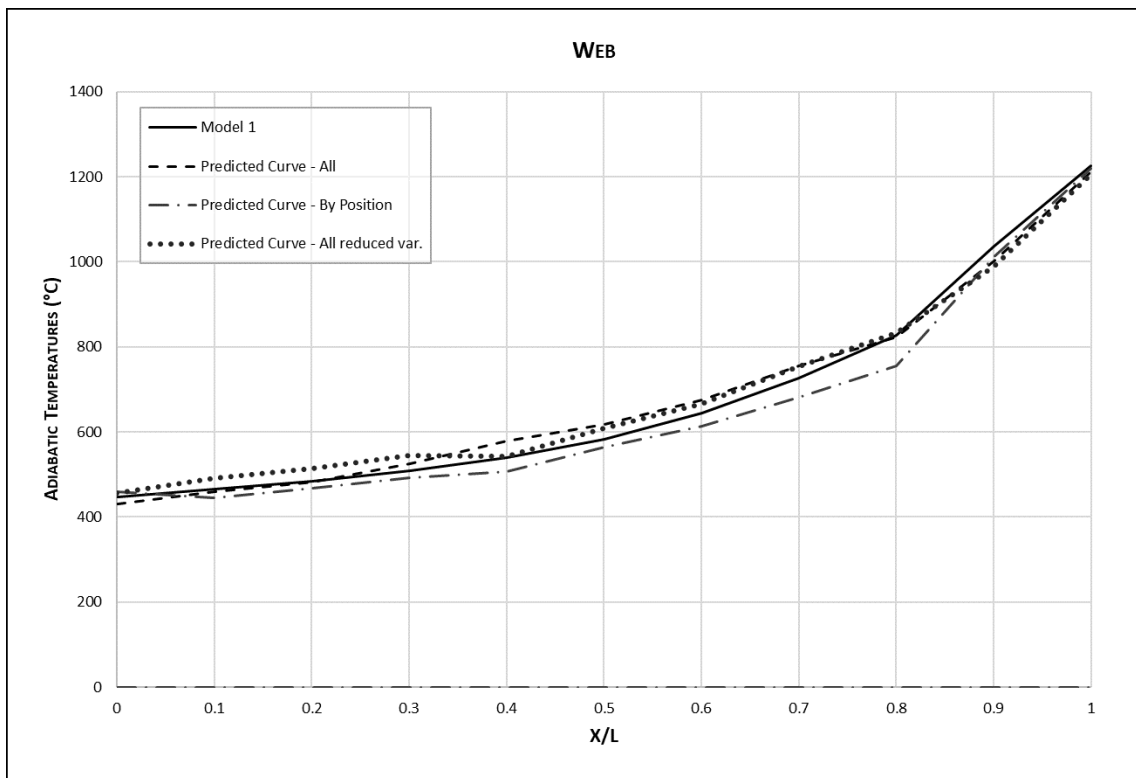
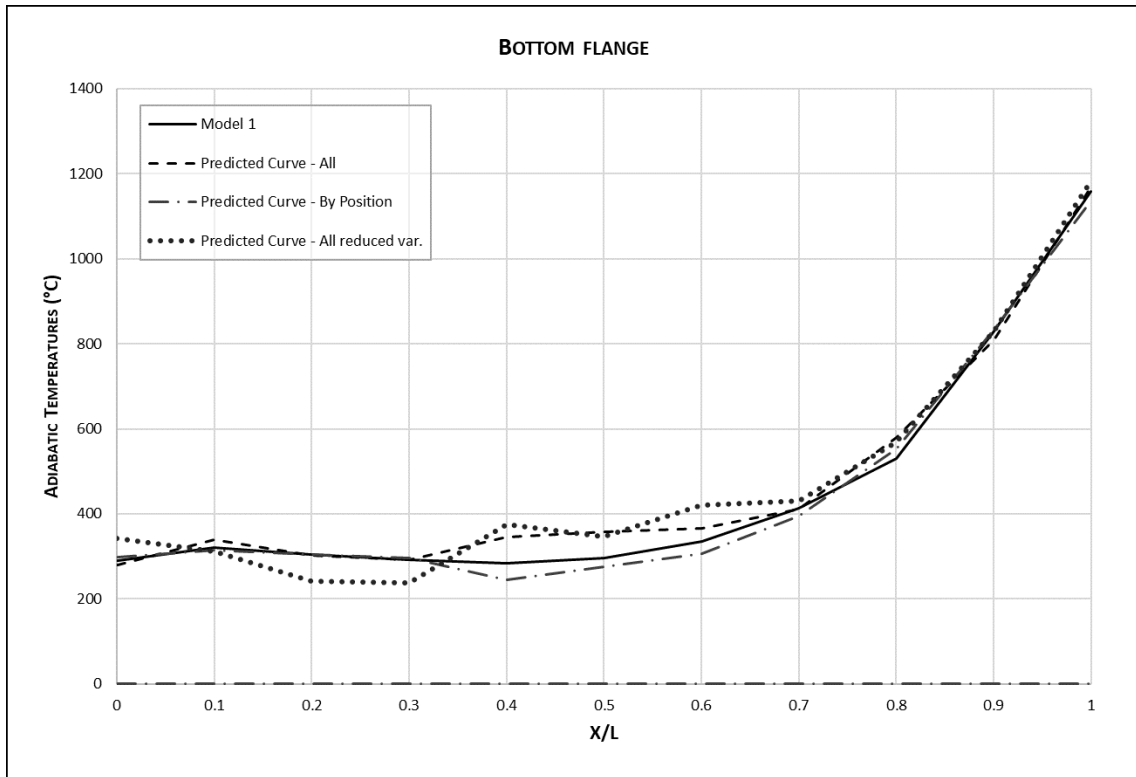
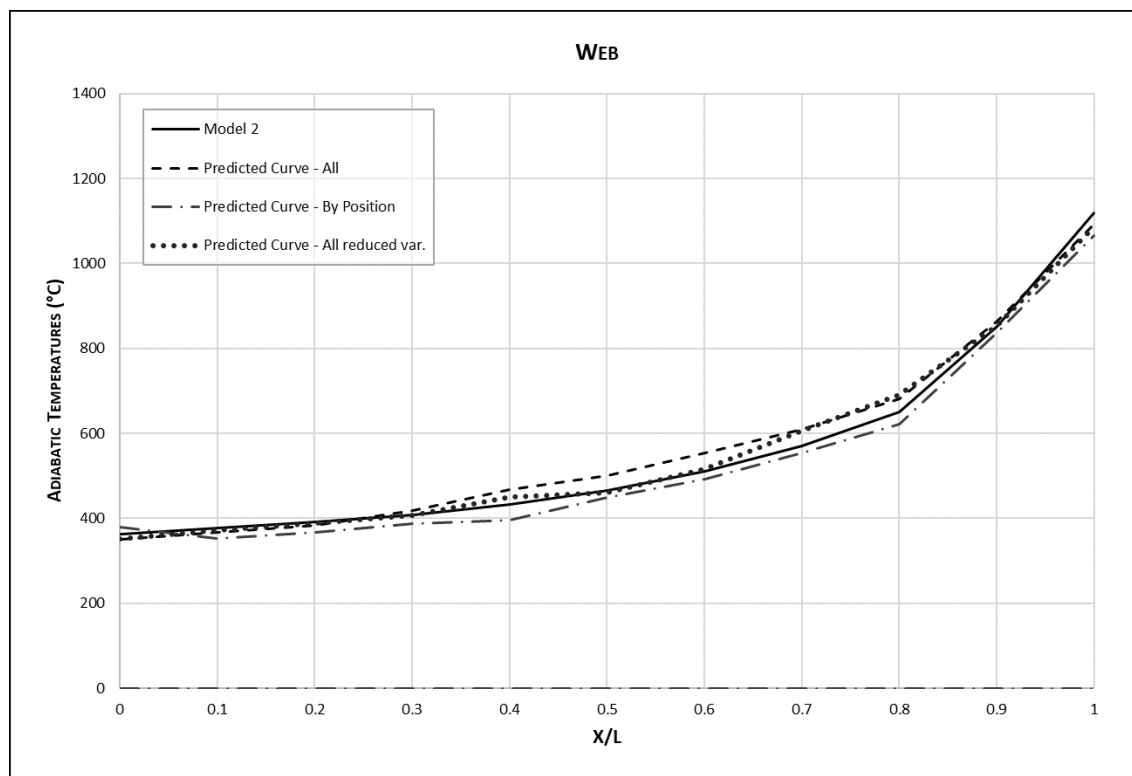
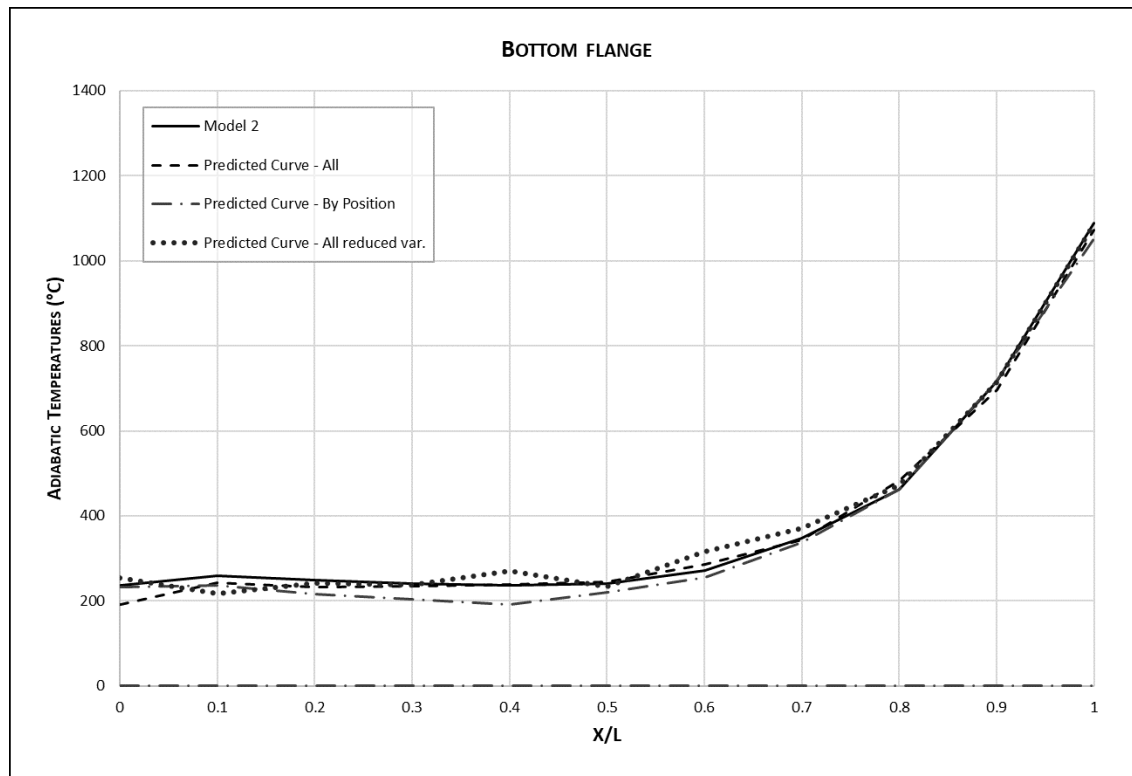


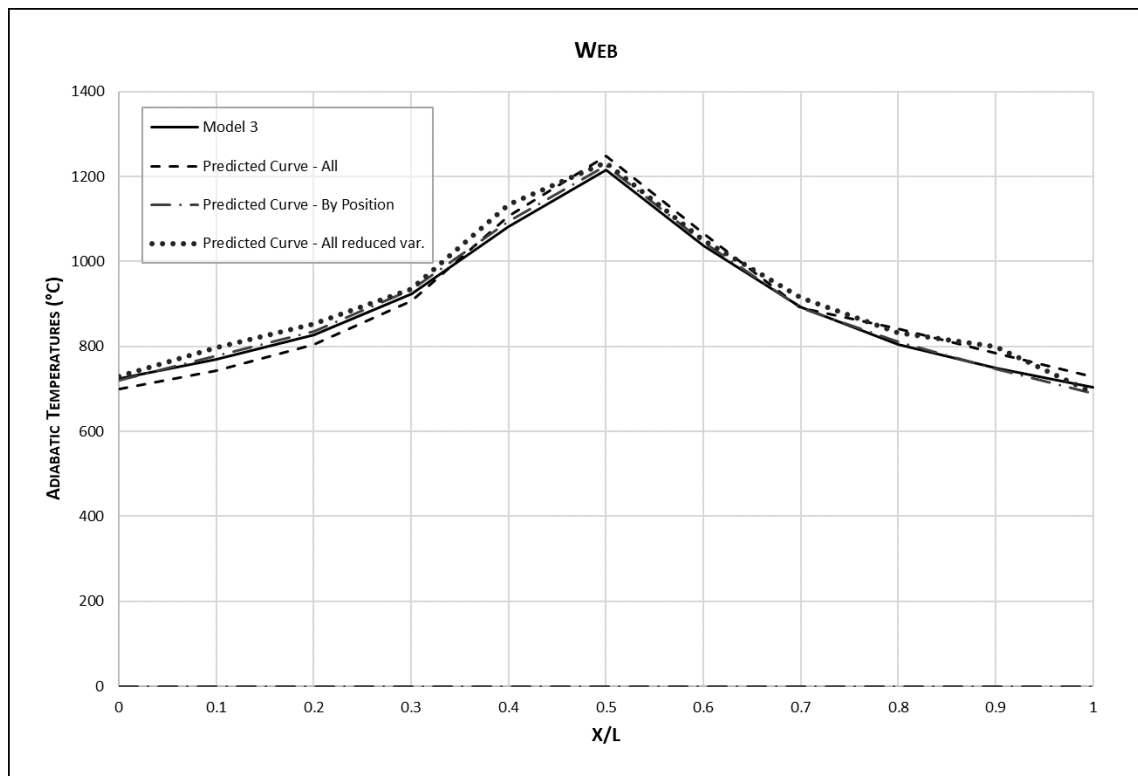
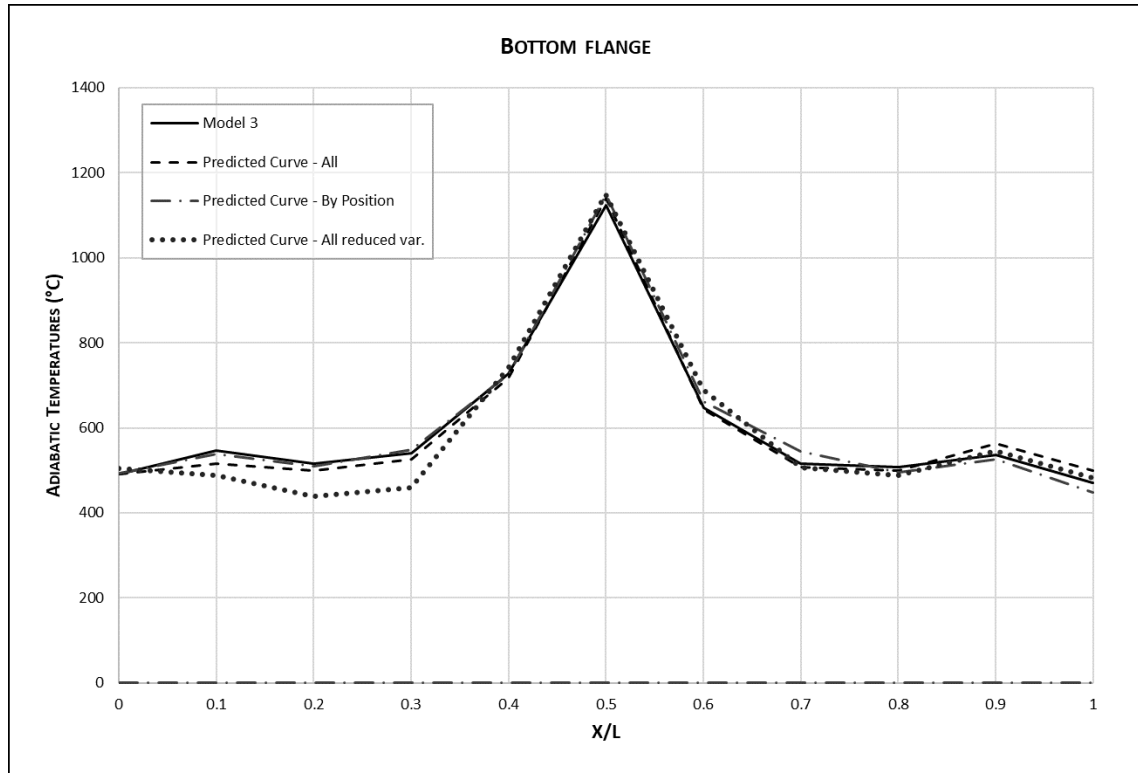


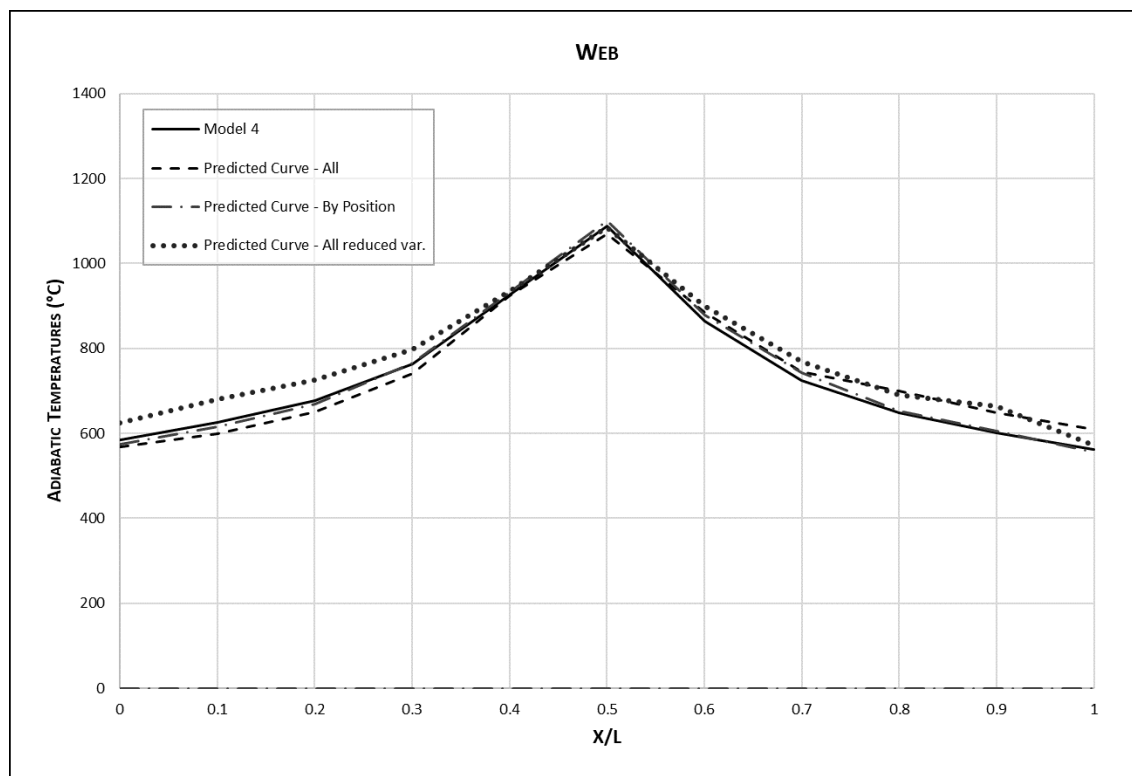
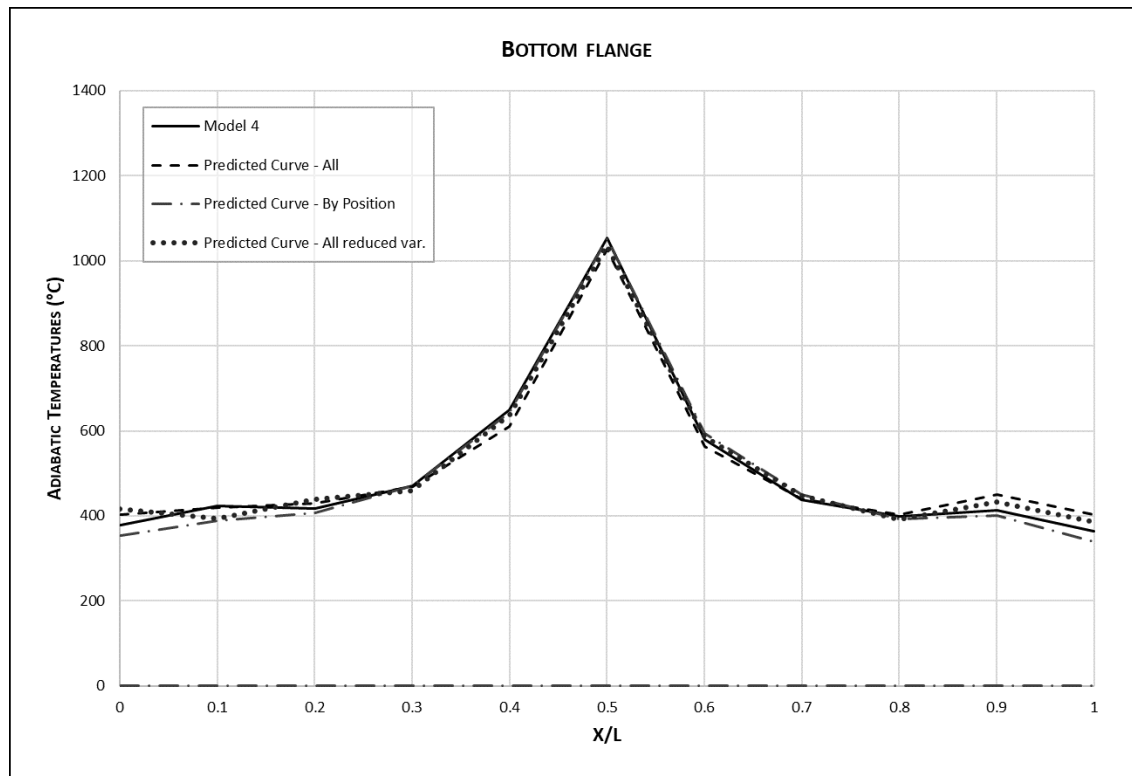
APPENDIX 4: DESIGN FIRE CURVES

