

F Scale

Straight Switch Turnout

TURNOUT DIMENSIONS

Revised: February 2015

RP-12.21

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	6.844	6.497	6.371	10.024	10.200	10.043	10.475	13.388	13.338
(4)	Switch Heel Spread	0.320	0.320	0.320	0.320	0.320	0.320	0.320	0.320	0.320
(5)	Switch Heel Angle (deg.)	2.678	2.821	2.877	1.828	1.796	1.825	1.749	1.369	1.374
LEAD TO THEORETICAL POINT OF FROG										
(8)	Lead	22.096	24.999	27.903	36.491	39.960	42.470	46.260	53.974	56.791
CLOSURE DISTANCE										
(9)	Straight Rail Length	13.351	16.496	19.419	23.805	26.893	28.814	32.165	36.638	39.054
(10)	Curved Rail Length	13.580	16.680	19.574	23.935	27.008	28.918	32.258	36.721	39.131
(11)	Curved Rail Radius	67.235	111.126	168.637	216.196	288.903	365.347	464.916	548.418	659.779
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL										
(12)	1st Point Y1	0.559	0.600	0.634	0.592	0.609	0.620	0.635	0.615	0.626
(13)	1st Point X1	10.182	10.621	11.226	15.975	16.924	17.247	18.516	22.547	23.102
(14)	Mid-Point Y2	0.967	1.035	1.089	1.029	1.056	1.064	1.090	1.064	1.078
(15)	Mid-Point X2	13.520	14.745	16.080	21.926	23.647	24.450	26.557	31.707	32.865
(16)	3rd Point Y3	1.546	1.627	1.687	1.631	1.660	1.650	1.685	1.667	1.674
(17)	3rd Point X3	16.857	18.869	20.935	27.877	30.370	31.654	34.598	40.866	42.629
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
(19)	Overall Length	4.756	5.354	5.952	7.141	7.739	9.519	9.822	11.133	12.101
(20)	Toe Length	1.901	2.007	2.113	2.662	2.867	3.613	3.620	3.948	4.399
(21)	Heel Length	2.855	3.347	3.839	4.479	4.872	5.906	6.201	7.185	7.702
(22)	Toe Spread	0.472	0.399	0.351	0.379	0.358	0.401	0.362	0.359	0.366
(23)	Heel Spread	0.708	0.666	0.638	0.638	0.608	0.655	0.619	0.653	0.641
(35)	Wing Rail Extension	1.748	1.981	2.215	2.449	2.682	2.916	3.150	3.384	3.617
(36)	Wing Rail Flare Length	0.886	0.886	0.886	0.886	1.181	1.181	1.575	1.575	1.772
(37)	Wing Rail Flare Width	0.118	0.118	0.118	0.118	0.112	0.112	0.107	0.107	0.106
(38)	Wing Rail Bend Width	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(39)	Wing Rail End Chamfer	0.172	0.172	0.172	0.172	0.172	0.172	0.172	0.172	0.172
POINT OF FROG TO INTERSECTION OF CENTERLINES										
(24)	PF to ICL	11.132	13.915	16.698	19.481	22.264	25.047	27.830	30.613	33.396
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS										
For Track Centers of:		7.677	(13 prototype feet)							
(25)	Straight Track Dist.	7.965	10.172	12.347	14.504	16.649	18.787	20.920	23.048	25.174
(26)	Crossover Track Dist.	8.924	10.940	12.987	15.052	17.129	19.214	21.304	23.397	25.494
For Track Center Increment of:		0.591	(1 prototype foot)							
(28)	Straight Track Incr.	2.325	2.923	3.519	4.113	4.706	5.299	5.891	6.483	7.074
(29)	Crossover Track Incr.	2.399	2.982	3.568	4.155	4.743	5.331	5.920	6.509	7.099
GUARD RAILS										
(30)	Parallel End Setback	0.394	0.419	0.443	0.468	0.493	0.517	0.542	0.566	0.591
(31)	Bevel Length	0.640	0.640	0.640	0.640	0.640	0.640	0.640	0.640	0.640
(32)	Flare Length	1.427	1.427	1.427	1.427	1.427	1.427	1.427	1.427	1.427
(33)	Overall Length	4.872	4.872	4.872	4.872	4.872	4.872	4.872	4.872	4.872
(34)	Parallel Length	2.018	2.018	2.018	2.018	2.018	2.018	2.018	2.018	2.018
(37)	Flare Width	0.095	0.095	0.095	0.095	0.095	0.095	0.095	0.095	0.095
(38)	Plane Width	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056
(39)	End Chamfer	0.148	0.148	0.148	0.148	0.148	0.148	0.148	0.148	0.148

