rail.

Guard Rail Brace, Adjustable. A guard rail brace which may be adjusted laterally with respect to the rail, to vary the distance between the guard rail and the running rail.

Guard Rail Clamp. A device consisting of a yoke and fastenings designed to engage the running rail and the guard rail and hold them in correct relation to each other.

Crossing Terms

Bolted Rail Crossing. A crossing in which all the running surfaces are of rolled rail, the parts being held together with bolts.

Manganese Steel Insert Crossing. A crossing in which a manganese steel casting is inserted at each of the four intersections, being fitted into rolled rails and forming the points and wings of the crossing frogs.

Solid Manganese Steel Crossing. A crossing in which the frogs are of the solid manganese steel type.

Single Rail Crossing. A crossing in which the connections between the end frogs and the center frogs consist of running rails only.

Two-Rail Crossing. A crossing in which the connections between the end frogs and the center frogs consist of running rails and guard rails.

Three-Rail Crossing. A crossing in which the connections between the end frogs and the center frogs consist of running rails, guard rails and easer rails.

Crossing Plates. Plates interposed between a crossing and the ties or other timbers to protect the ties and to better support the crossing by distributing the loads over larger areas.

Center Frogs. The two frogs at the opposite ends of the short diagonal of a crossing.

End Frogs. The two frogs at the opposite ends of the long diagonal of a crossing.

Easer Rail (or Easer). A rail placed with its head along the outside and close up to the head of the running rail and sloped at the ends to provide a bearing for the over-hanging portion of hollowed-out treads of worn wheels.

Guard Rail. A rail placed parallel with the running rail, with the flangeway between them.

Knuckle Rail. A bent rail, or equivalent structure, forming the obtuse point against which the movable center points of a movable point crossing or slip switch rest when set for traffic.

Movable Center Point. One of the movable tapered rails of a movable point crossing or slip switch.

Reinforced Rail. A bent rail placed with its head along the outside of and close up to the head of a knuckle rail to strengthen it and to act as an easer rail; or a piece of rail similarly applied to a movable center point.

Running Rail. The rail or surface on which the tread of the wheel bears.

Turnout Terms

Turnout. An arrangement of a switch and a frog with closure rails, by means on which rolling stock may be diverted from one track to another.

Curved Lead. The distance between the actual point of the switch and the half-inch point of the frog, measured on the outside gauge line of the turnout.

Lead. The distance between the actual point of the switch and the half-inch point of the frog.

Lead (Actual). The length between the actual point of the switch and the half-inch point of the frog measured on the line of the parent track.

Lead (Theoretically). The distance from the theoretical point of a uniform turnout curve to the theoretical point of the frog, measured on the line of the parent track.

Lead Curve. The curve in the turnout interposed between the switch and the frog.

Turnout Number. The number corresponding to the frog number of the frog used in the turnout.