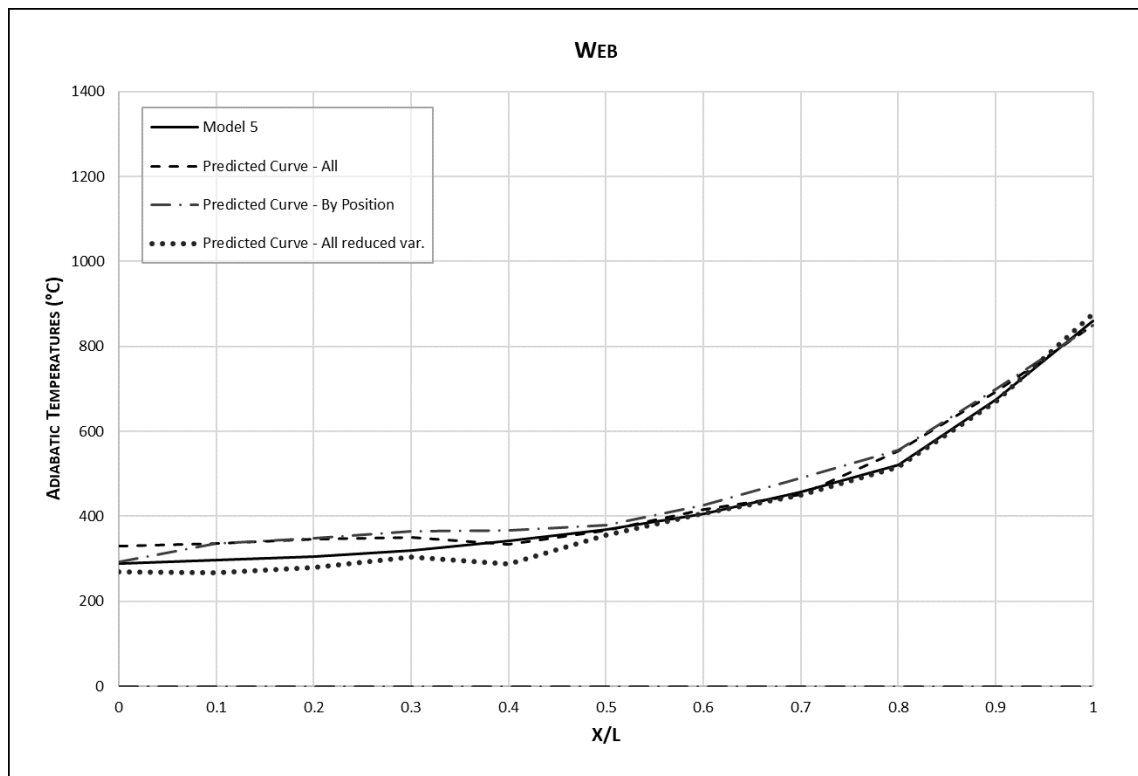
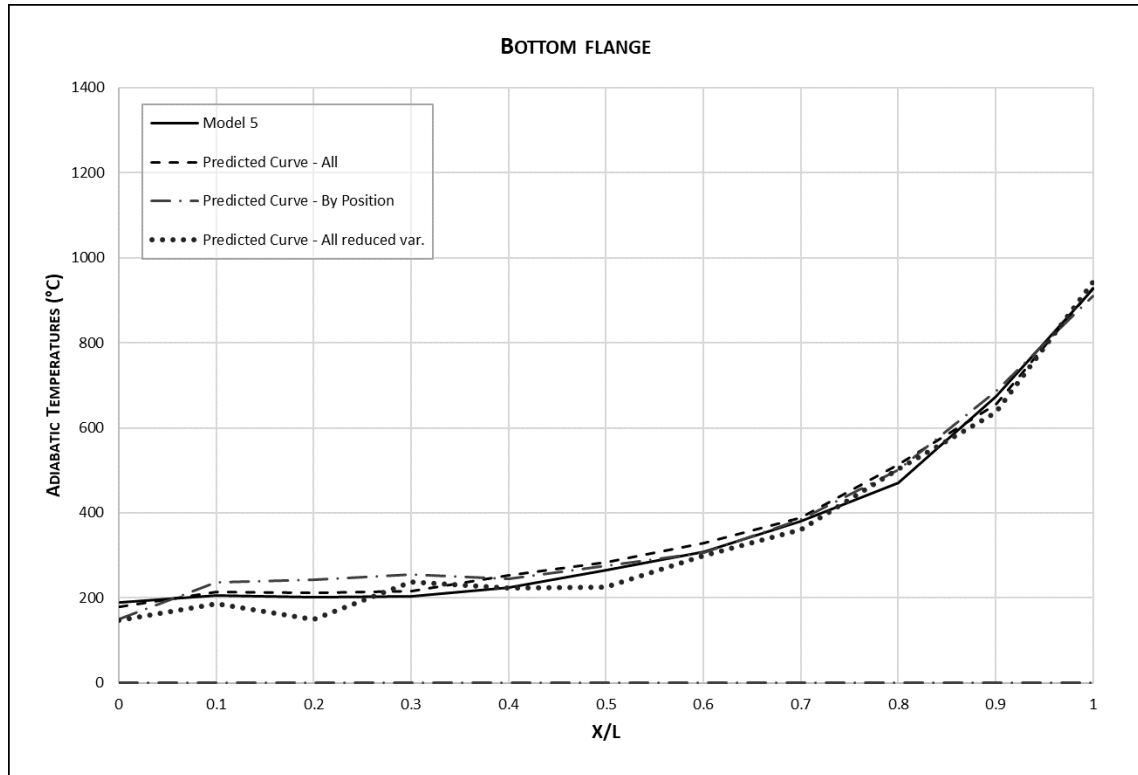
GRAPHICAL FORMAT

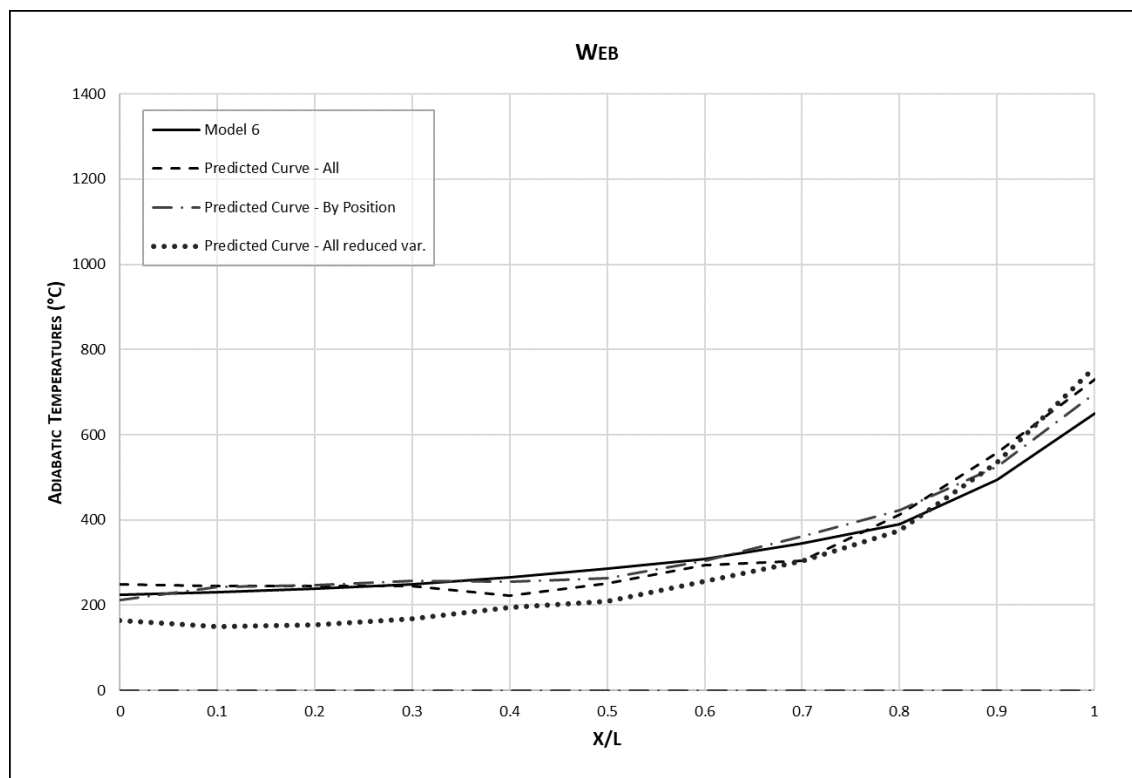
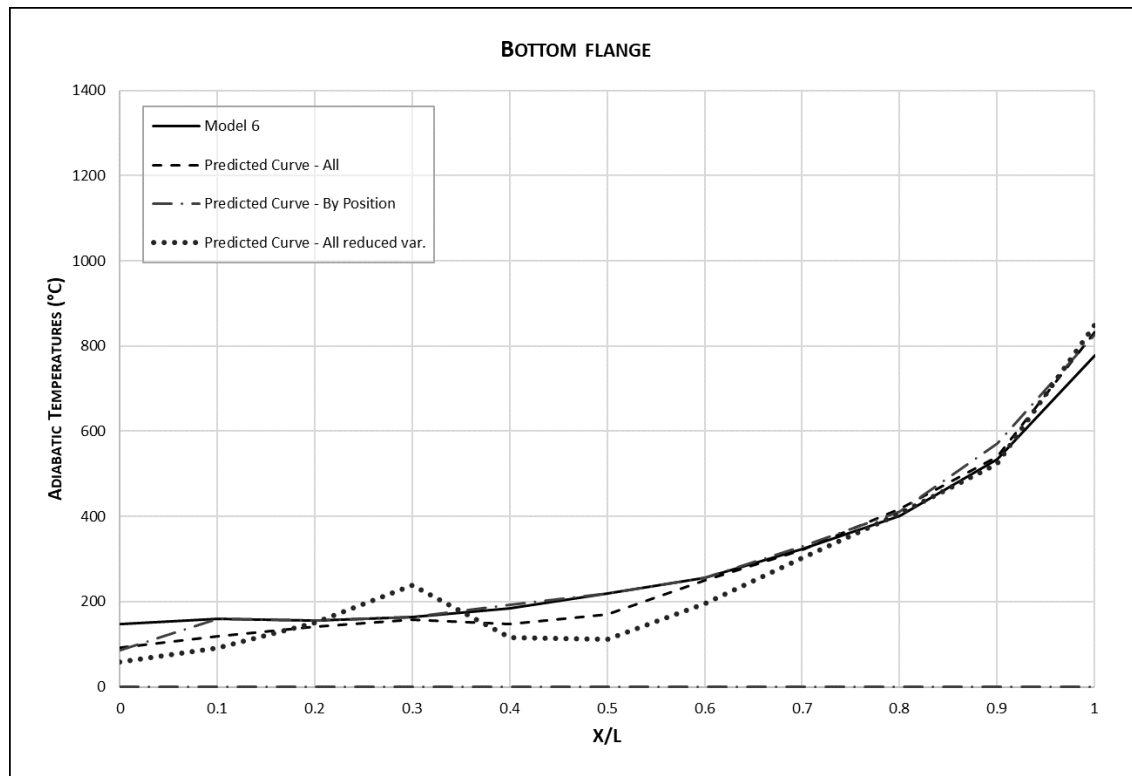


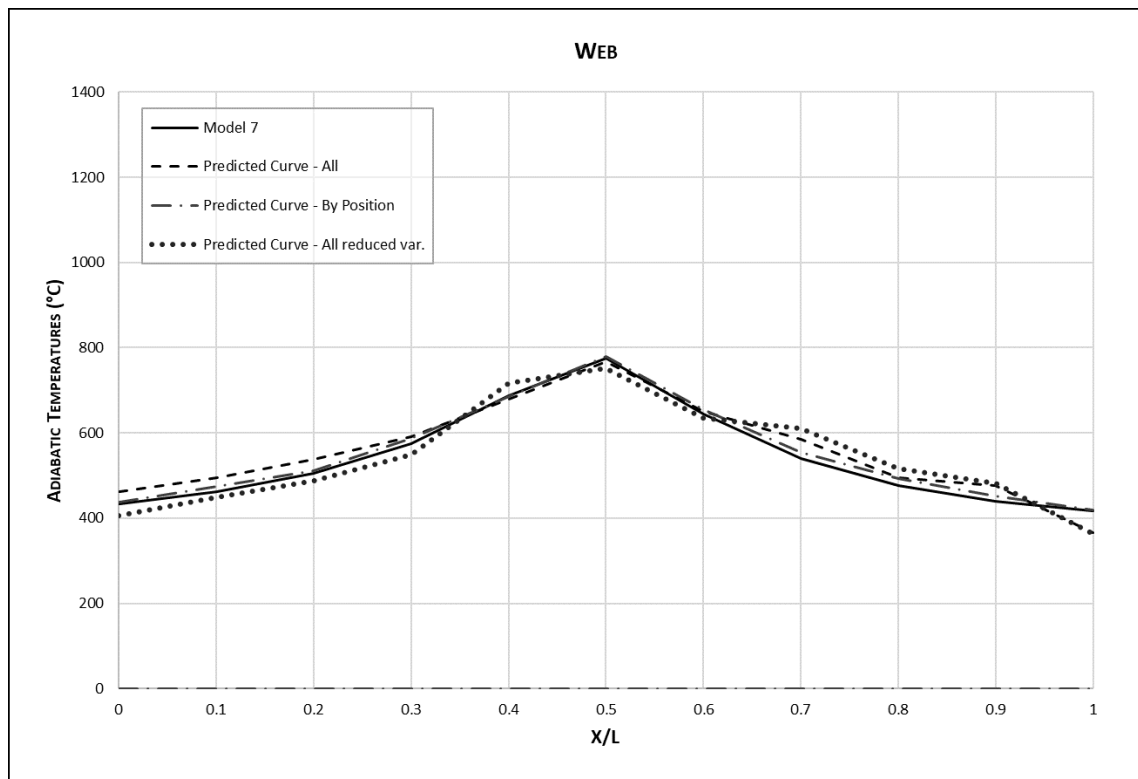
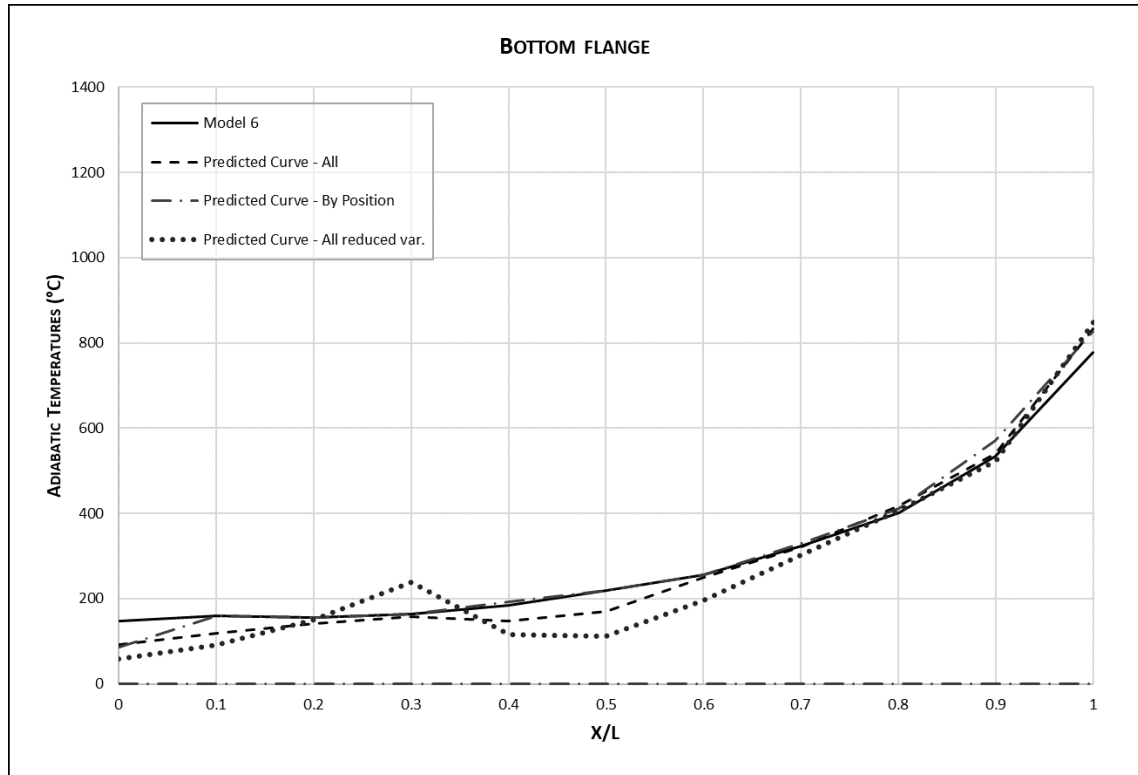


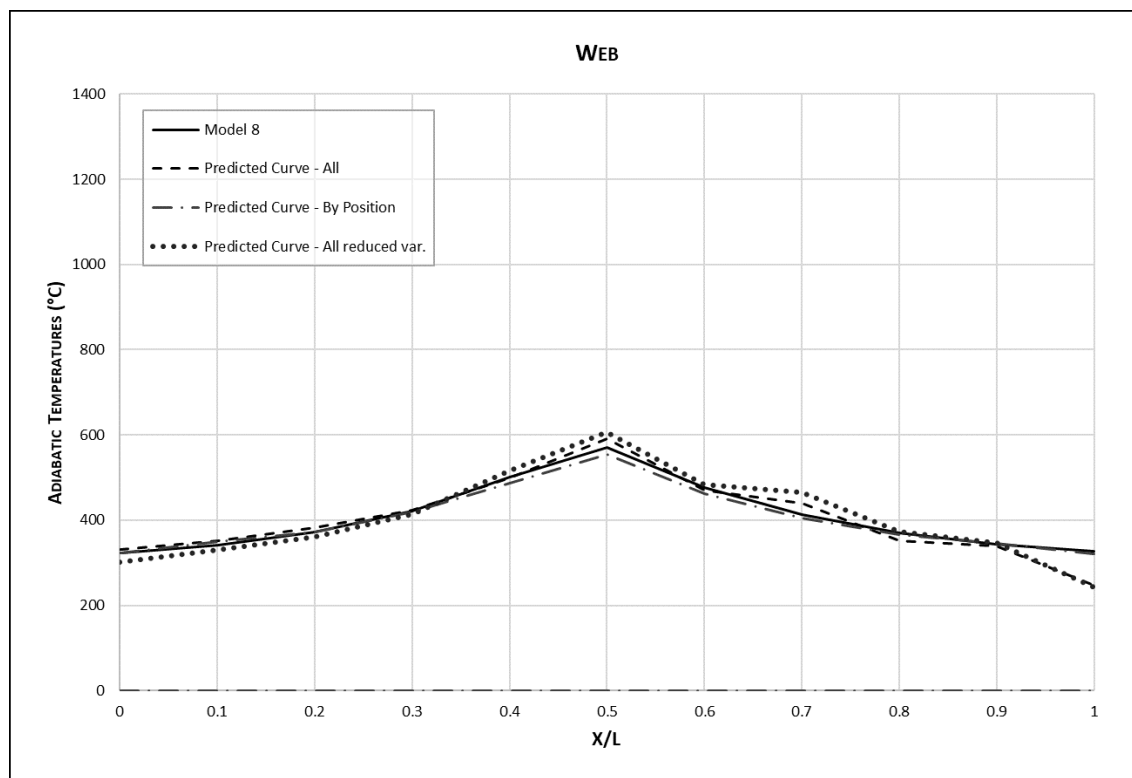
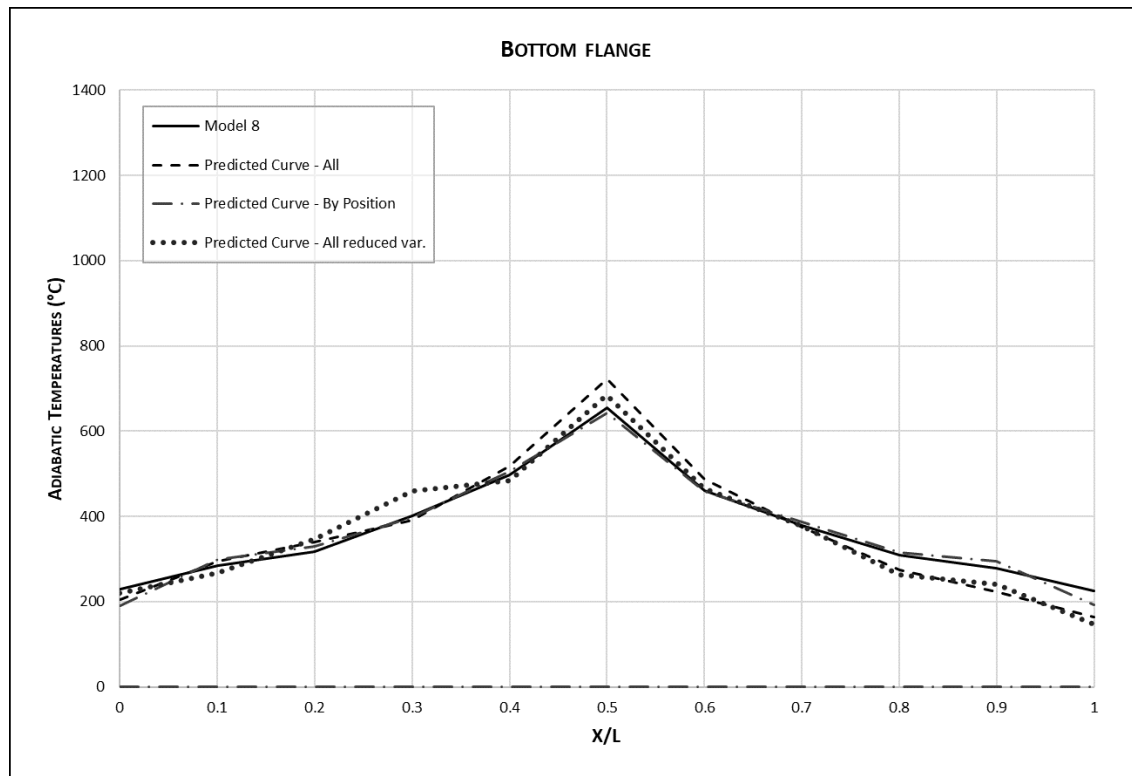


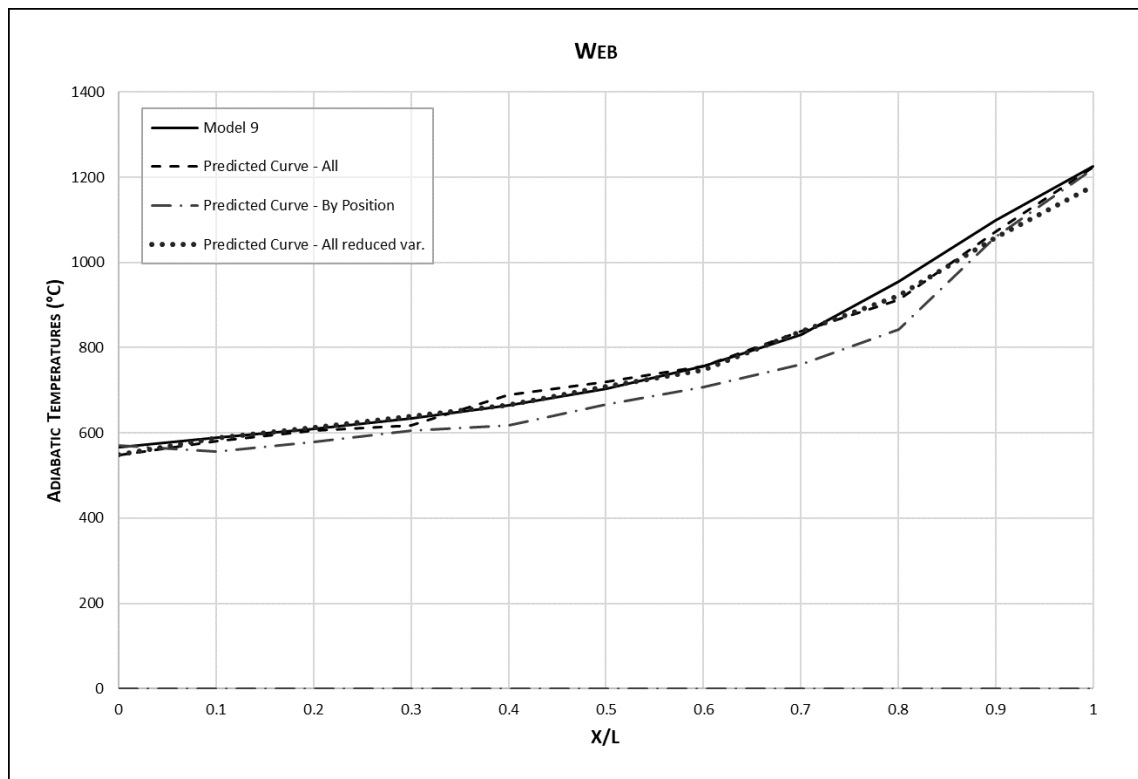
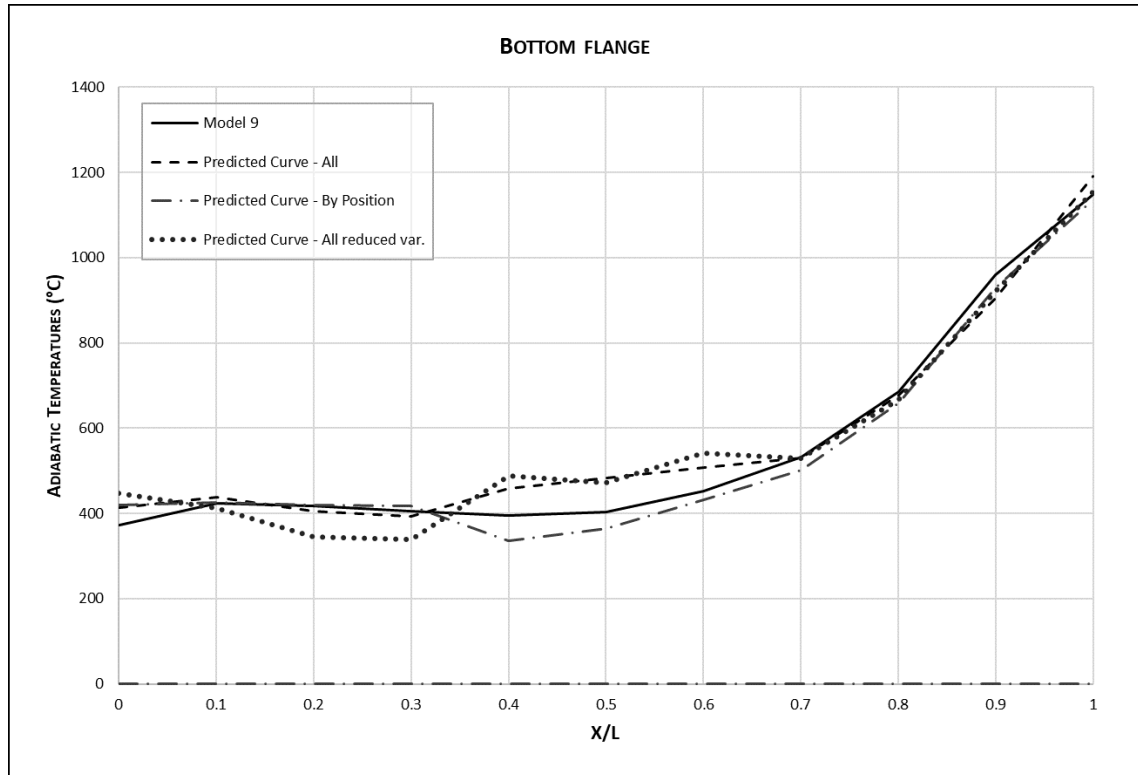


