

Zdf Scale

Straight Switch Turnout

TURNOUT DIMENSIONS

Revised: February 2015

RP-12.51

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	0.888	0.896	0.916	1.354	1.413	1.429	1.511	1.873	1.901
(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.)	3.209	3.182	3.111	2.105	2.017	1.994	1.887	1.522	1.499
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	0.913	1.148	1.370	1.660	1.887	2.017	2.270	2.574	2.749
(10)	Curved Rail Length	0.932	1.164	1.384	1.671	1.896	2.026	2.278	2.581	2.756
(11)	Curved Rail Radius	4.838	8.094	12.354	15.780	21.157	26.592	34.001	40.154	48.244
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL										
(12)	1st Point Y1	0.068	0.071	0.073	0.070	0.072	0.072	0.073	0.072	0.073
(13)	1st Point X1	1.117	1.183	1.259	1.769	1.885	1.934	2.078	2.516	2.588
(14)	Mid-Point Y2	0.097	0.102	0.106	0.102	0.104	0.104	0.106	0.105	0.105
(15)	Mid-Point X2	1.345	1.470	1.602	2.184	2.356	2.438	2.645	3.160	3.275
(16)	3rd Point Y3	0.137	0.144	0.149	0.145	0.147	0.146	0.149	0.148	0.148
(17)	3rd Point X3	1.573	1.757	1.944	2.599	2.828	2.942	3.213	3.803	3.962
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	0.503	0.574	0.645	0.770	0.841	1.021	1.065	1.202	1.307
(20)	Toe Length	0.240	0.265	0.290	0.357	0.391	0.476	0.492	0.538	0.596
(21)	Heel Length	0.264	0.309	0.355	0.414	0.450	0.545	0.573	0.664	0.711
(22)	Toe Spread	0.059	0.053	0.048	0.051	0.049	0.053	0.049	0.049	0.050
(23)	Heel Spread	0.065	0.062	0.059	0.059	0.056	0.061	0.057	0.060	0.059
(35)	Wing Rail Extension	0.161	0.183	0.205	0.226	0.248	0.269	0.291	0.313	0.334
(36)	Wing Rail Flare Length	0.082	0.082	0.082	0.082	0.109	0.109	0.145	0.145	0.164
(37)	Wing Rail Flare Width	0.011	0.011	0.011	0.011	0.010	0.010	0.010	0.010	0.010
(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	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
POINT OF FROG TO INTERSECTION OF CENTERLINES										
(24)	PF to ICL	1.000	1.250	1.500	1.750	2.000	2.250	2.500	2.750	3.000
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS										
For Track Centers of:		0.709	(13 prototype feet)							
(25)	Straight Track Dist.	0.792	1.010	1.225	1.438	1.651	1.862	2.073	2.284	2.494
(26)	Crossover Track Dist.	0.881	1.081	1.284	1.489	1.695	1.902	2.109	2.316	2.524
For Track Center Increment of:		0.055	(1 prototype foot)							
(28)	Straight Track Incr.	0.215	0.270	0.325	0.380	0.435	0.489	0.544	0.599	0.653
(29)	Crossover Track Incr.	0.222	0.275	0.330	0.384	0.438	0.492	0.547	0.601	0.656
GUARD RAILS										
(30)	Parallel End Setback	0.036	0.039	0.041	0.043	0.045	0.048	0.050	0.052	0.055
(31)	Bevel Length	0.059	0.059	0.059	0.059	0.059	0.059	0.059	0.059	0.059
(32)	Flare Length	0.132	0.132	0.150	0.150	0.150	0.150	0.164	0.164	0.164
(33)	Overall Length	0.450	0.450	0.600	0.600	0.600	0.600	0.709	0.709	0.709
(34)	Parallel Length	0.186	0.186	0.300	0.300	0.300	0.300	0.382	0.382	0.382
(37)	Flare Width	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
(38)	Plane Width	0.005	0.005	0.005	0.005	0.005	0.005	0.004	0.004	0.004
(39)	End Chamfer	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014

