

NMRA Recommended Practices  
**Proto:64 Scale**  
**Curved Switch Turnout**

**TURNOUT  
DIMENSIONS**

Revised: February 2015

RP-12.8

Design and calculations by Van S. Fehr

(1)	FROG NUMBERS	4	5	6	7	8	9	10	11	12
<b>PROPERTIES OF CURVED SWITCHES</b>										
(2)	Switch Rail Length	2.419	2.410	2.456	4.130	4.226	4.311	4.317	4.370	6.500
(3)	Switch Point Angle (deg.)	1.573	1.579	1.549	0.921	0.900	0.882	0.881	0.870	0.585
(4)	Switch Heel Spread	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
(5)	Switch Heel Angle (deg.)	4.383	4.398	4.316	2.566	2.507	2.458	2.454	2.425	1.630
(6)	Switch Rail Radius	49.322	48.978	50.844	143.824	150.613	156.705	157.174	161.019	356.319
(7)	Switch Mid-Ordinate	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
<b>LEAD TO THEORETICAL POINT OF FROG</b>										
(8)	Lead	6.719	7.582	8.445	11.754	12.758	13.633	14.457	15.277	19.367
<b>CLOSURE DISTANCE</b>										
(9)	Straight Rail Length	3.704	4.543	5.329	6.791	7.636	8.191	9.008	9.673	11.492
(10)	Curved Rail Length	3.776	4.602	5.379	6.832	7.672	8.224	9.038	9.701	11.516
(11)	Curved Rail Radius	21.927	37.547	59.149	69.837	94.625	120.769	158.340	199.927	210.006
<b>GAGE LINE OFFSETS ON CURVED CLOSURE RAIL</b>										
(12)	1st Point Y1	0.216	0.230	0.241	0.222	0.229	0.231	0.238	0.243	0.227
(13)	1st Point X1	3.344	3.546	3.788	5.827	6.135	6.358	6.569	6.788	9.373
(14)	Mid-Point Y2	0.347	0.370	0.388	0.361	0.370	0.371	0.383	0.389	0.368
(15)	Mid-Point X2	4.270	4.682	5.120	7.525	8.044	8.406	8.821	9.206	12.246
(16)	3rd Point Y3	0.518	0.545	0.564	0.541	0.551	0.546	0.560	0.565	0.548
(17)	3rd Point X3	5.196	5.818	6.453	9.223	9.953	10.454	11.073	11.625	15.119
<b>PROPERTIES OF FROGS</b>										
(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	1.503	1.691	1.879	2.255	2.443	3.006	3.101	3.516	3.821
(20)	Toe Length	0.596	0.628	0.660	0.833	0.896	1.131	1.132	1.234	1.376
(21)	Heel Length	0.906	1.063	1.219	1.422	1.547	1.875	1.969	2.281	2.445
(22)	Toe Spread	0.148	0.125	0.110	0.119	0.112	0.125	0.113	0.112	0.115
(23)	Heel Spread	0.225	0.211	0.202	0.203	0.193	0.208	0.197	0.207	0.204
(35)	Wing Rail Extension	0.555	0.629	0.703	0.777	0.852	0.926	1.000	1.074	1.149
(36)	Wing Rail Flare Length	0.281	0.281	0.281	0.281	0.375	0.375	0.500	0.500	0.563
(37)	Wing Rail Flare Width	0.038	0.038	0.038	0.038	0.035	0.035	0.034	0.034	0.034
(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	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055
<b>POINT OF FROG TO INTERSECTION OF CENTERLINES</b>										
(24)	PF to ICL	3.532	4.415	5.298	6.181	7.064	7.947	8.830	9.713	10.596
<b>DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS</b>										
<b>For Track Centers of:</b>		2.438	<b>(13 prototype feet)</b>							
(25)	Straight Track Dist.	2.534	3.236	3.927	4.613	5.296	5.976	6.654	7.331	8.007
(26)	Crossover Track Dist.	2.838	3.479	4.131	4.788	5.448	6.111	6.776	7.442	8.109
<b>For Track Center Increment of:</b>		0.188	<b>(1 prototype foot)</b>							
(28)	Straight Track Incr.	0.738	0.928	1.117	1.306	1.494	1.682	1.870	2.058	2.246
(29)	Crossover Track Incr.	0.762	0.947	1.133	1.319	1.506	1.693	1.880	2.067	2.254
<b>GUARD RAILS</b>										
(30)	Parallel End Setback	0.125	0.133	0.141	0.149	0.156	0.164	0.172	0.180	0.188
(31)	Bevel Length	0.203	0.203	0.203	0.203	0.203	0.203	0.203	0.203	0.203
(32)	Flare Length	0.453	0.453	0.453	0.453	0.453	0.453	0.453	0.453	0.453
(33)	Overall Length	1.547	1.547	1.547	1.547	1.547	1.547	1.547	1.547	1.547
(34)	Parallel Length	0.641	0.641	0.641	0.641	0.641	0.641	0.641	0.641	0.641
(37)	Flare Width	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030
(38)	Plane Width	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
(39)	End Chamfer	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047