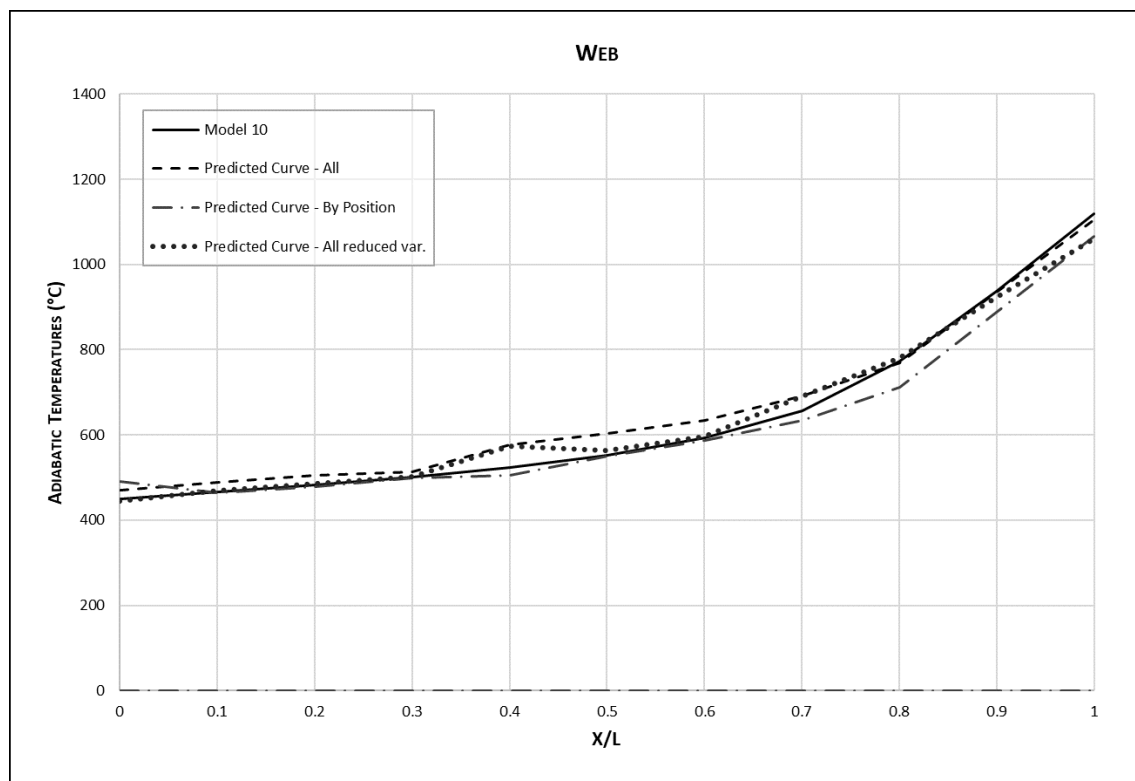
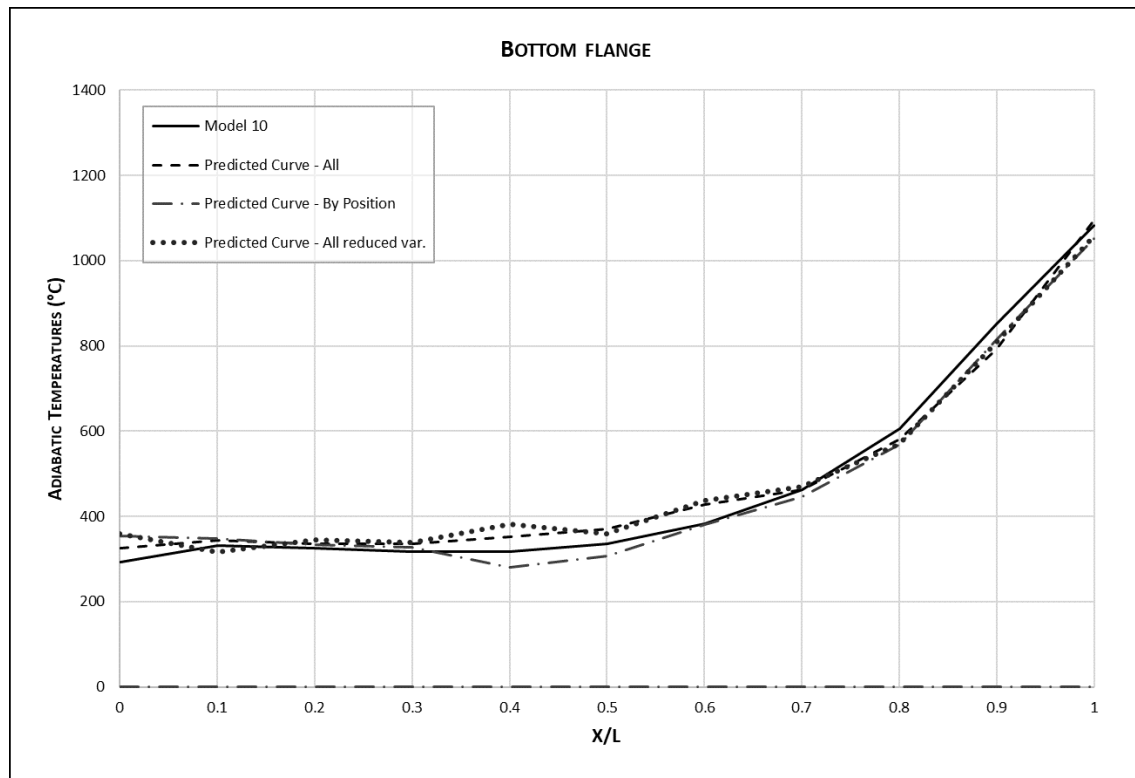


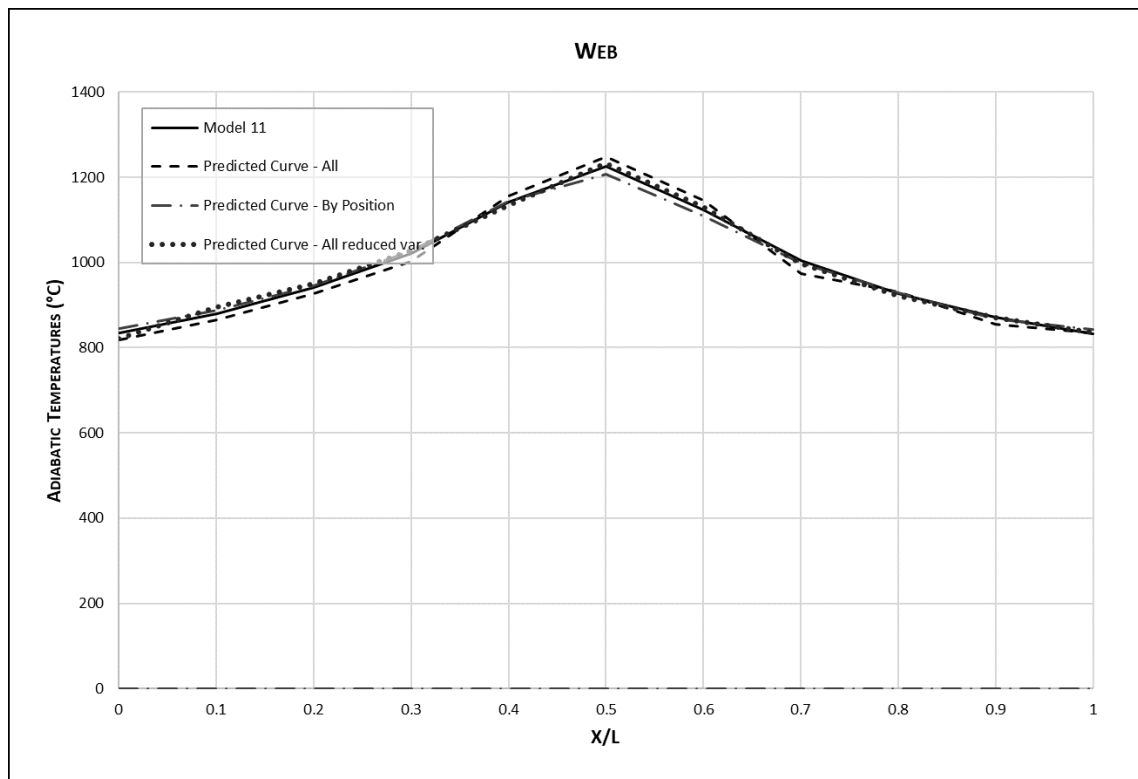
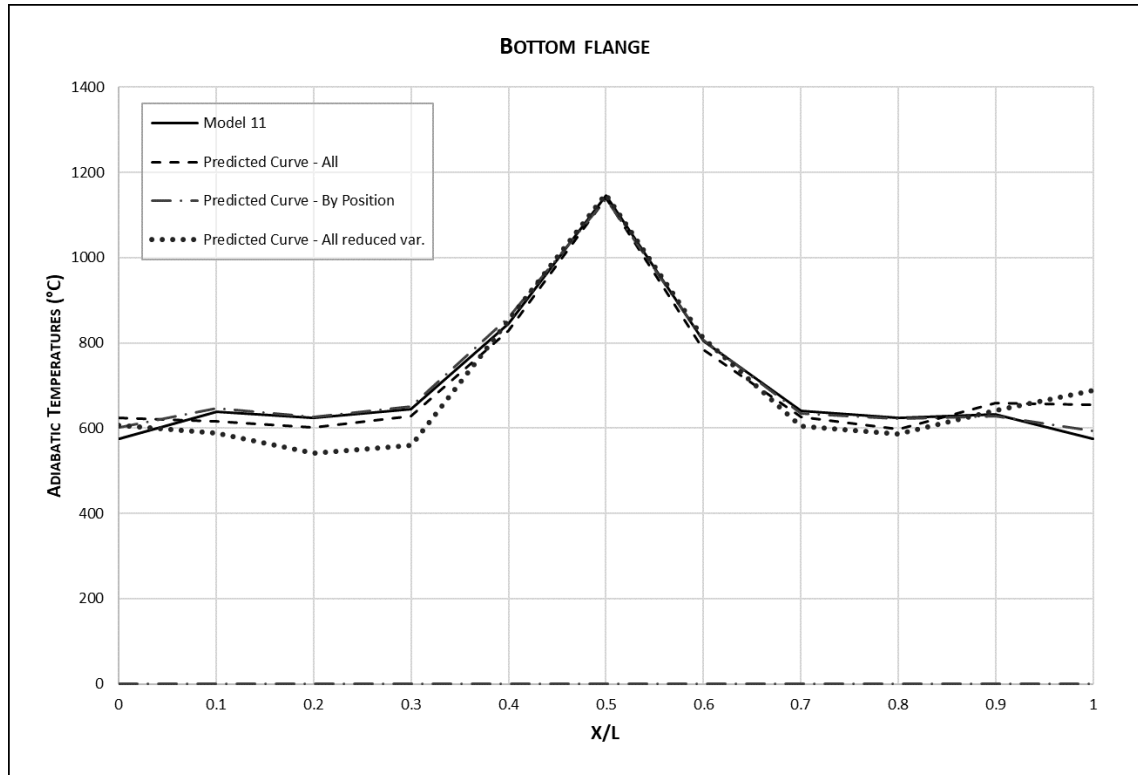


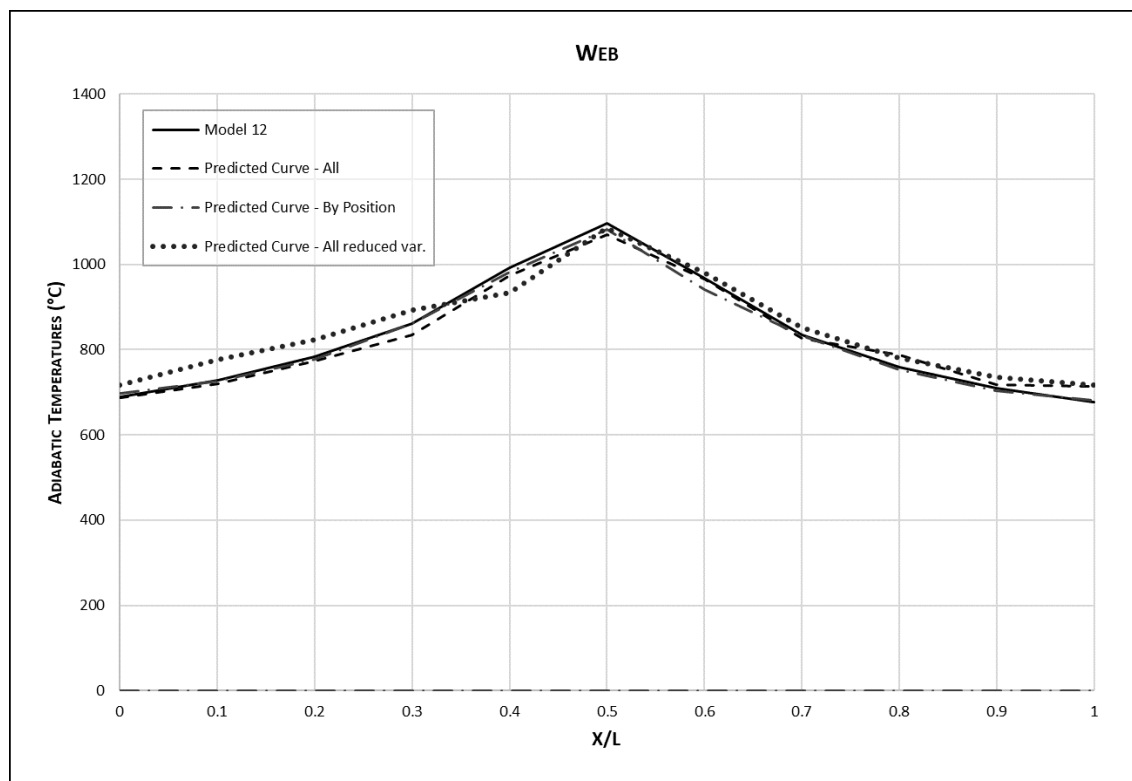
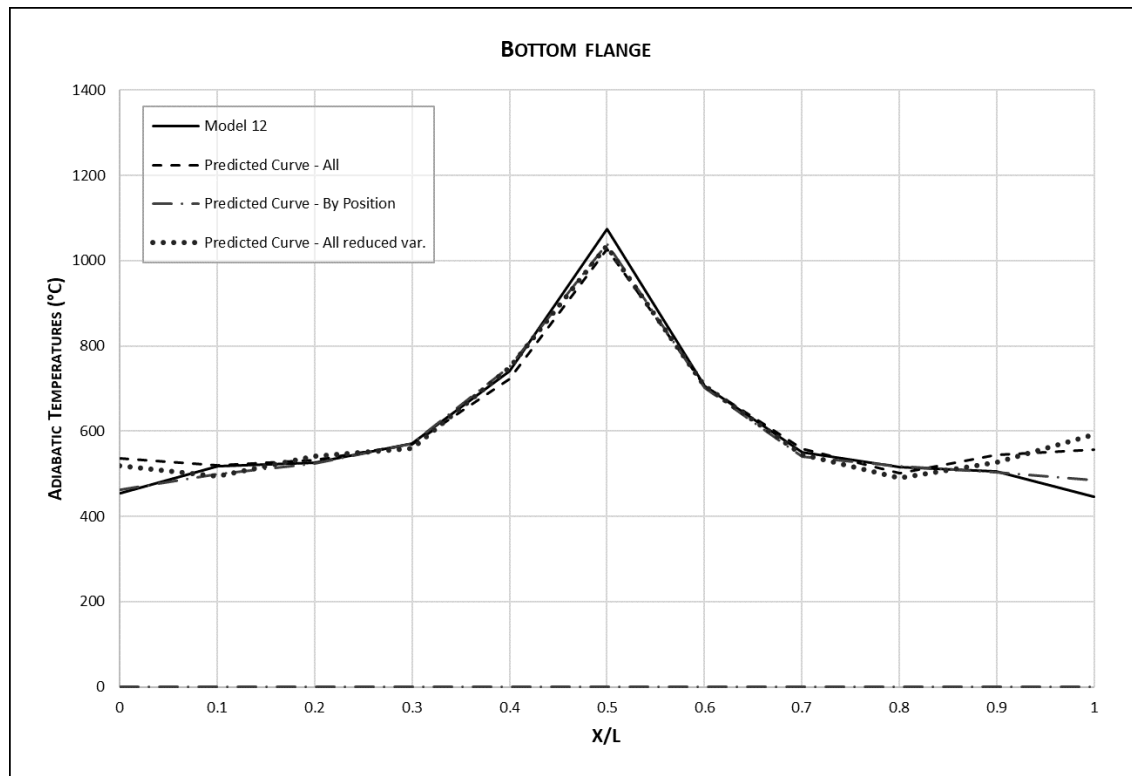


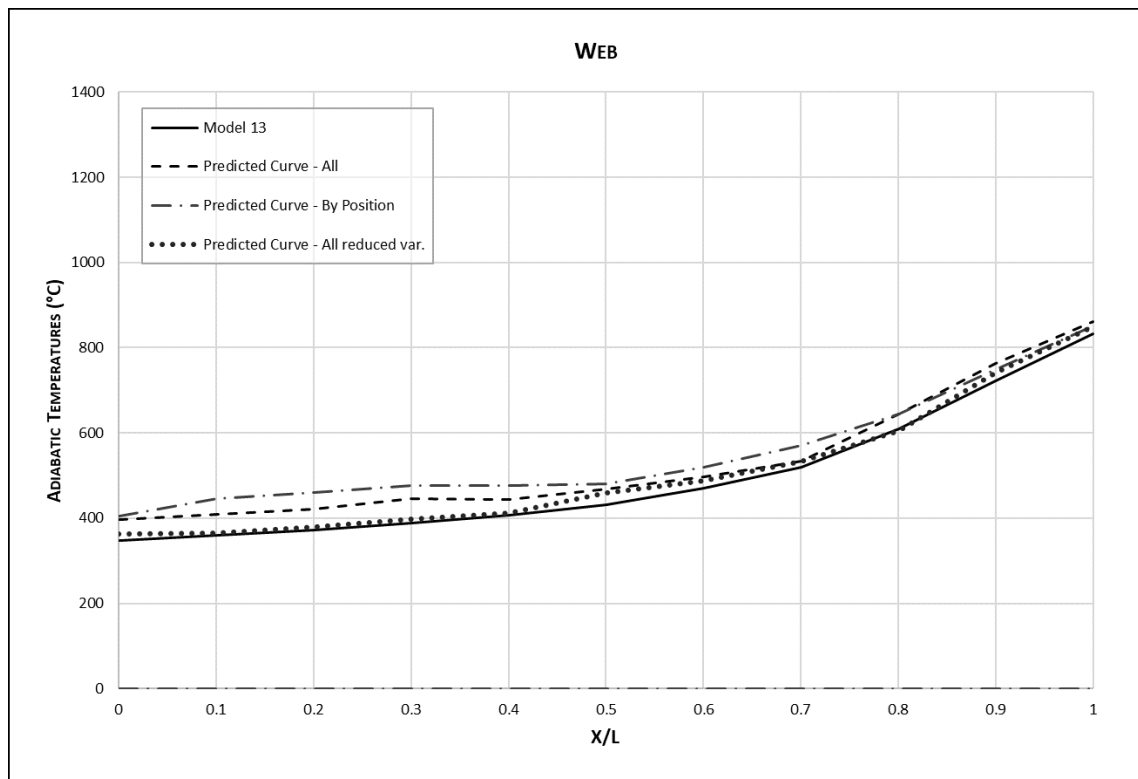
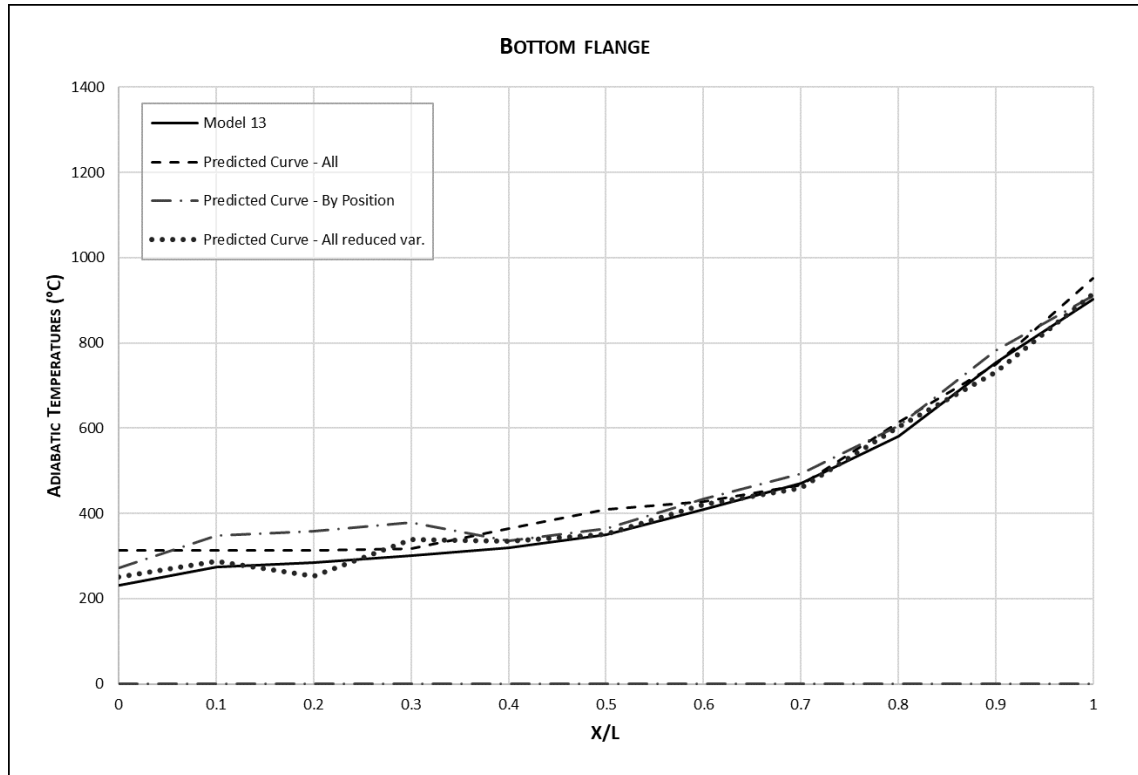