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(1)	FROG NUMBERS	13	14	15	16	17	18	19	20
PROPERTIES OF STRAIGHT SWITCHES									
(2)	Switch Rail Length	13.409	13.526	18.641	18.460	18.447	18.471	18.617	18.794
(4)	Switch Heel Spread	0.320	0.320	0.320	0.320	0.320	0.320	0.320	0.320
(5)	Switch Heel Angle (deg.)	1.366	1.355	0.983	0.993	0.993	0.992	0.984	0.975
LEAD TO THEORETICAL POINT OF FROG									
(8)	Lead	59.836	62.881	74.262	77.165	79.983	82.800	86.023	89.247
CLOSURE DISTANCE									
(9)	Straight Rail Length	41.799	44.498	50.313	53.415	55.782	58.112	61.206	64.270
(10)	Curved Rail Length	41.871	44.565	50.374	53.472	55.836	58.164	61.255	64.317
(11)	Curved Rail Radius	789.474	933.184	1017.931	1184.159	1346.377	1521.461	1728.290	1950.521
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL									
(12)	1st Point Y1	0.638	0.649	0.613	0.626	0.634	0.641	0.650	0.659
(13)	1st Point X1	23.859	24.651	31.219	31.813	32.393	32.999	33.919	34.861
(14)	Mid-Point Y2	1.095	1.112	1.063	1.084	1.092	1.101	1.117	1.132
(15)	Mid-Point X2	34.309	35.775	43.797	45.167	46.338	47.527	49.220	50.929
(16)	3rd Point Y3	1.691	1.707	1.668	1.692	1.696	1.699	1.719	1.736
(17)	3rd Point X3	44.758	46.900	56.376	58.521	60.283	62.055	64.522	66.996
PROPERTIES OF FROGS									
(18)	Frog Angle (deg.)	4.405	4.091	3.818	3.580	3.369	3.182	3.015	2.864
(19)	Overall Length	13.068	14.035	14.511	15.478	16.445	17.413	17.900	18.388
(20)	Toe Length	4.628	4.857	5.308	5.291	5.754	6.217	6.200	6.183
(21)	Heel Length	8.440	9.178	9.203	10.187	10.692	11.196	11.700	12.205
(22)	Toe Spread	0.356	0.347	0.354	0.331	0.338	0.345	0.326	0.309
(23)	Heel Spread	0.649	0.655	0.613	0.636	0.629	0.622	0.616	0.610
(35)	Wing Rail Extension	4.011	4.405	4.638	5.118	5.352	5.586	5.979	6.373
(36)	Wing Rail Flare Length	2.308	2.613	2.728	3.056	3.162	3.269	3.578	3.887
(37)	Wing Rail Flare Width	0.103	0.102	0.102	0.101	0.101	0.101	0.100	0.100
(38)	Wing Rail Bend Width	0.103	0.102	0.102	0.101	0.101	0.101	0.100	0.100
(39)	Wing Rail End Chamfer	0.172	0.172	0.172	0.172	0.172	0.172	0.172	0.172
POINT OF FROG TO INTERSECTION OF CENTERLINES									
(24)	PF to ICL	36.179	38.962	41.745	44.528	47.311	50.094	52.877	55.660
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS									
For Track Centers of:		7.677	(13 prototype feet)						
(25)	Straight Track Dist.	27.298	29.419	31.540	33.659	35.777	37.894	40.011	42.127
(26)	Crossover Track Dist.	27.593	29.693	31.795	33.899	36.003	38.108	40.213	42.319
For Track Center Increment of:		0.591	(1 prototype foot)						
(28)	Straight Track Incr.	7.666	8.257	8.848	9.440	10.031	10.622	11.213	11.804
(29)	Crossover Track Incr.	7.689	8.278	8.868	9.458	10.048	10.638	11.228	11.818
GUARD RAILS									
(30)	Parallel End Setback	0.615	0.640	0.665	0.689	0.714	0.738	0.763	0.788
(31)	Bevel Length	0.640	0.640	0.640	0.640	0.640	0.640	0.640	0.640
(32)	Flare Length	1.427	1.624	1.624	1.624	1.624	1.624	1.624	1.624
(33)	Overall Length	4.872	6.496	6.496	6.496	6.496	6.496	6.496	6.496
(34)	Parallel Length	2.018	3.248	3.248	3.248	3.248	3.248	3.248	3.248
(37)	Total Flare at End	0.095	0.095	0.095	0.095	0.095	0.095	0.095	0.095
(38)	Bevel Cut at End	0.056	0.051	0.051	0.051	0.051	0.051	0.051	0.051
(39)	End Chamfer	0.148	0.148	0.148	0.148	0.148	0.148	0.148	0.148