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(1)	FROG NUMBERS	13	14	15	16	17	18	19	20
PROPERTIES OF STRAIGHT SWITCHES									
(2)	Switch Rail Length	1.940	1.982	2.596	2.612	2.642	2.675	2.721	2.769
(4)	Switch Heel Spread	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
(5)	Switch Heel Angle (deg.)	1.469	1.438	1.098	1.091	1.078	1.065	1.047	1.029
LEAD TO THEORETICAL POINT OF FROG									
(8)	Lead	5.527	5.808	6.859	7.127	7.387	7.648	7.945	8.243
CLOSURE DISTANCE									
(9)	Straight Rail Length	2.954	3.157	3.536	3.774	3.945	4.114	4.352	4.588
(10)	Curved Rail Length	2.960	3.162	3.541	3.779	3.950	4.119	4.356	4.592
(11)	Curved Rail Radius	57.769	68.299	74.577	87.005	98.789	111.473	126.854	143.364
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL									
(12)	1st Point Y1	0.073	0.074	0.072	0.073	0.073	0.074	0.074	0.075
(13)	1st Point X1	2.678	2.771	3.480	3.555	3.629	3.704	3.809	3.916
(14)	Mid-Point Y2	0.107	0.108	0.105	0.106	0.107	0.107	0.108	0.109
(15)	Mid-Point X2	3.417	3.560	4.364	4.499	4.615	4.732	4.897	5.063
(16)	3rd Point Y3	0.149	0.150	0.148	0.150	0.150	0.150	0.151	0.153
(17)	3rd Point X3	4.155	4.349	5.248	5.443	5.601	5.761	5.985	6.210
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	1.412	1.517	1.577	1.682	1.787	1.892	1.953	2.014
(20)	Toe Length	0.633	0.670	0.727	0.741	0.800	0.858	0.872	0.887
(21)	Heel Length	0.780	0.848	0.850	0.941	0.988	1.034	1.081	1.127
(22)	Toe Spread	0.049	0.048	0.048	0.046	0.047	0.048	0.046	0.044
(23)	Heel Spread	0.060	0.061	0.057	0.059	0.058	0.057	0.057	0.056
(35)	Wing Rail Extension	0.370	0.407	0.428	0.473	0.494	0.516	0.552	0.589
(36)	Wing Rail Flare Length	0.213	0.241	0.252	0.282	0.292	0.302	0.330	0.359
(37)	Wing Rail Flare Width	0.010	0.009	0.009	0.009	0.009	0.009	0.009	0.009
(38)	Wing Rail Bend Width	0.010	0.009	0.009	0.009	0.009	0.009	0.009	0.009
(39)	Wing Rail End Chamfer	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
POINT OF FROG TO INTERSECTION OF CENTERLINES									
(24)	PF to ICL	3.250	3.500	3.750	4.000	4.250	4.500	4.750	5.000
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS									
For Track Centers of:		0.709	(13 prototype feet)						
(25)	Straight Track Dist.	2.705	2.915	3.125	3.334	3.544	3.754	3.963	4.173
(26)	Crossover Track Dist.	2.732	2.940	3.148	3.357	3.565	3.773	3.982	4.191
For Track Center Increment of:		0.055	(1 prototype foot)						
(28)	Straight Track Incr.	0.708	0.763	0.817	0.872	0.926	0.981	1.036	1.090
(29)	Crossover Track Incr.	0.710	0.765	0.819	0.874	0.928	0.983	1.037	1.092
GUARD RAILS									
(30)	Parallel End Setback	0.057	0.059	0.061	0.064	0.066	0.068	0.070	0.073
(31)	Bevel Length	0.059	0.059	0.059	0.059	0.059	0.059	0.059	0.059
(32)	Flare Length	0.186	0.186	0.186	0.186	0.186	0.186	0.209	0.209
(33)	Overall Length	0.900	0.900	0.900	0.900	0.900	0.900	1.064	1.064
(34)	Parallel Length	0.527	0.527	0.527	0.527	0.527	0.527	0.645	0.645
(37)	Total Flare at End	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
(38)	Bevel Cut at End	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
(39)	End Chamfer	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014