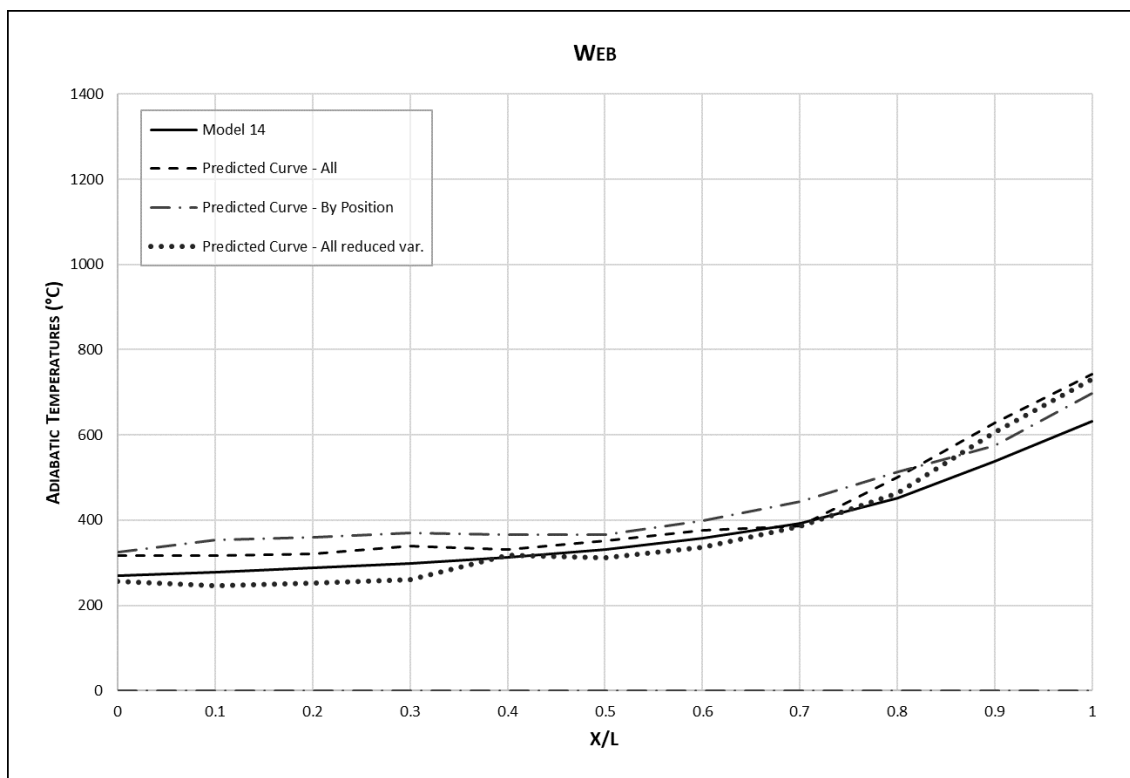
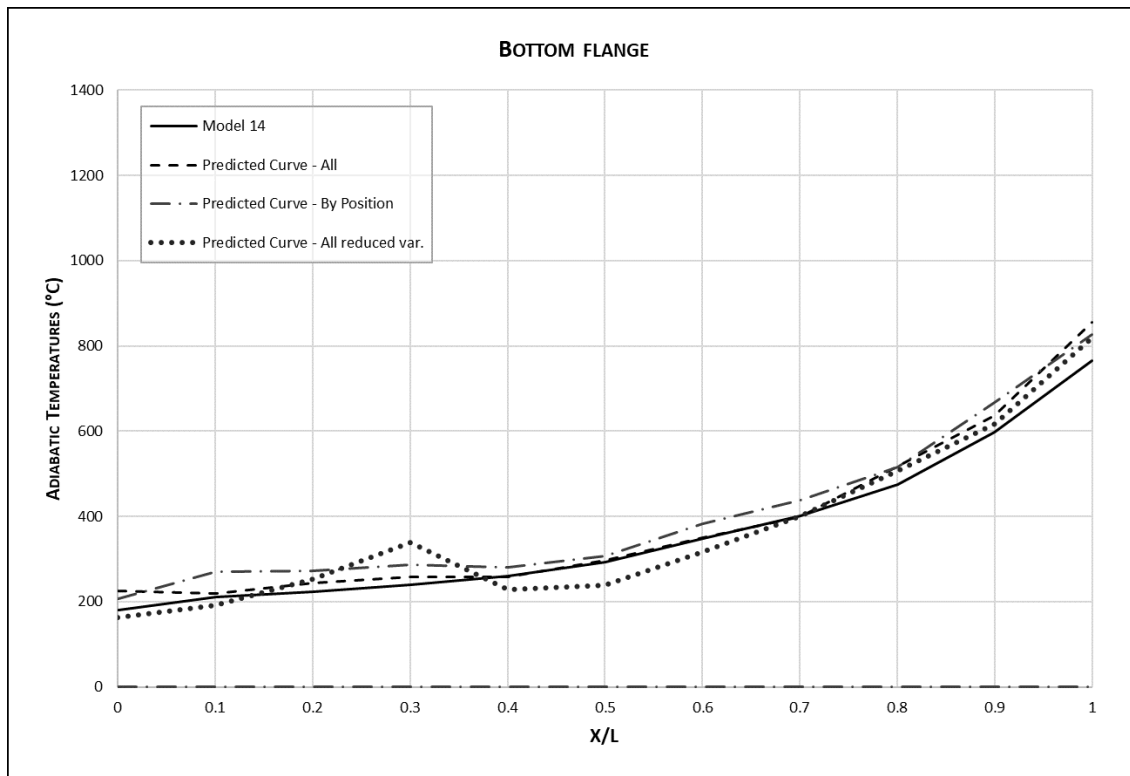


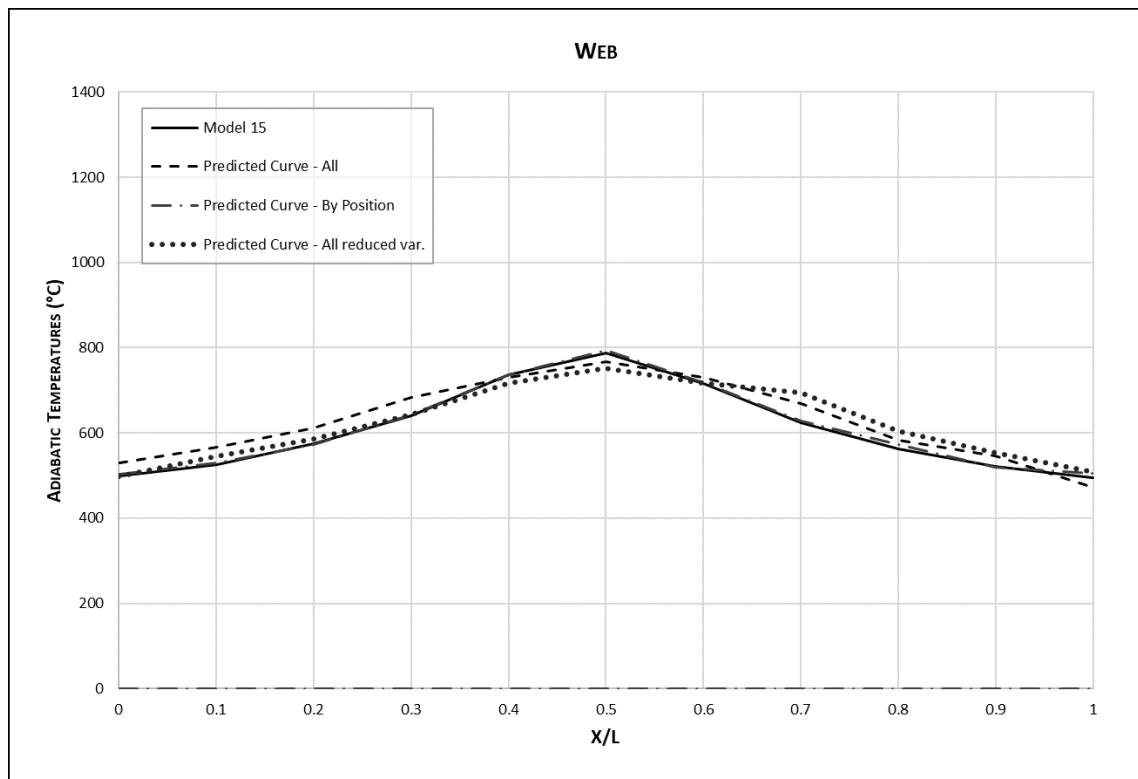
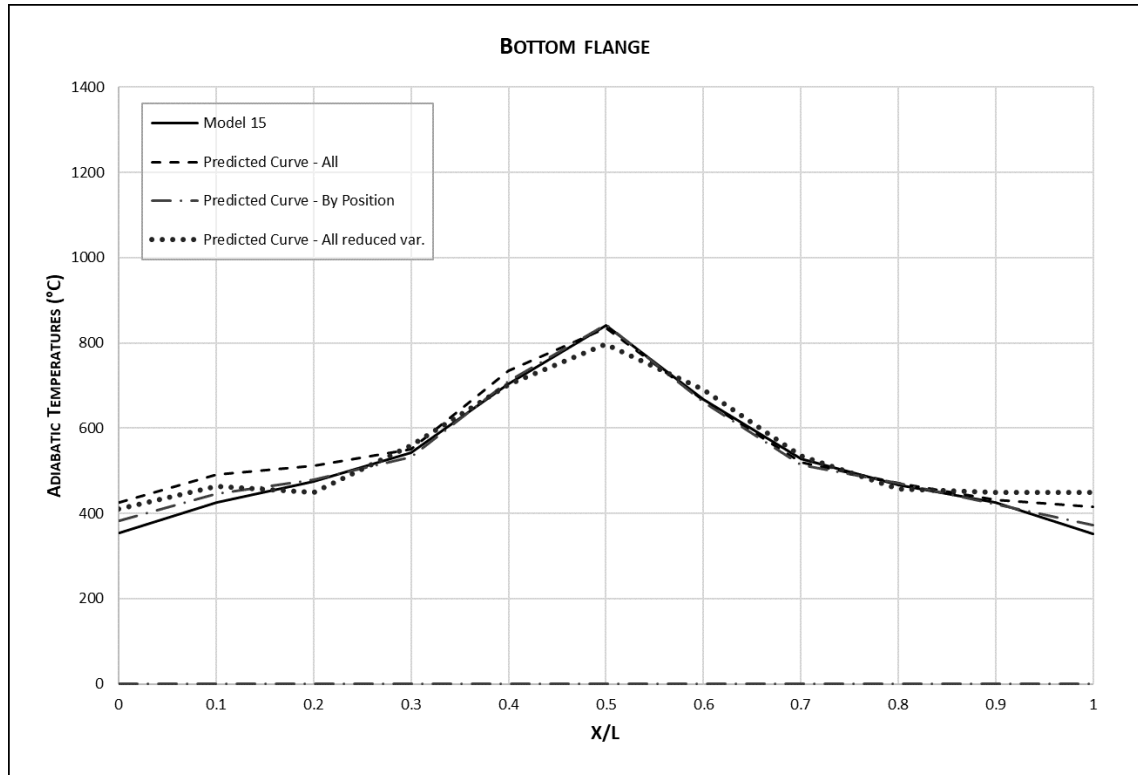


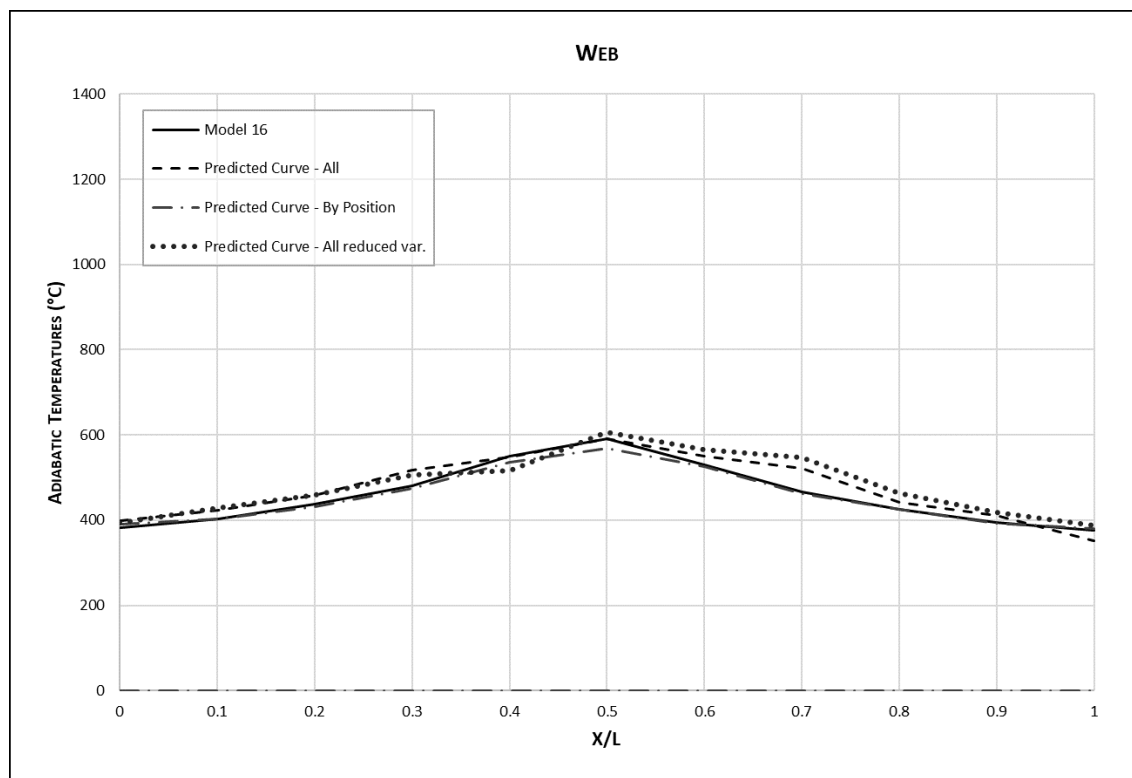
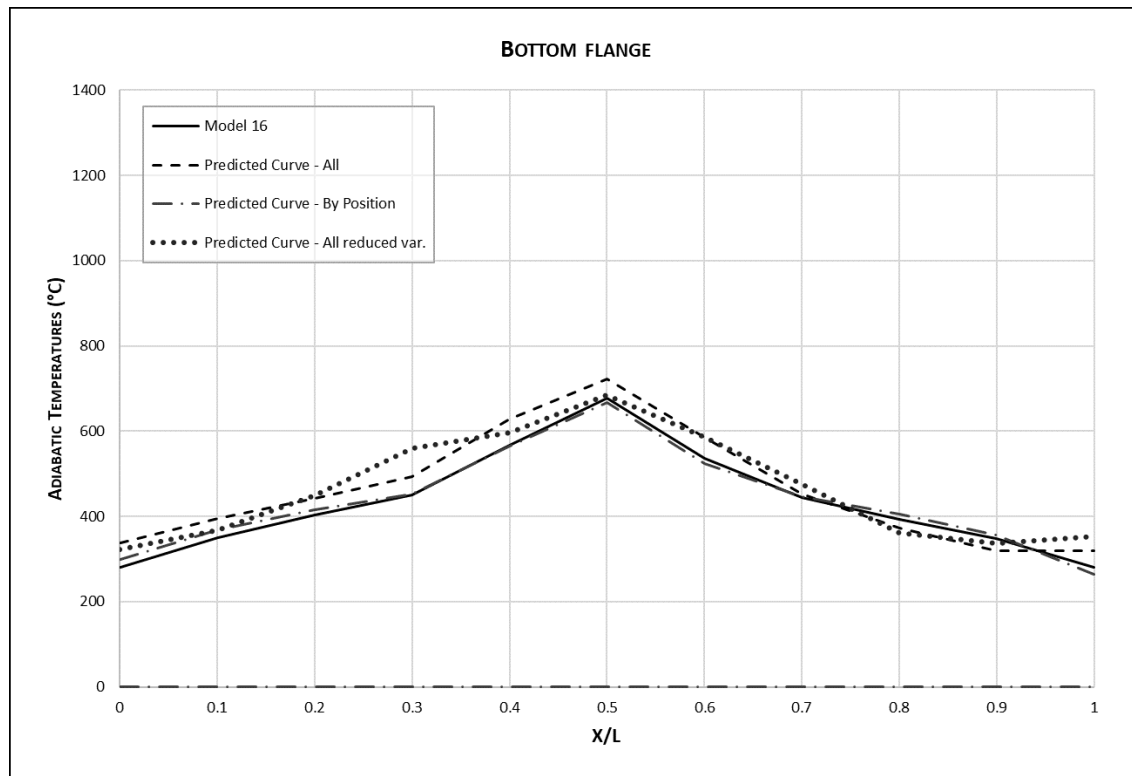


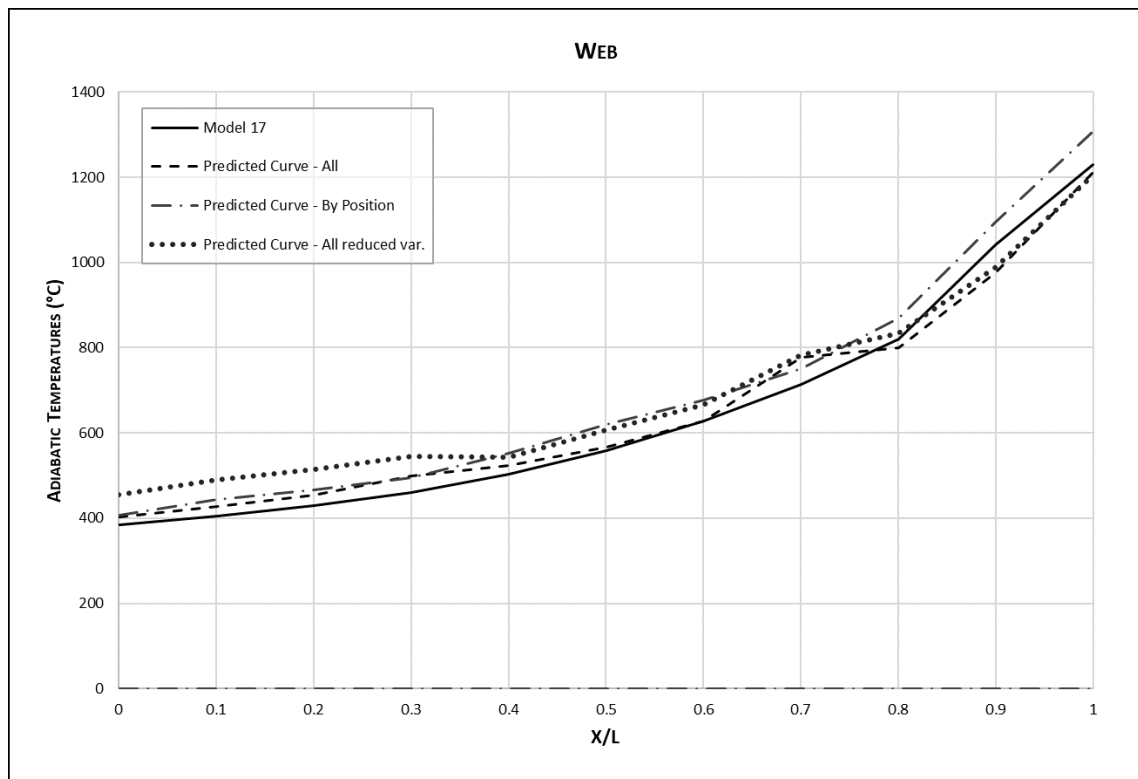
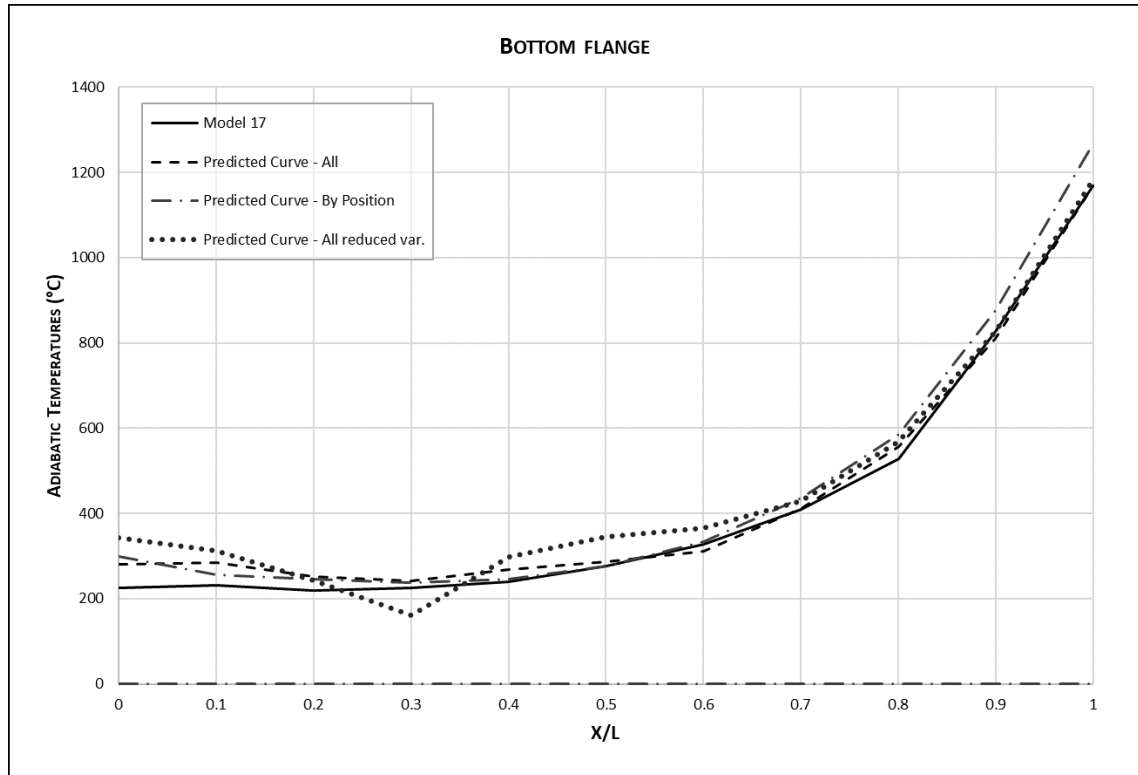