# Proto:64 Scale

## Curved Switch Turnout

# TURNOUT DIMENSIONS

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Design and calculations by Van S. Fehr

(1)	FROG NUMBERS	13	14	15	16	17	18	19	20
<b>PROPERTIES OF CURVED SWITCHES</b>									
(2)	Switch Rail Length	6.549	6.614	6.703	6.786	8.392	8.498	8.571	8.655
(3)	Switch Point Angle (deg.)	0.580	0.575	0.567	0.560	0.453	0.447	0.444	0.439
(4)	Switch Heel Spread	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
(5)	Switch Heel Angle (deg.)	1.618	1.602	1.581	1.561	1.263	1.247	1.236	1.224
(6)	Switch Rail Radius	361.706	368.959	378.909	388.417	593.893	609.032	619.585	631.841
(7)	Switch Mid-Ordinate	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
<b>LEAD TO THEORETICAL POINT OF FROG</b>									
(8)	Lead	20.275	21.184	22.078	23.008	26.301	27.234	28.168	29.102
<b>CLOSURE DISTANCE</b>									
(9)	Straight Rail Length	12.280	13.052	13.716	14.570	16.112	16.794	17.662	18.518
(10)	Curved Rail Length	12.302	13.073	13.736	14.588	16.129	16.811	17.677	18.533
(11)	Curved Rail Radius	252.884	300.937	351.727	414.074	438.650	497.638	569.404	647.424
<b>GAGE LINE OFFSETS ON CURVED CLOSURE RAIL</b>									
(12)	1st Point Y1	0.231	0.235	0.237	0.241	0.233	0.235	0.238	0.241
(13)	1st Point X1	9.619	9.877	10.132	10.429	12.420	12.696	12.987	13.285
(14)	Mid-Point Y2	0.374	0.379	0.382	0.388	0.377	0.379	0.385	0.390
(15)	Mid-Point X2	12.689	13.140	13.561	14.071	16.448	16.895	17.402	17.914
(16)	3rd Point Y3	0.554	0.559	0.560	0.568	0.559	0.559	0.566	0.572
(17)	3rd Point X3	15.759	16.403	16.990	17.714	20.476	21.093	21.817	22.544
<b>PROPERTIES OF FROGS</b>									
(18)	Frog Angle (deg.)	4.405	4.091	3.818	3.580	3.369	3.182	3.015	2.864
(19)	Overall Length	4.126	4.432	4.581	4.886	5.192	5.497	5.650	5.803
(20)	Toe Length	1.447	1.518	1.659	1.652	1.797	1.942	1.935	1.928
(21)	Heel Length	2.680	2.914	2.922	3.234	3.395	3.555	3.715	3.875
(22)	Toe Spread	0.111	0.108	0.111	0.103	0.106	0.108	0.102	0.096
(23)	Heel Spread	0.206	0.208	0.195	0.202	0.200	0.197	0.195	0.194
(35)	Wing Rail Extension	1.274	1.399	1.473	1.625	1.699	1.773	1.898	2.023
(36)	Wing Rail Flare Length	0.733	0.830	0.866	0.970	1.004	1.038	1.136	1.234
(37)	Wing Rail Flare Width	0.033	0.032	0.032	0.032	0.032	0.032	0.032	0.032
(38)	Wing Rail Bend Width	0.033	0.032	0.032	0.032	0.032	0.032	0.032	0.032
(39)	Wing Rail End Chamfer	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055
<b>POINT OF FROG TO INTERSECTION OF CENTERLINES</b>									
(24)	PF to ICL	11.479	12.362	13.245	14.128	15.011	15.894	16.777	17.660
<b>DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS</b>									
<b>For Track Centers of:</b>		2.438	<b>(13 prototype feet)</b>						
(25)	Straight Track Dist.	8.683	9.357	10.032	10.706	11.380	12.053	12.726	13.400
(26)	Crossover Track Dist.	8.776	9.445	10.113	10.782	11.451	12.121	12.791	13.460
<b>For Track Center Increment of:</b>		0.188	<b>(1 prototype foot)</b>						
(28)	Straight Track Incr.	2.434	2.622	2.809	2.997	3.185	3.372	3.560	3.748
(29)	Crossover Track Incr.	2.441	2.628	2.816	3.003	3.190	3.378	3.565	3.752
<b>GUARD RAILS</b>									
(30)	Parallel End Setback	0.195	0.203	0.211	0.219	0.227	0.234	0.242	0.250
(31)	Bevel Length	0.203	0.203	0.203	0.203	0.203	0.203	0.203	0.203
(32)	Flare Length	0.453	0.453	0.516	0.516	0.516	0.516	0.516	0.516
(33)	Overall Length	1.547	1.547	2.063	2.063	2.063	2.063	2.063	2.063
(34)	Parallel Length	0.641	0.641	1.031	1.031	1.031	1.031	1.031	1.031
(37)	Total Flare at End	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030
(38)	Bevel Cut at End	0.018	0.018	0.016	0.016	0.016	0.016	0.016	0.016
(39)	End Chamfer	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047