

OO Scale

Straight Switch Turnout

TURNOUT DIMENSIONS

Revised: February 2015

RP-12.29

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	2.094	2.047	2.049	3.127	3.221	3.212	3.373	4.247	4.270
(4)	Switch Heel Spread	0.112	0.112	0.112	0.112	0.112	0.112	0.112	0.112	0.112
(5)	Switch Heel Angle (deg.)	3.071	3.142	3.138	2.056	1.996	2.002	1.906	1.514	1.506
LEAD TO THEORETICAL POINT OF FROG										
(8)	Lead	5.892	6.667	7.441	9.731	10.656	11.325	12.336	14.393	15.144
CLOSURE DISTANCE										
(9)	Straight Rail Length	3.197	3.967	4.687	5.730	6.483	6.939	7.764	8.836	9.421
(10)	Curved Rail Length	3.257	4.015	4.728	5.765	6.513	6.967	7.788	8.858	9.442
(11)	Curved Rail Radius	16.695	27.789	42.396	54.013	72.371	91.593	116.859	137.482	165.623
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL										
(12)	1st Point Y1	0.174	0.184	0.193	0.183	0.187	0.189	0.193	0.188	0.191
(13)	1st Point X1	2.893	3.038	3.221	4.559	4.842	4.947	5.314	6.456	6.625
(14)	Mid-Point Y2	0.275	0.293	0.306	0.291	0.298	0.299	0.306	0.300	0.303
(15)	Mid-Point X2	3.692	4.030	4.393	5.992	6.463	6.682	7.255	8.665	8.980
(16)	3rd Point Y3	0.416	0.437	0.452	0.439	0.446	0.443	0.452	0.447	0.449
(17)	3rd Point X3	4.491	5.022	5.565	7.424	8.083	8.416	9.196	10.874	11.336
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	1.363	1.546	1.728	2.068	2.251	2.749	2.853	3.226	3.507
(20)	Toe Length	0.602	0.653	0.704	0.874	0.952	1.174	1.199	1.310	1.453
(21)	Heel Length	0.761	0.893	1.024	1.194	1.299	1.575	1.654	1.916	2.054
(22)	Toe Spread	0.149	0.130	0.117	0.125	0.119	0.130	0.120	0.119	0.121
(23)	Heel Spread	0.189	0.178	0.170	0.170	0.162	0.175	0.165	0.174	0.171
(35)	Wing Rail Extension	0.466	0.528	0.591	0.653	0.715	0.778	0.840	0.902	0.965
(36)	Wing Rail Flare Length	0.236	0.236	0.236	0.236	0.315	0.315	0.420	0.420	0.472
(37)	Wing Rail Flare Width	0.032	0.032	0.032	0.032	0.030	0.030	0.029	0.029	0.028
(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	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046
POINT OF FROG TO INTERSECTION OF CENTERLINES										
(24)	PF to ICL	3.000	3.750	4.500	5.250	6.000	6.750	7.500	8.250	9.000
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS										
For Track Centers of:		2.047	(13 prototype feet)							
(25)	Straight Track Dist.	2.061	2.634	3.198	3.758	4.314	4.868	5.421	5.973	6.524
(26)	Crossover Track Dist.	2.317	2.839	3.369	3.904	4.442	4.982	5.524	6.066	6.610
For Track Center Increment of:		0.157	(1 prototype foot)							
(28)	Straight Track Incr.	0.620	0.780	0.938	1.097	1.255	1.413	1.571	1.729	1.886
(29)	Crossover Track Incr.	0.640	0.795	0.951	1.108	1.265	1.422	1.579	1.736	1.893
GUARD RAILS										
(30)	Parallel End Setback	0.105	0.112	0.118	0.125	0.131	0.138	0.144	0.151	0.158
(31)	Bevel Length	0.171	0.171	0.171	0.171	0.171	0.171	0.171	0.171	0.171
(32)	Flare Length	0.381	0.381	0.381	0.381	0.381	0.433	0.433	0.433	0.433
(33)	Overall Length	1.299	1.299	1.299	1.299	1.299	1.732	1.732	1.732	1.732
(34)	Parallel Length	0.538	0.538	0.538	0.538	0.538	0.866	0.866	0.866	0.866
(37)	Flare Width	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
(38)	Plane Width	0.015	0.015	0.015	0.015	0.015	0.014	0.014	0.014	0.014
(39)	End Chamfer	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039