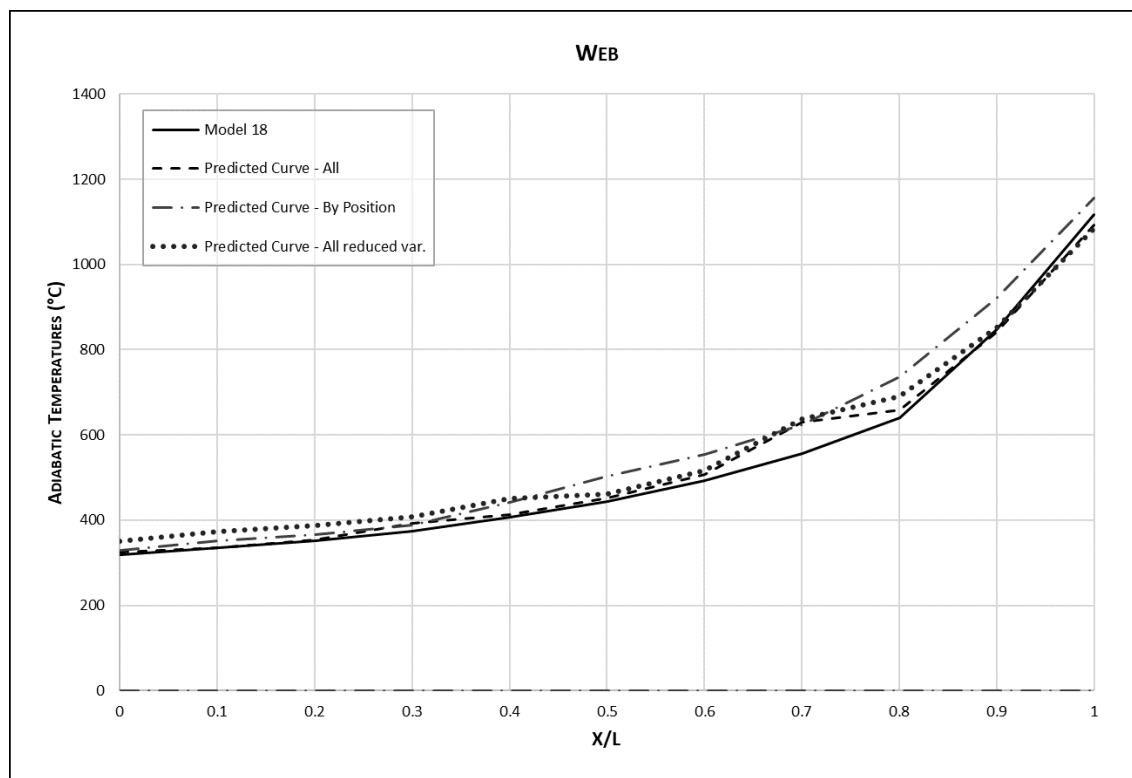
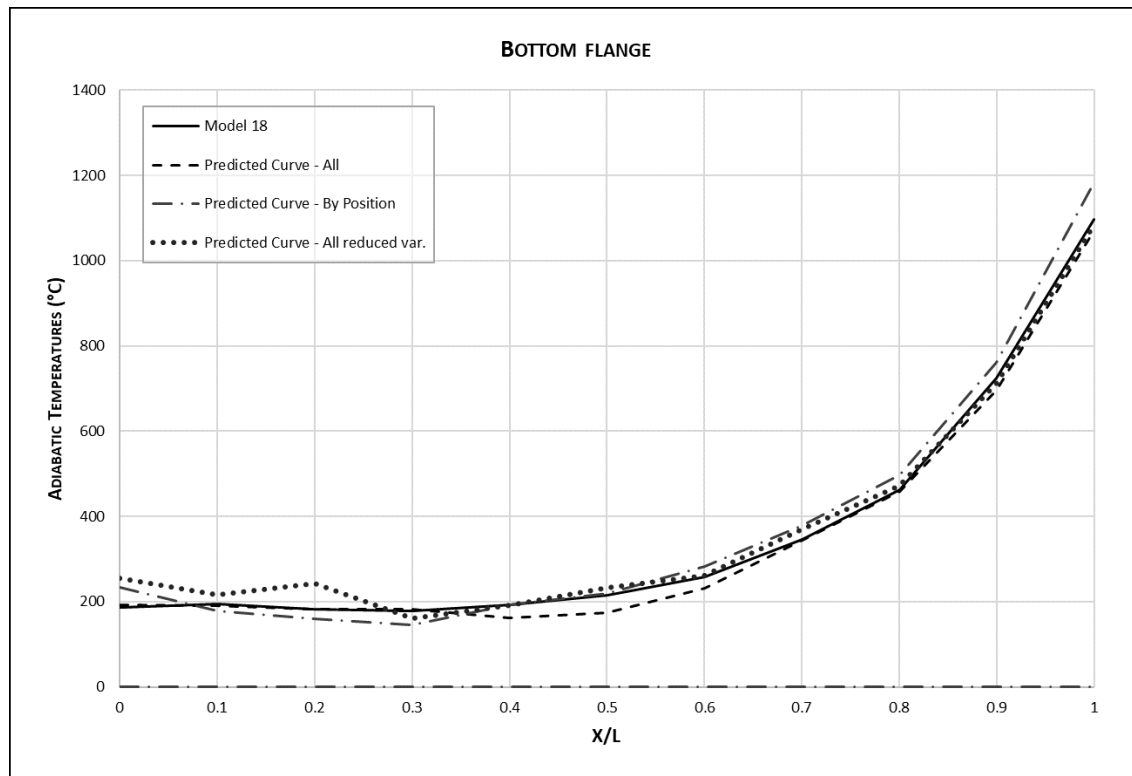


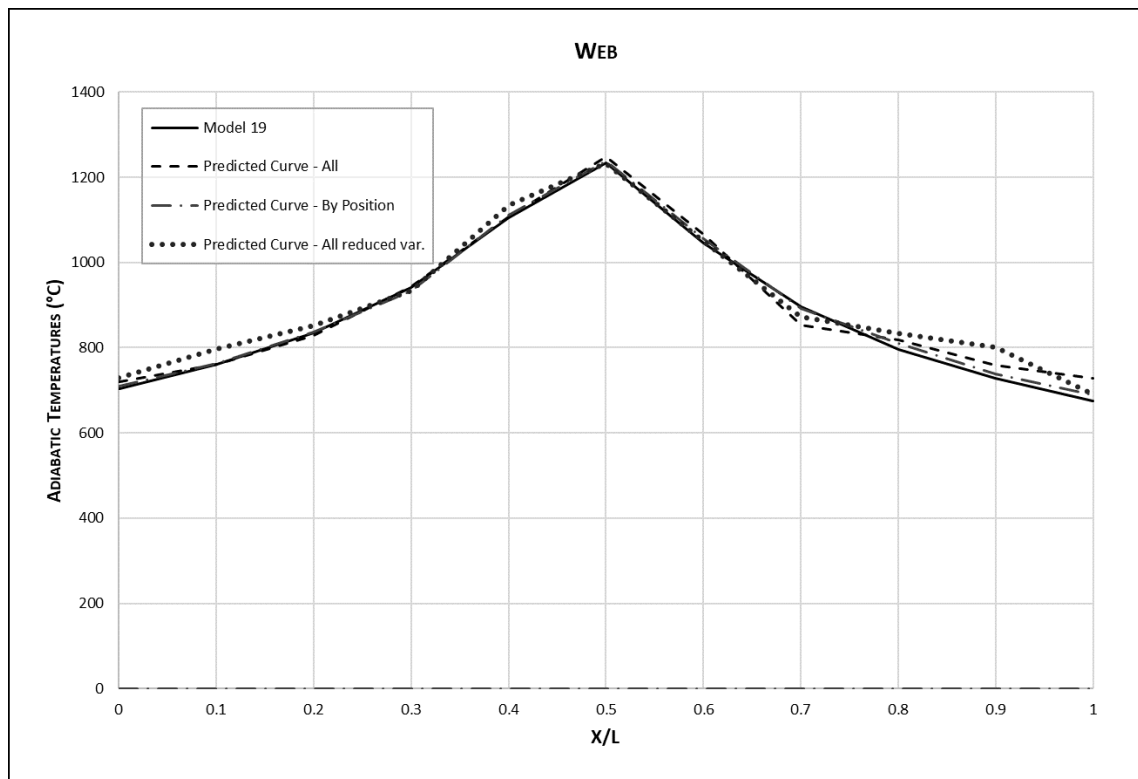
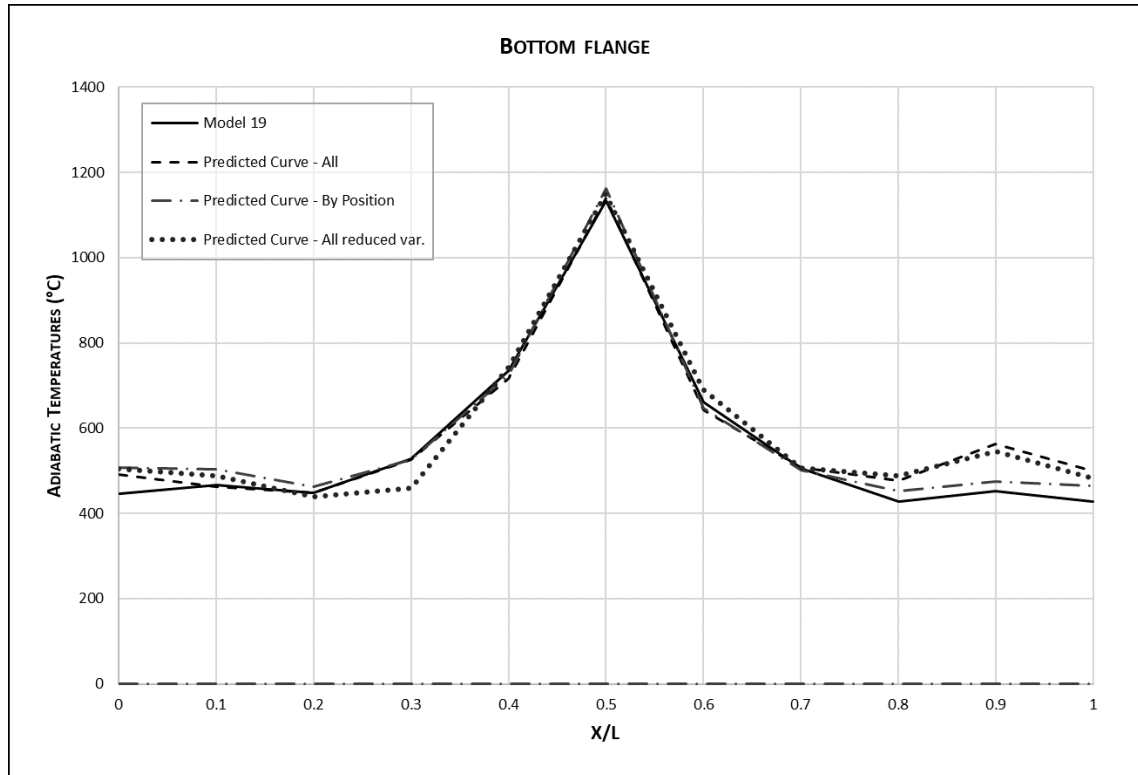


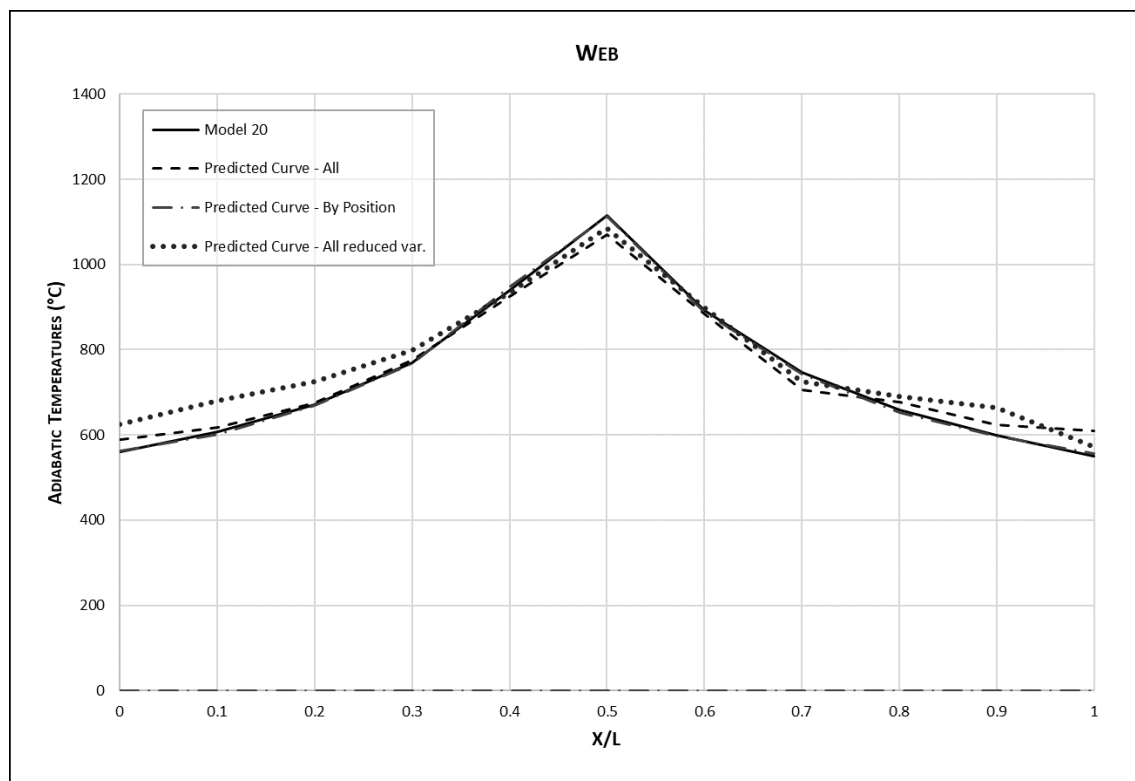
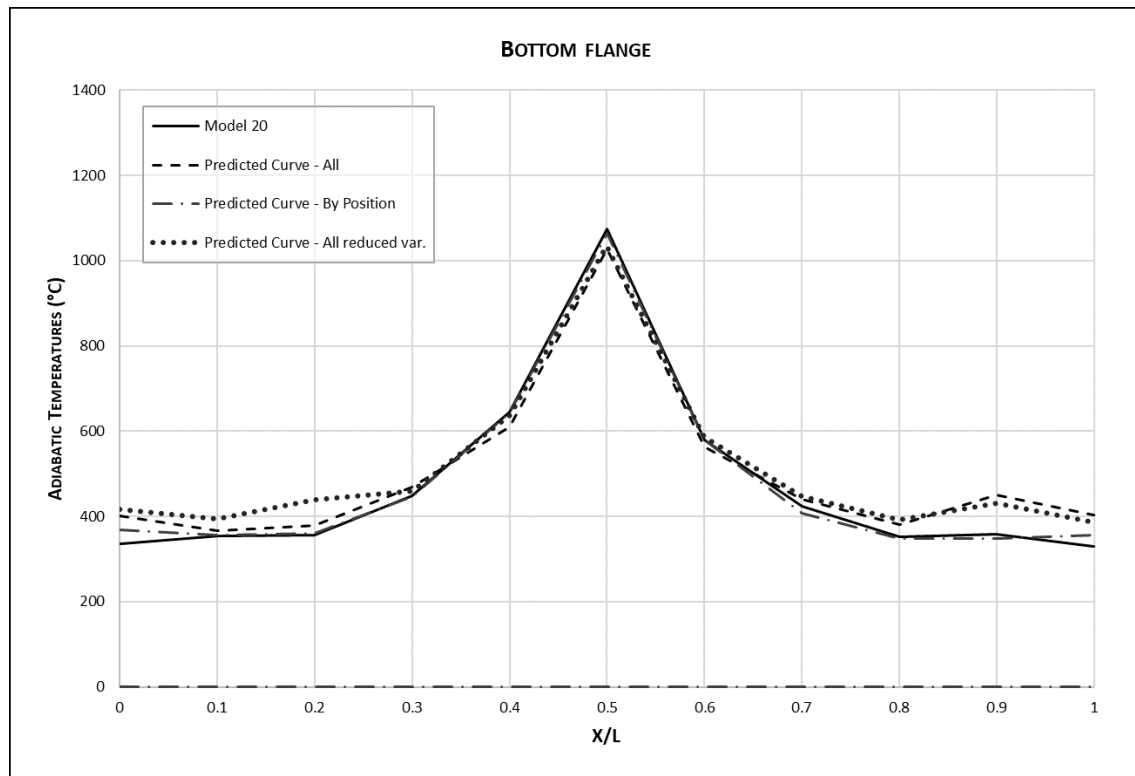


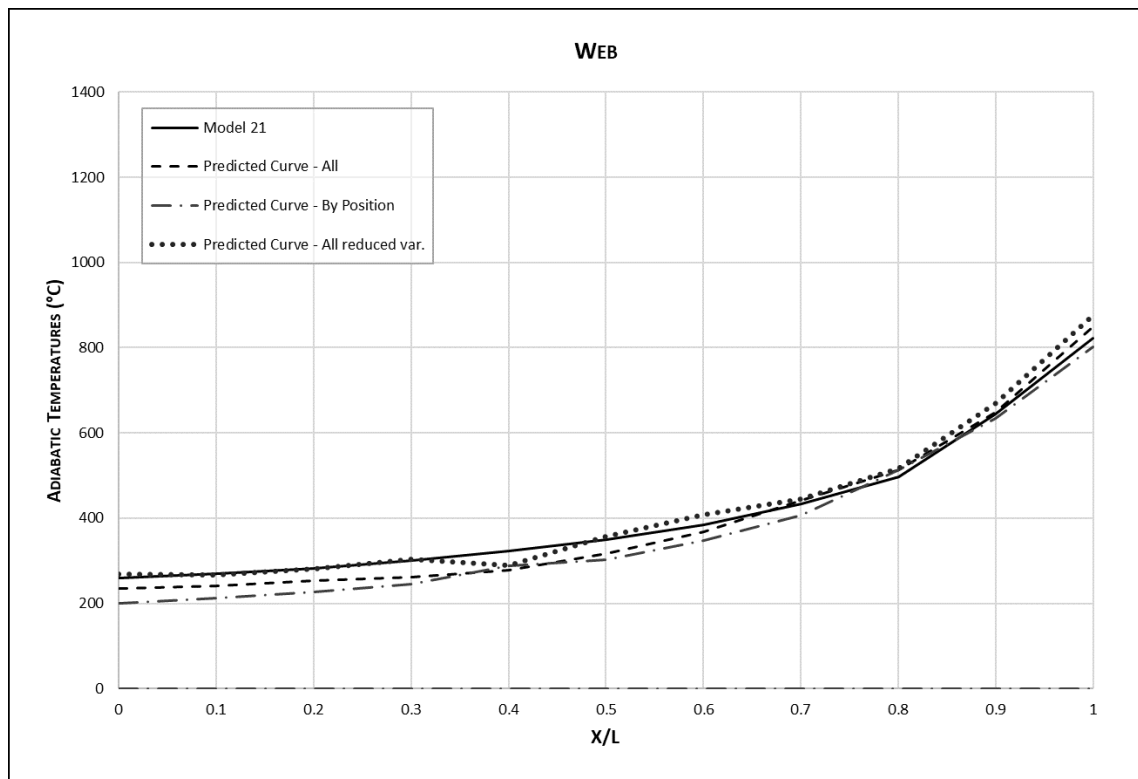
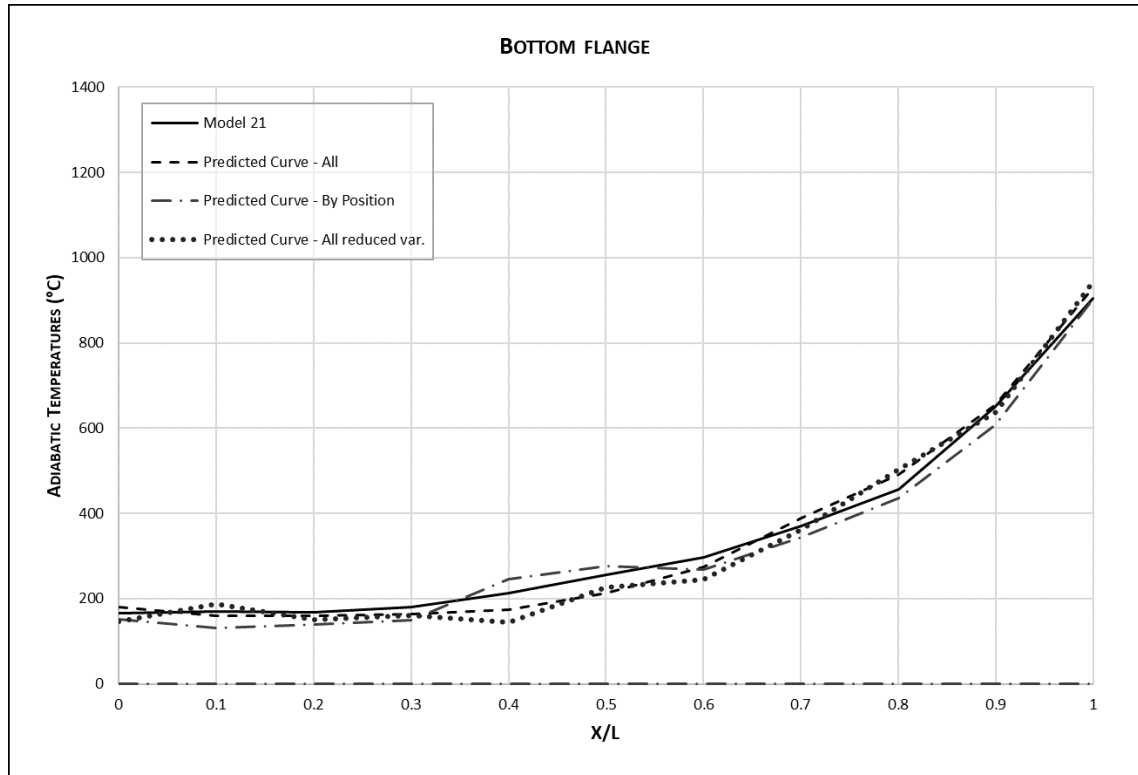


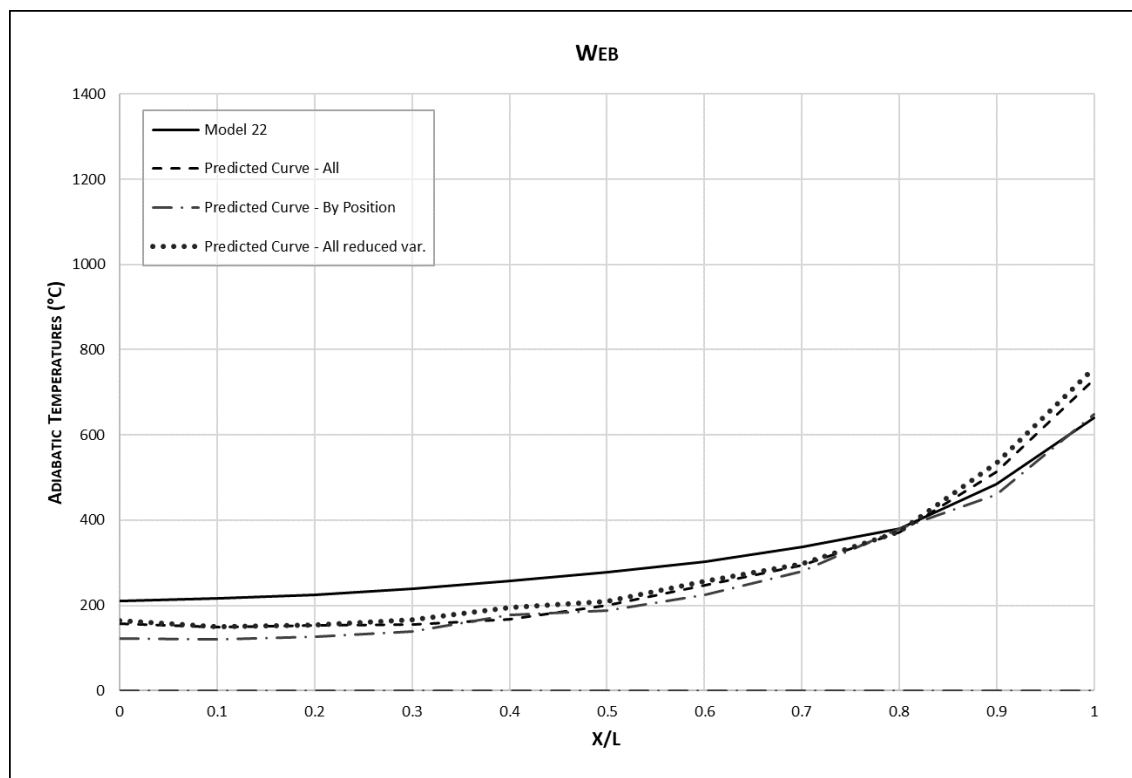
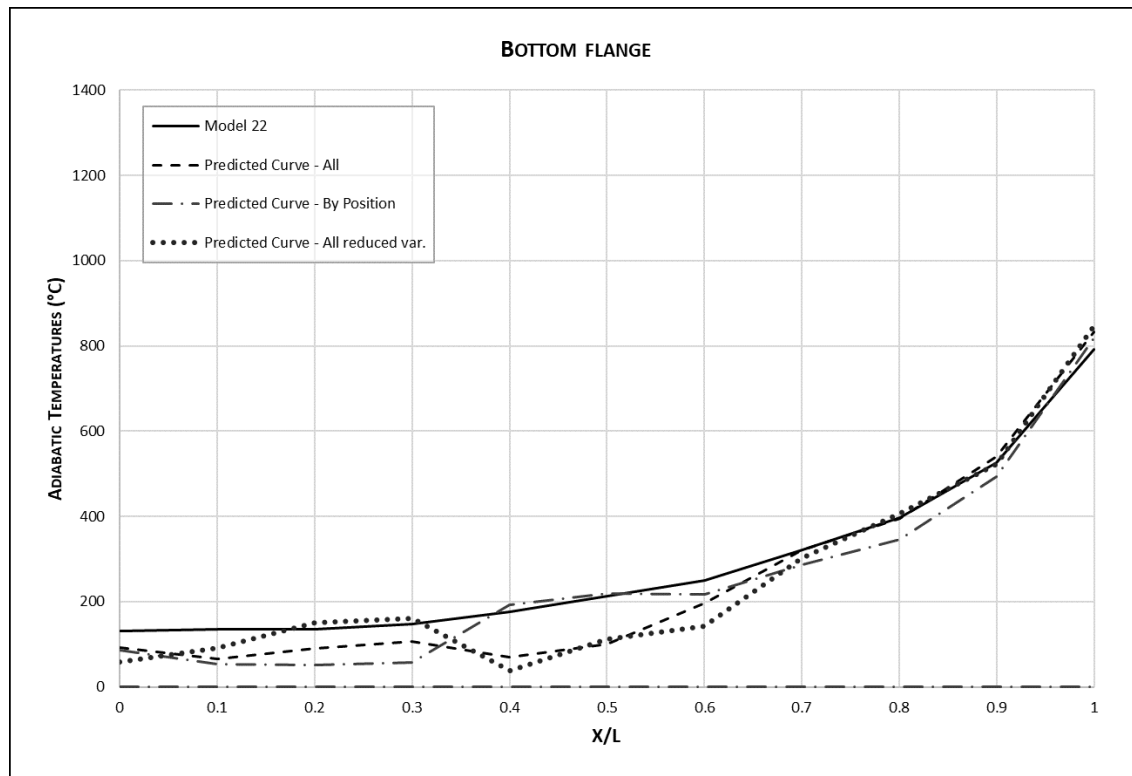


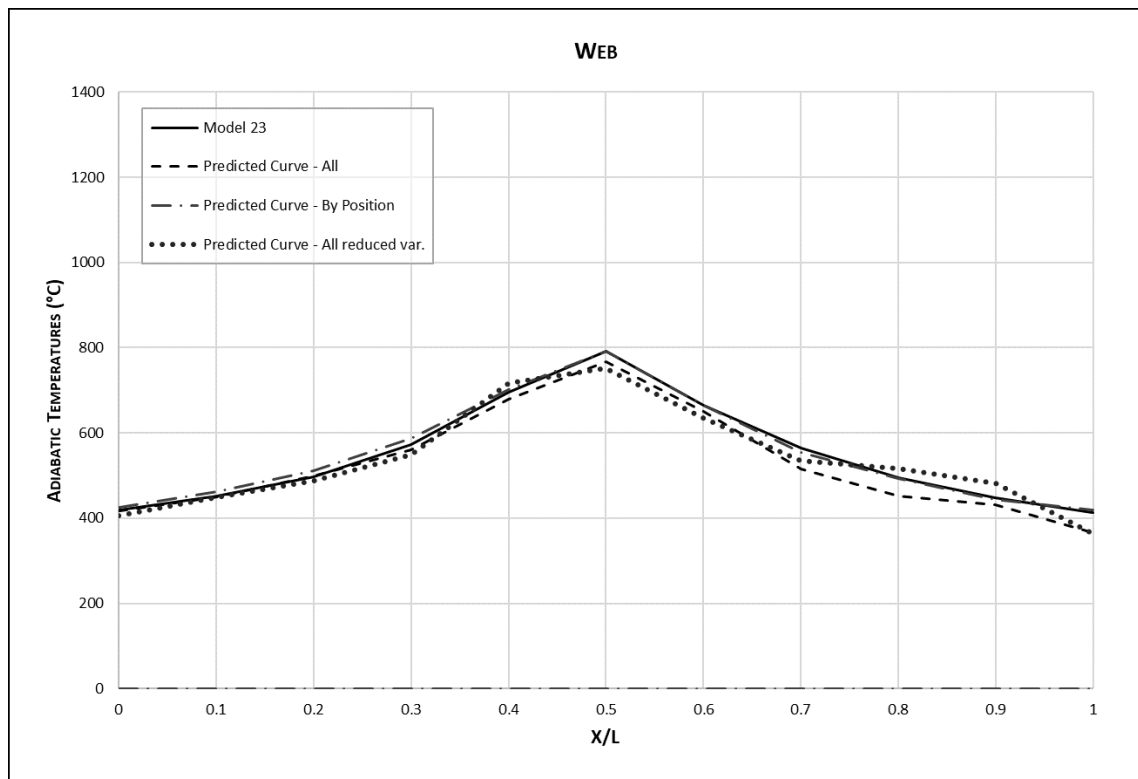
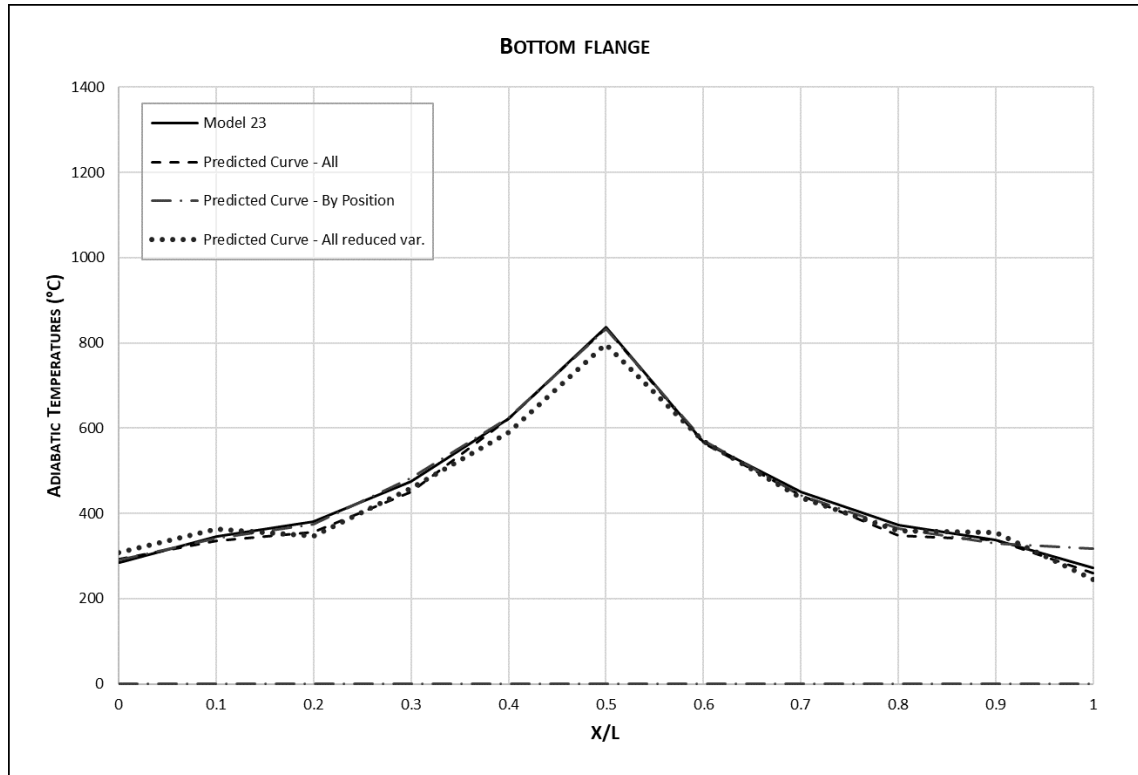


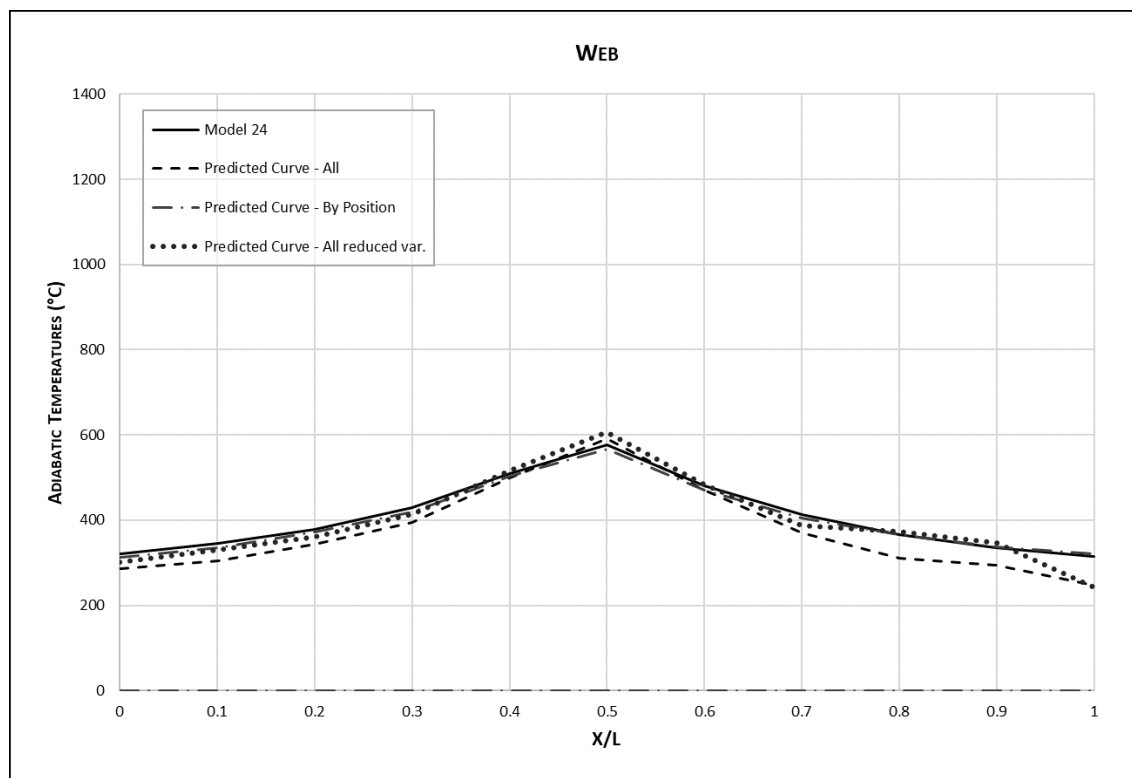
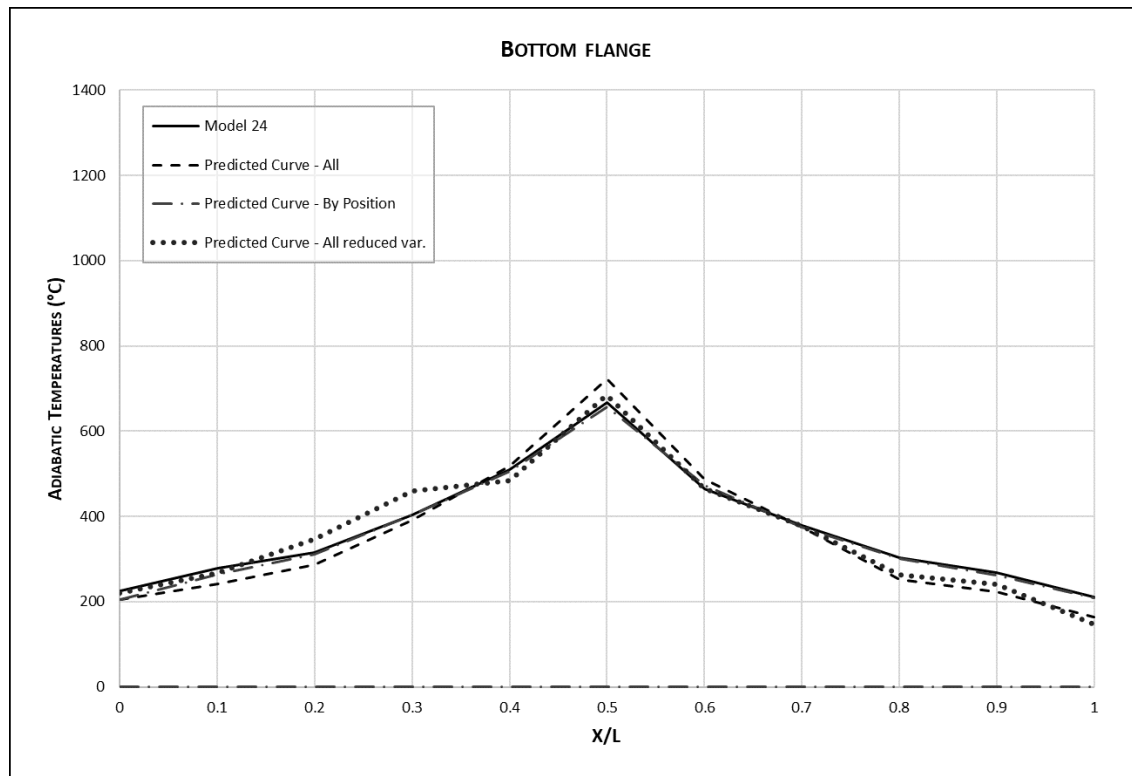


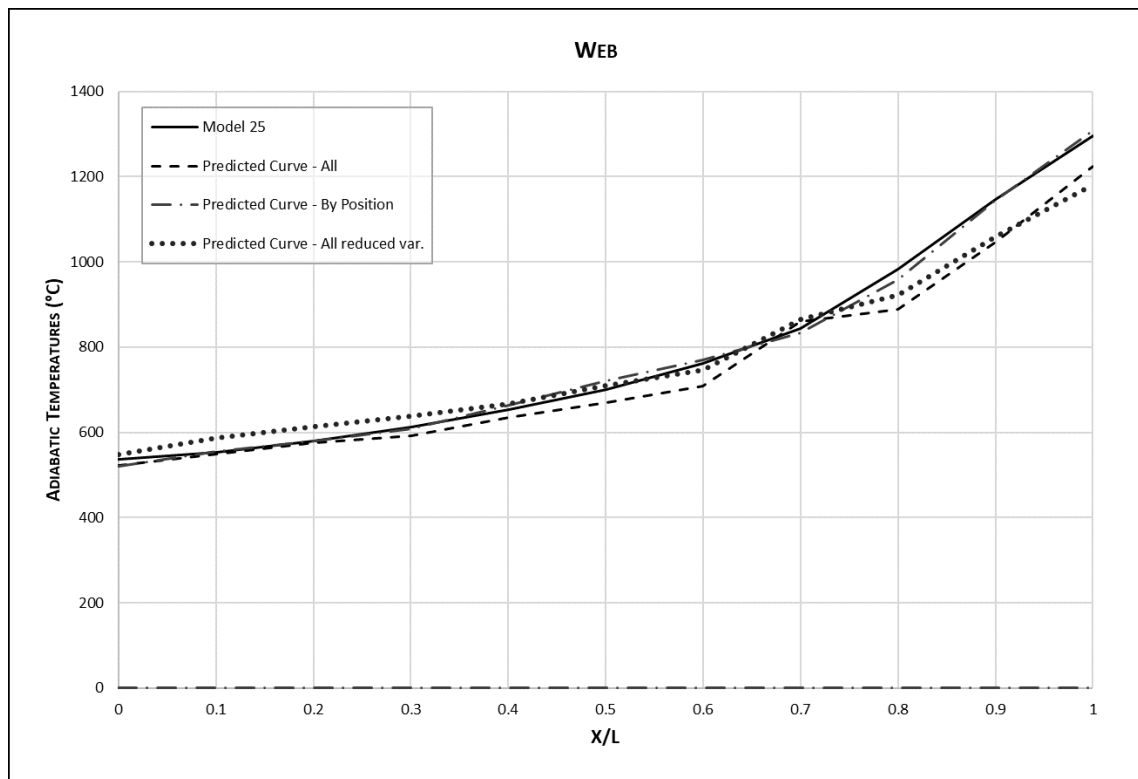
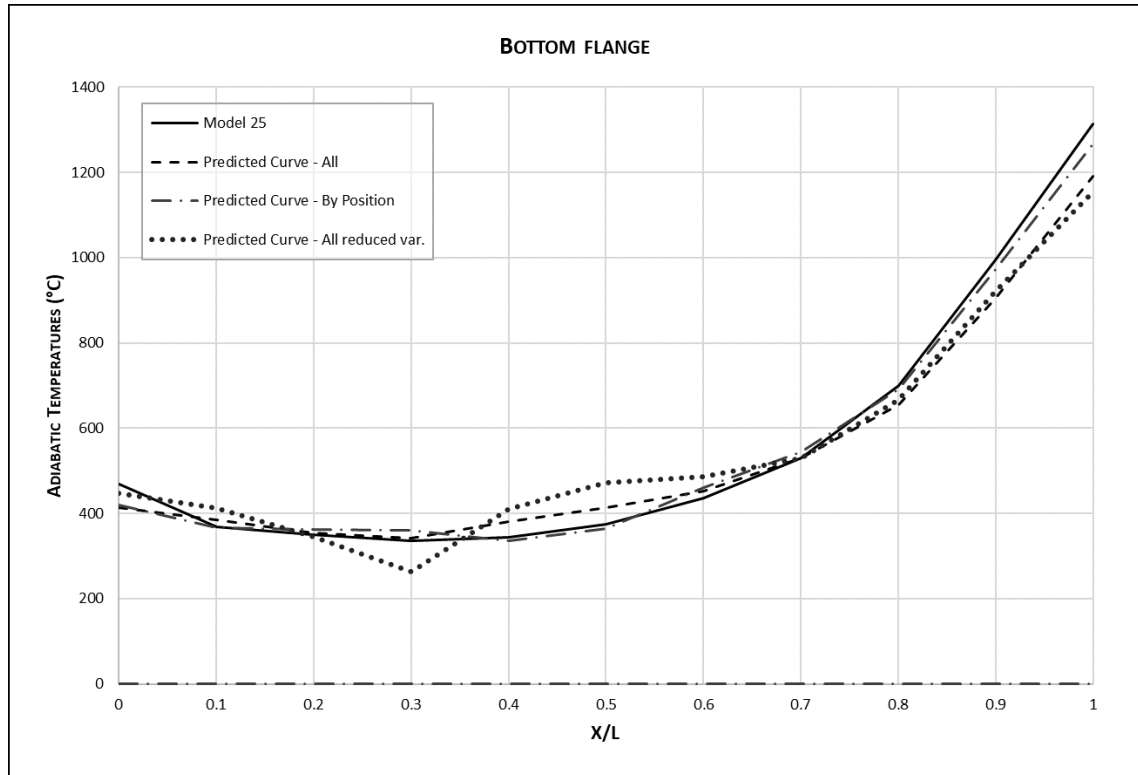


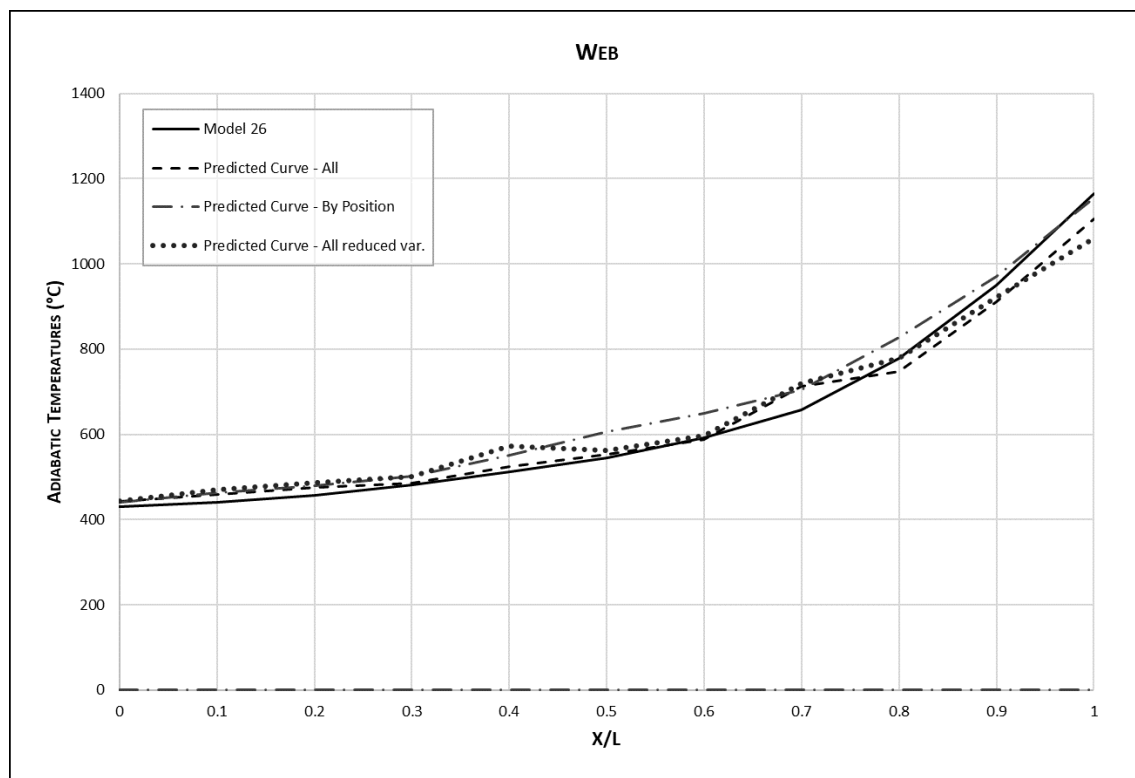
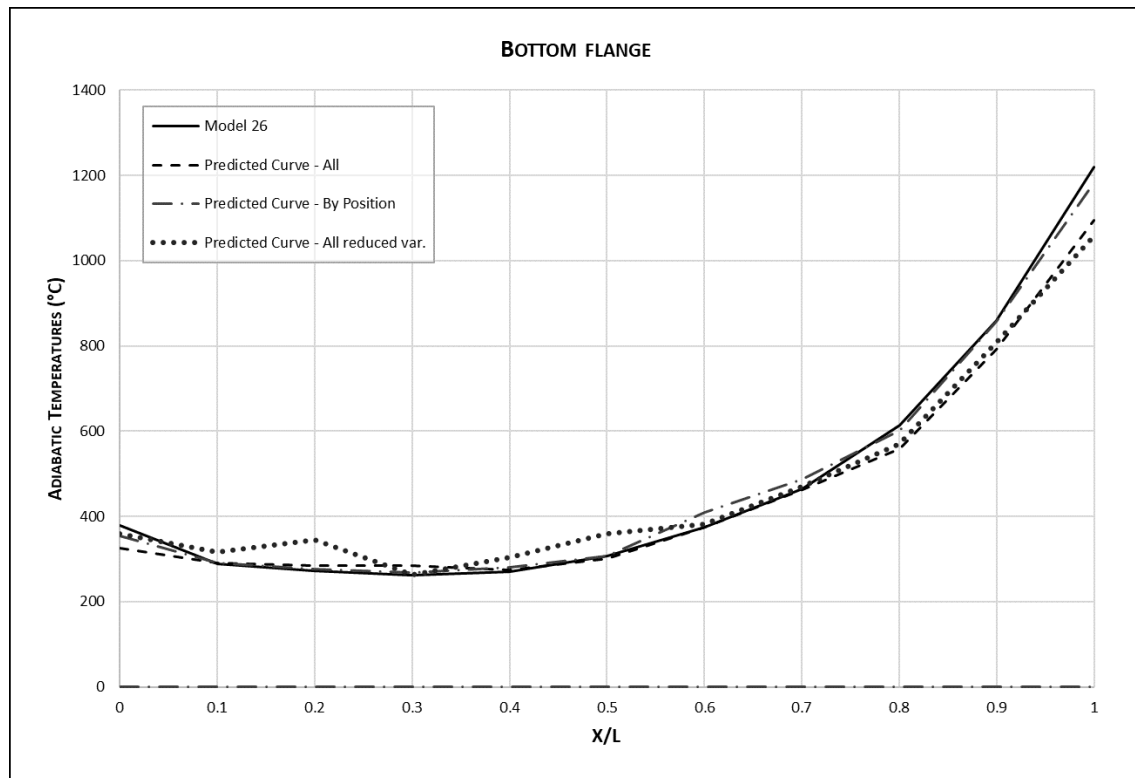