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(1)	FROG NUMBERS	13	14	15	16	17	18	19	20
PROPERTIES OF STRAIGHT SWITCHES									
(2)	Switch Rail Length	4.324	4.389	5.901	5.890	5.921	5.960	6.035	6.118
(4)	Switch Heel Spread	0.112	0.112	0.112	0.112	0.112	0.112	0.112	0.112
(5)	Switch Heel Angle (deg.)	1.487	1.465	1.089	1.091	1.086	1.078	1.065	1.051
LEAD TO THEORETICAL POINT OF FROG									
(8)	Lead	15.956	16.768	19.803	20.577	21.329	22.080	22.940	23.799
CLOSURE DISTANCE									
(9)	Straight Rail Length	10.094	10.757	12.136	12.902	13.476	14.041	14.807	15.566
(10)	Curved Rail Length	10.113	10.774	12.152	12.918	13.490	14.055	14.820	15.578
(11)	Curved Rail Radius	198.534	235.054	255.131	297.422	338.453	382.783	435.497	492.193
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL									
(12)	1st Point Y1	0.194	0.196	0.188	0.191	0.193	0.194	0.197	0.199
(13)	1st Point X1	6.848	7.079	8.935	9.116	9.290	9.471	9.737	10.009
(14)	Mid-Point Y2	0.307	0.311	0.300	0.305	0.307	0.309	0.313	0.317
(15)	Mid-Point X2	9.371	9.768	11.969	12.342	12.659	12.981	13.439	13.901
(16)	3rd Point Y3	0.453	0.457	0.448	0.454	0.455	0.455	0.460	0.465
(17)	3rd Point X3	11.895	12.457	15.003	15.567	16.028	16.492	17.141	17.792
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	3.789	4.070	4.220	4.501	4.782	5.064	5.217	5.370
(20)	Toe Length	1.538	1.622	1.766	1.785	1.931	2.078	2.097	2.116
(21)	Heel Length	2.251	2.448	2.454	2.717	2.851	2.986	3.120	3.255
(22)	Toe Spread	0.118	0.116	0.118	0.111	0.114	0.115	0.110	0.106
(23)	Heel Spread	0.173	0.175	0.164	0.170	0.168	0.166	0.164	0.163
(35)	Wing Rail Extension	1.070	1.175	1.237	1.365	1.427	1.490	1.595	1.700
(36)	Wing Rail Flare Length	0.615	0.697	0.727	0.815	0.843	0.872	0.954	1.037
(37)	Wing Rail Flare Width	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027
(38)	Wing Rail Bend Width	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027
(39)	Wing Rail End Chamfer	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046
POINT OF FROG TO INTERSECTION OF CENTERLINES									
(24)	PF to ICL	9.750	10.500	11.250	12.000	12.750	13.500	14.250	15.000
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS									
For Track Centers of:		2.047	(13 prototype feet)						
(25)	Straight Track Dist.	7.075	7.625	8.175	8.724	9.273	9.822	10.371	10.919
(26)	Crossover Track Dist.	7.154	7.698	8.243	8.788	9.333	9.879	10.425	10.970
For Track Center Increment of:		0.157	(1 prototype foot)						
(28)	Straight Track Incr.	2.044	2.202	2.360	2.517	2.675	2.832	2.990	3.148
(29)	Crossover Track Incr.	2.050	2.208	2.365	2.522	2.679	2.837	2.994	3.152
GUARD RAILS									
(30)	Parallel End Setback	0.164	0.171	0.177	0.184	0.190	0.197	0.203	0.210
(31)	Bevel Length	0.171	0.171	0.171	0.171	0.171	0.171	0.171	0.171
(32)	Flare Length	0.433	0.472	0.472	0.472	0.472	0.472	0.538	0.538
(33)	Overall Length	1.732	2.047	2.047	2.047	2.047	2.047	2.598	2.598
(34)	Parallel Length	0.866	1.102	1.102	1.102	1.102	1.102	1.522	1.522
(37)	Total Flare at End	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
(38)	Bevel Cut at End	0.014	0.013	0.013	0.013	0.013	0.013	0.012	0.012
(39)	End Chamfer	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039