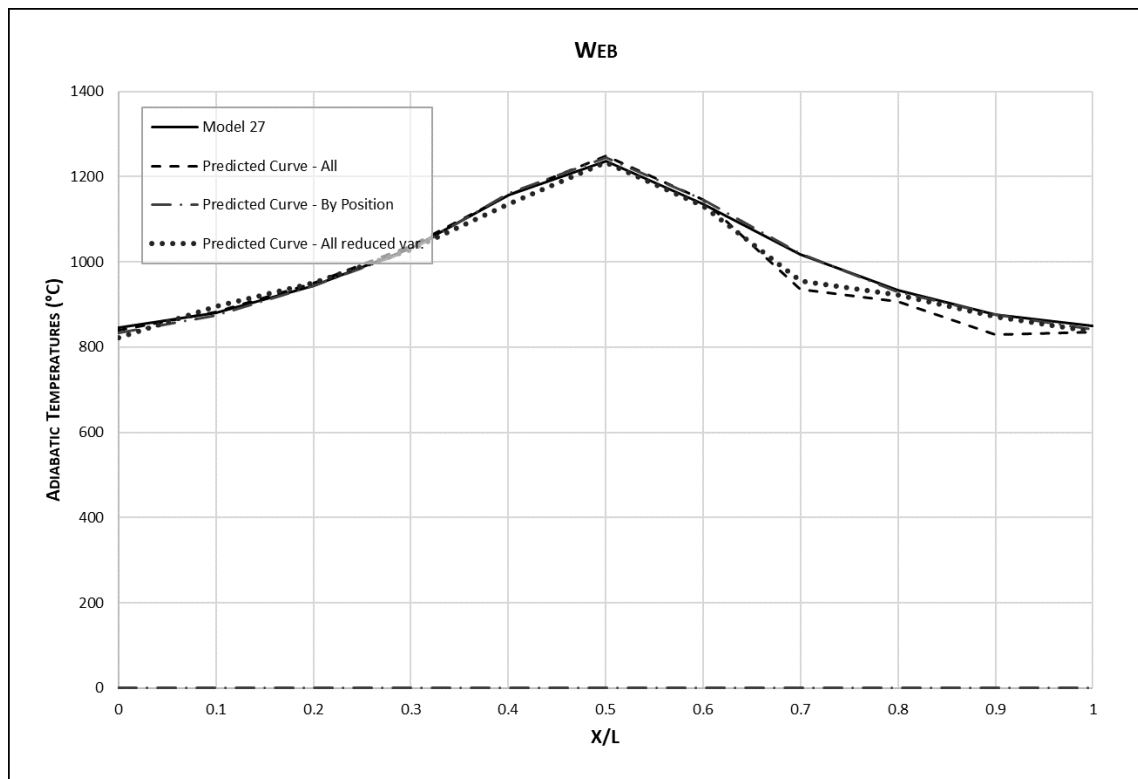
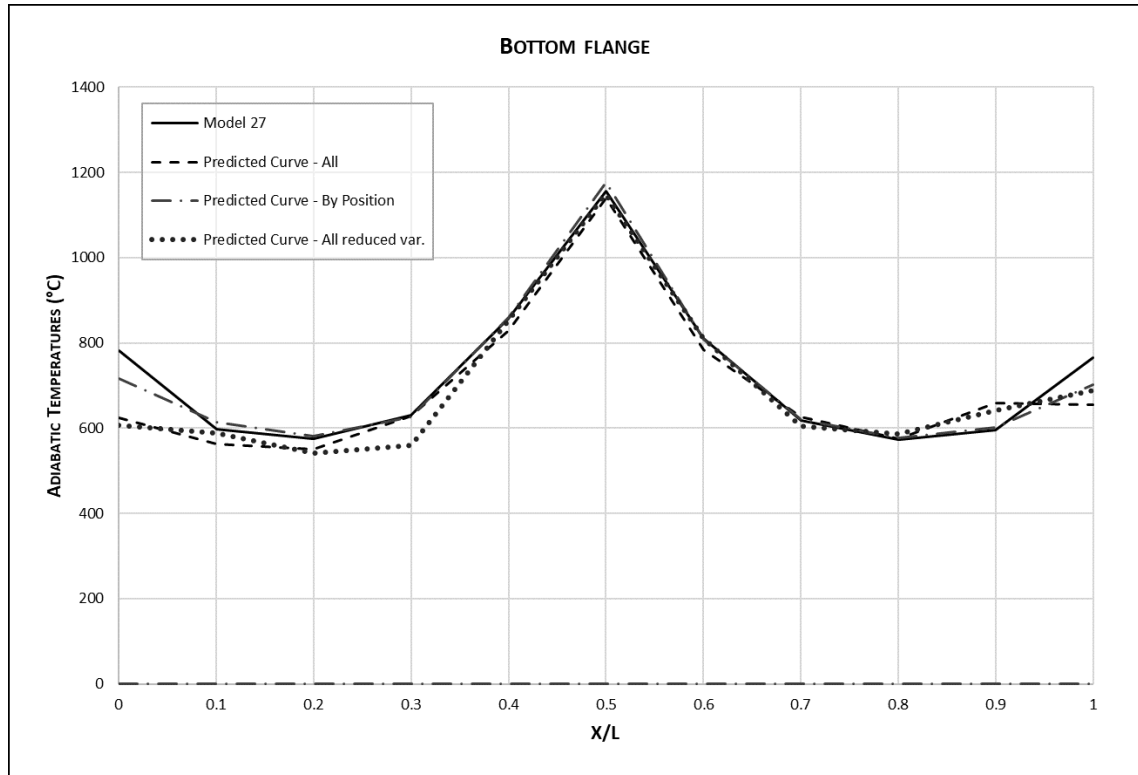


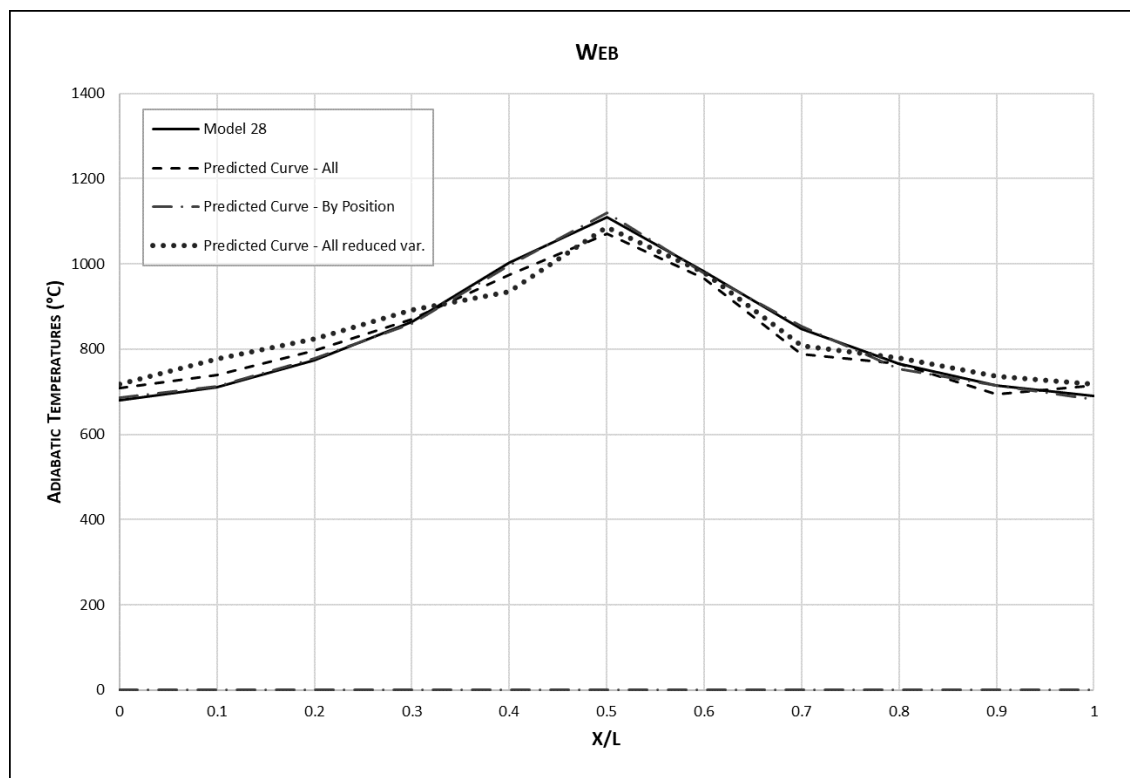
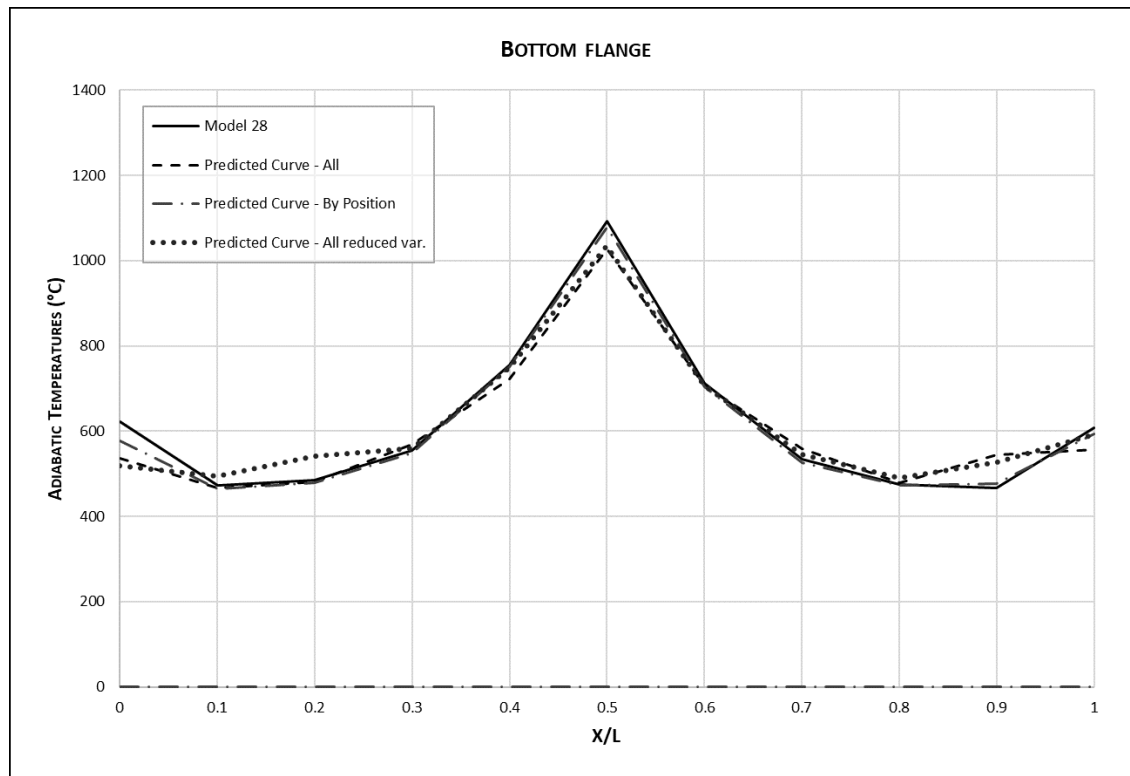


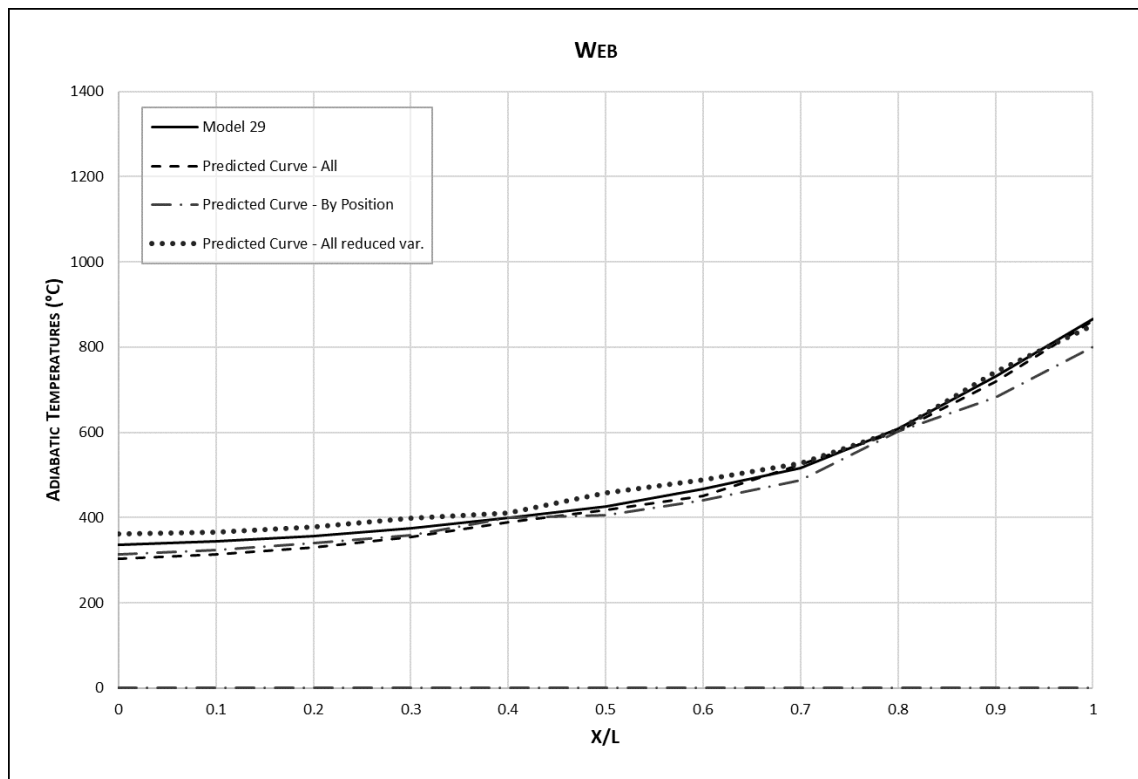
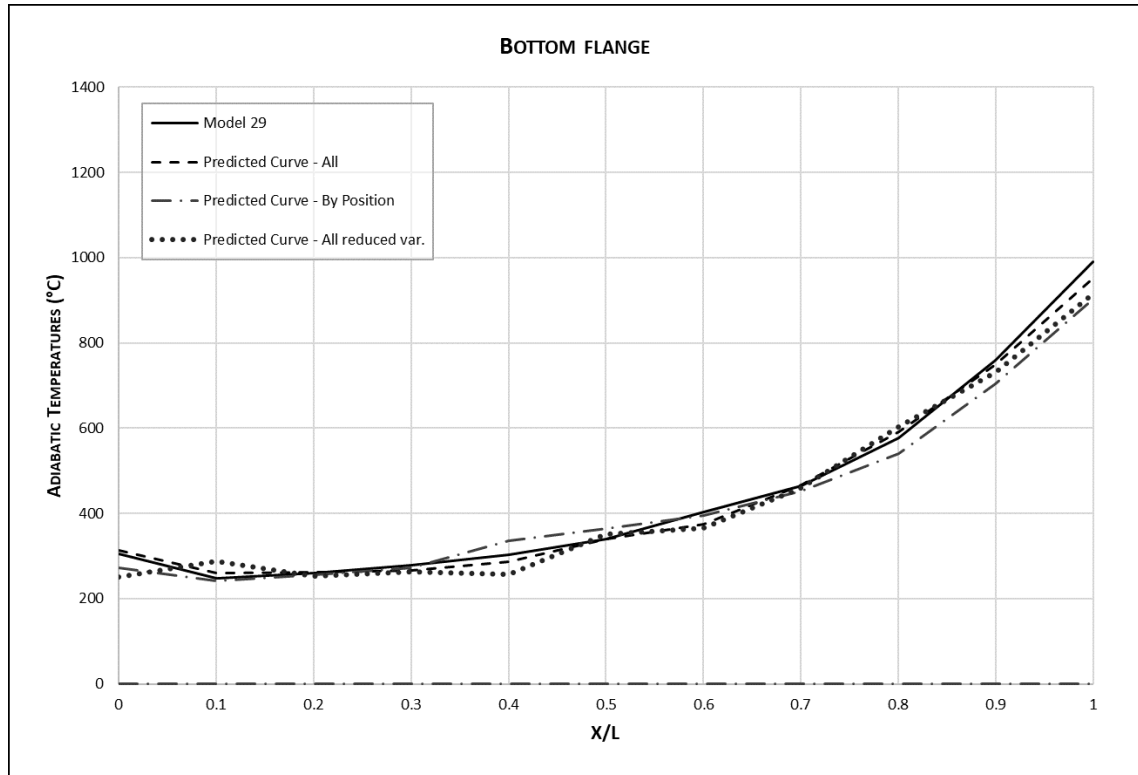


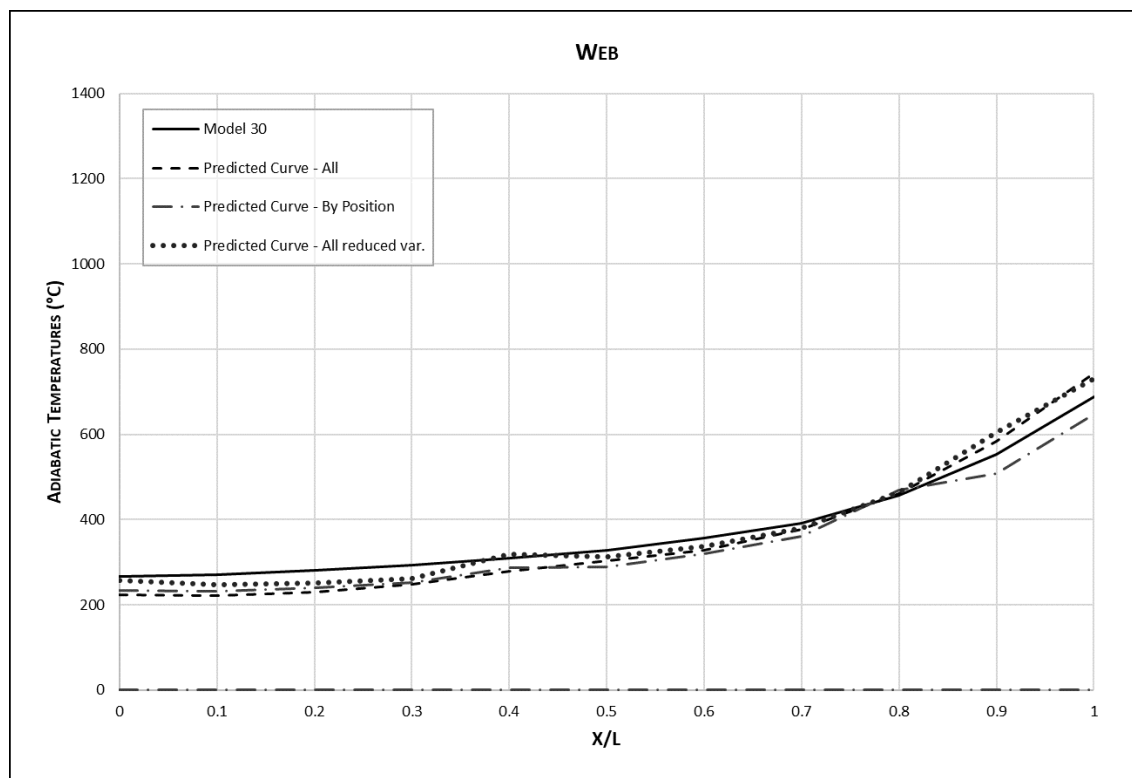
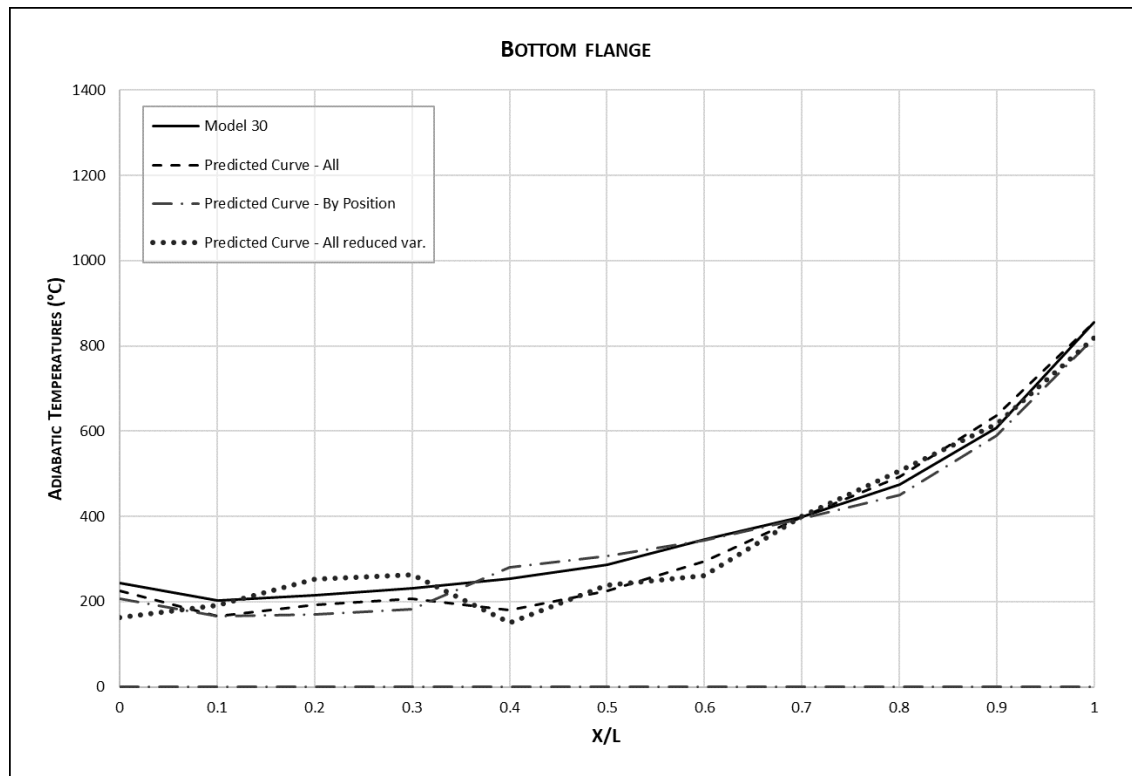


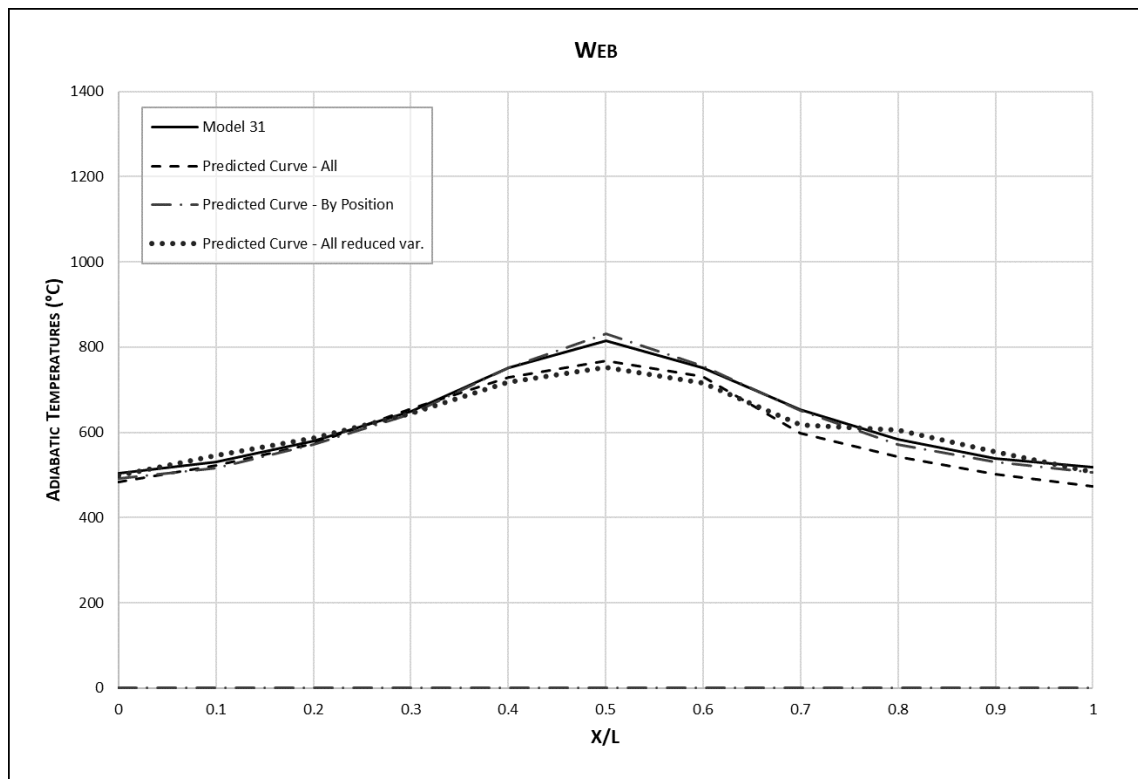
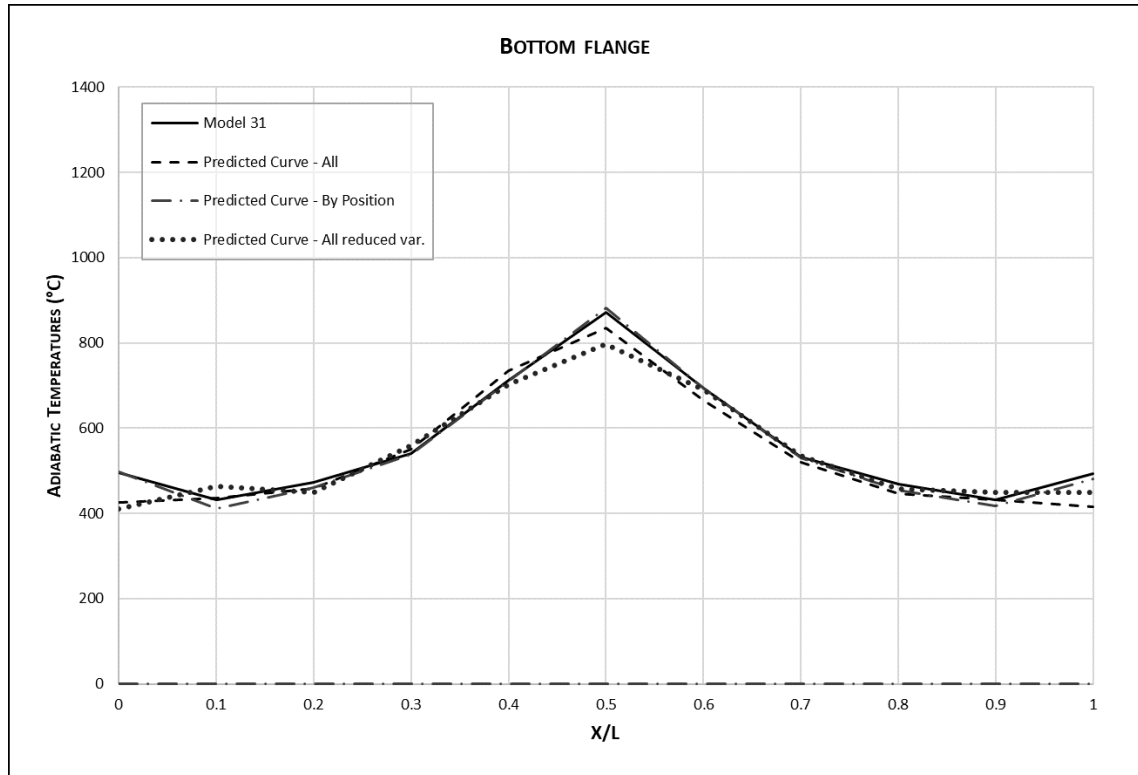


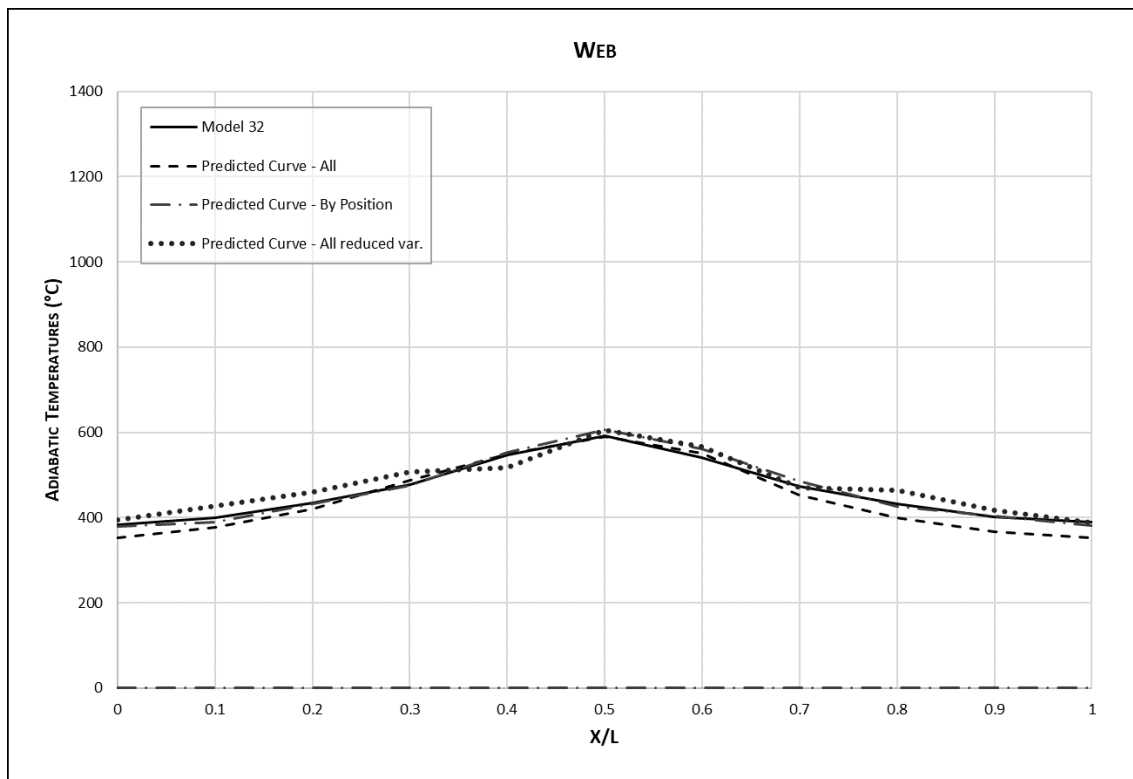
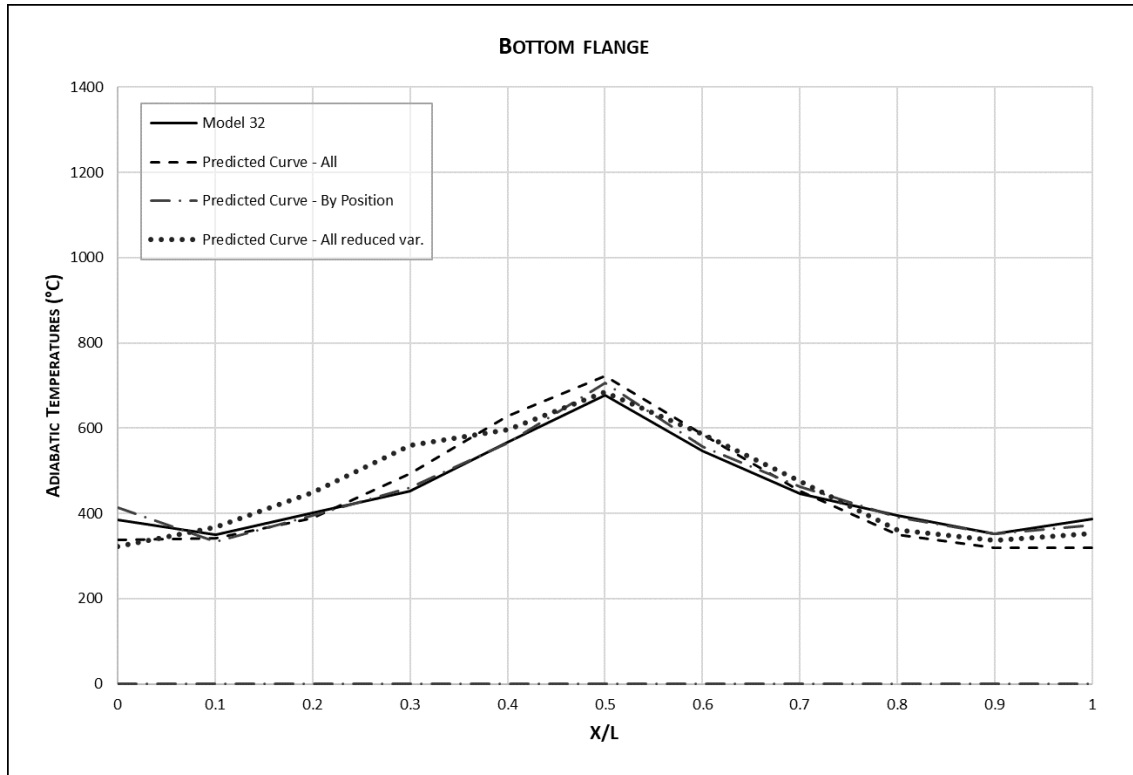


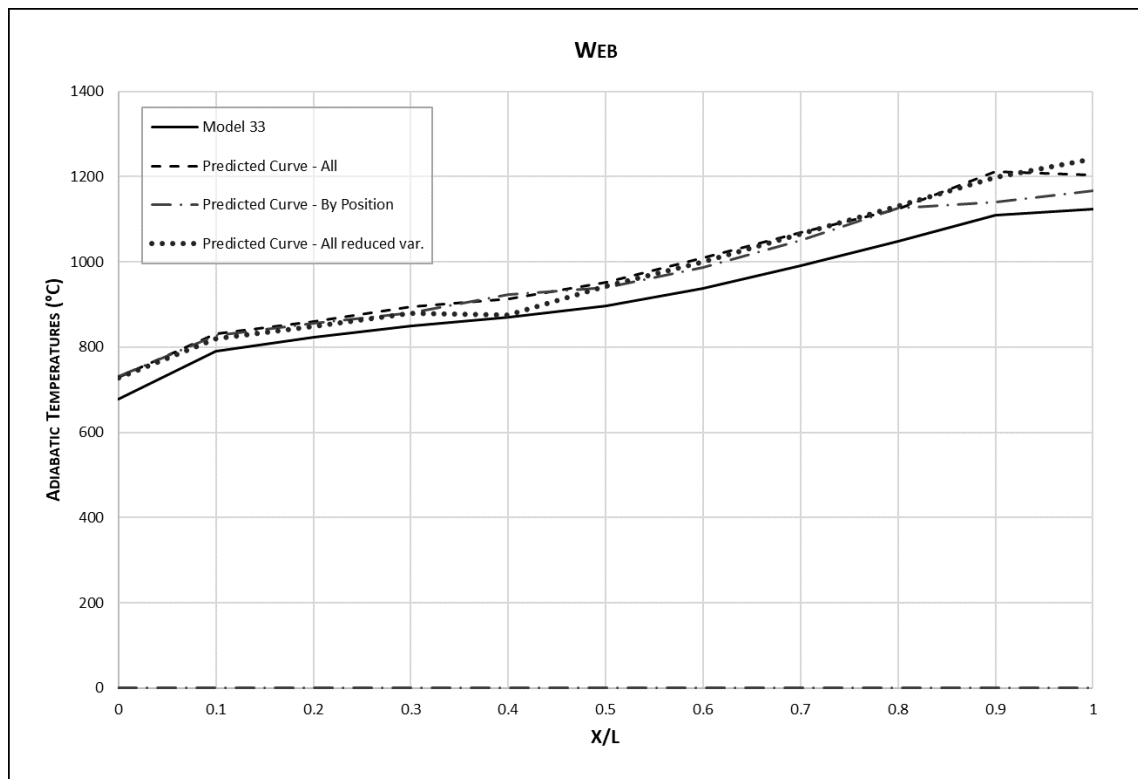
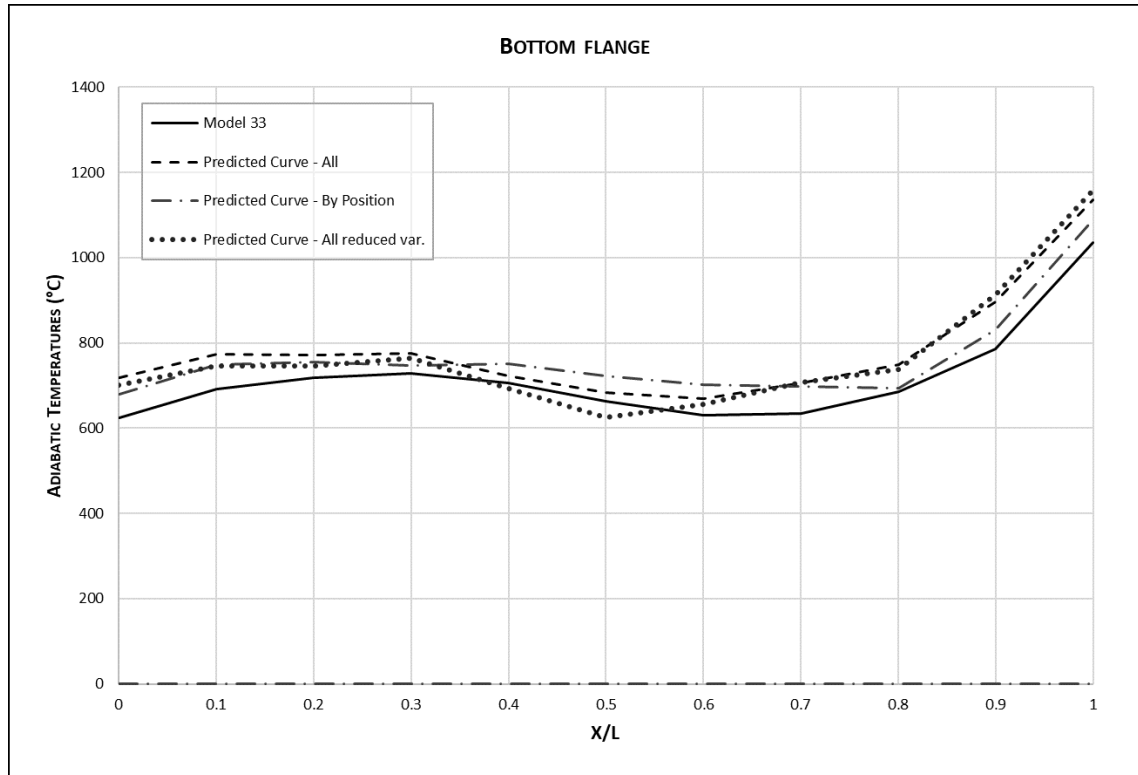


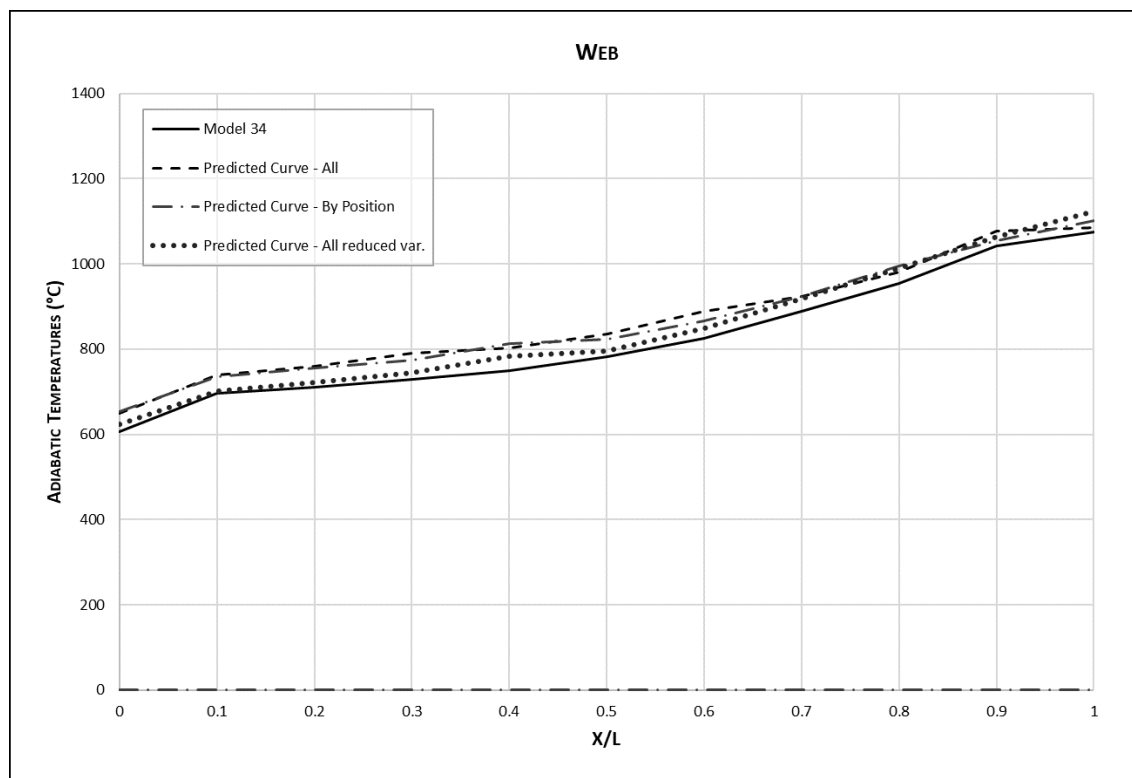
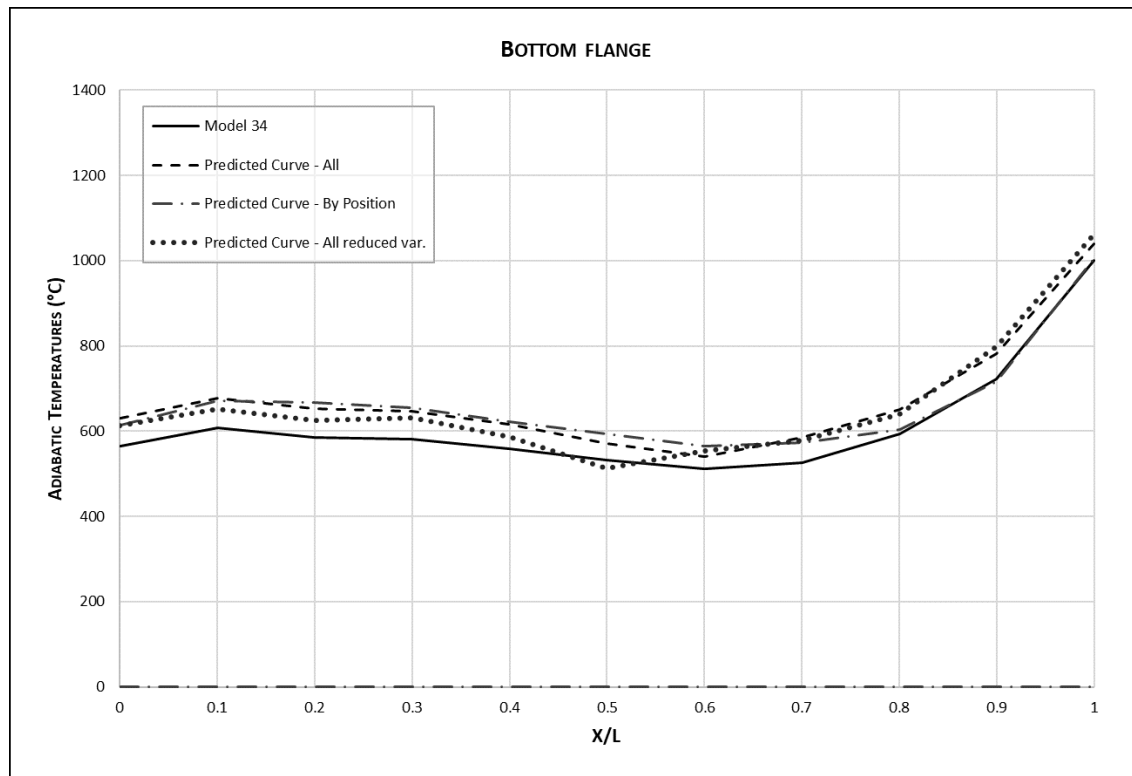


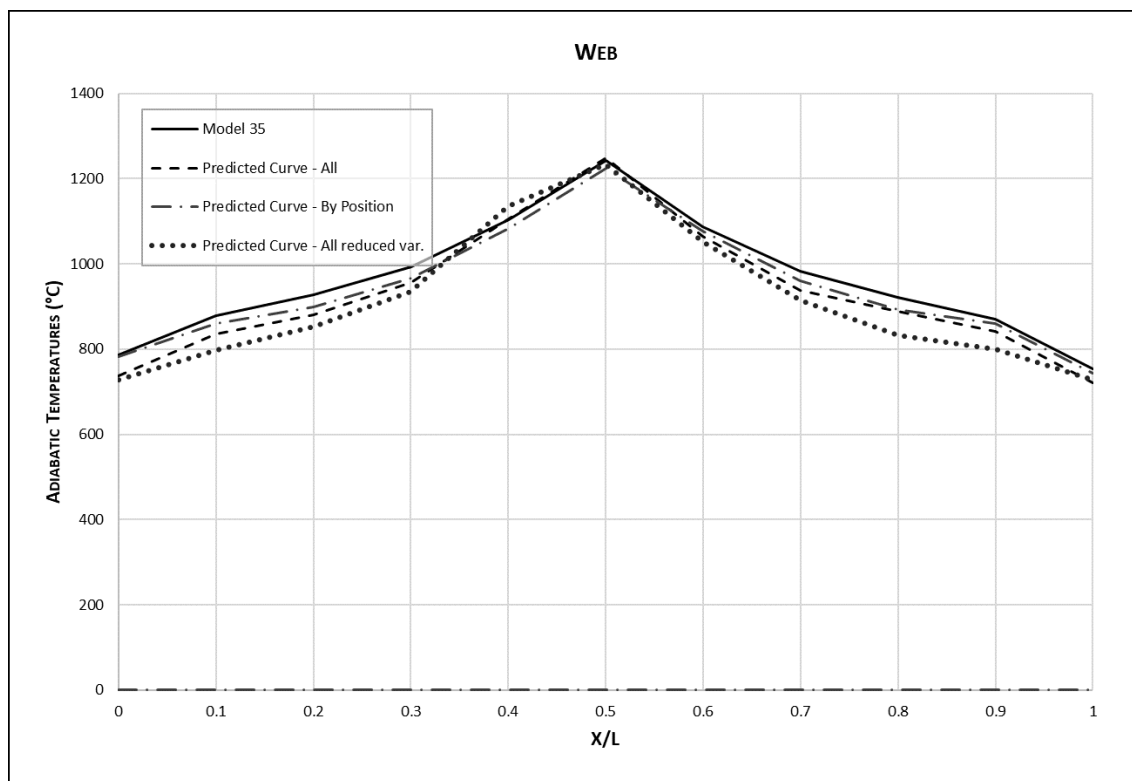
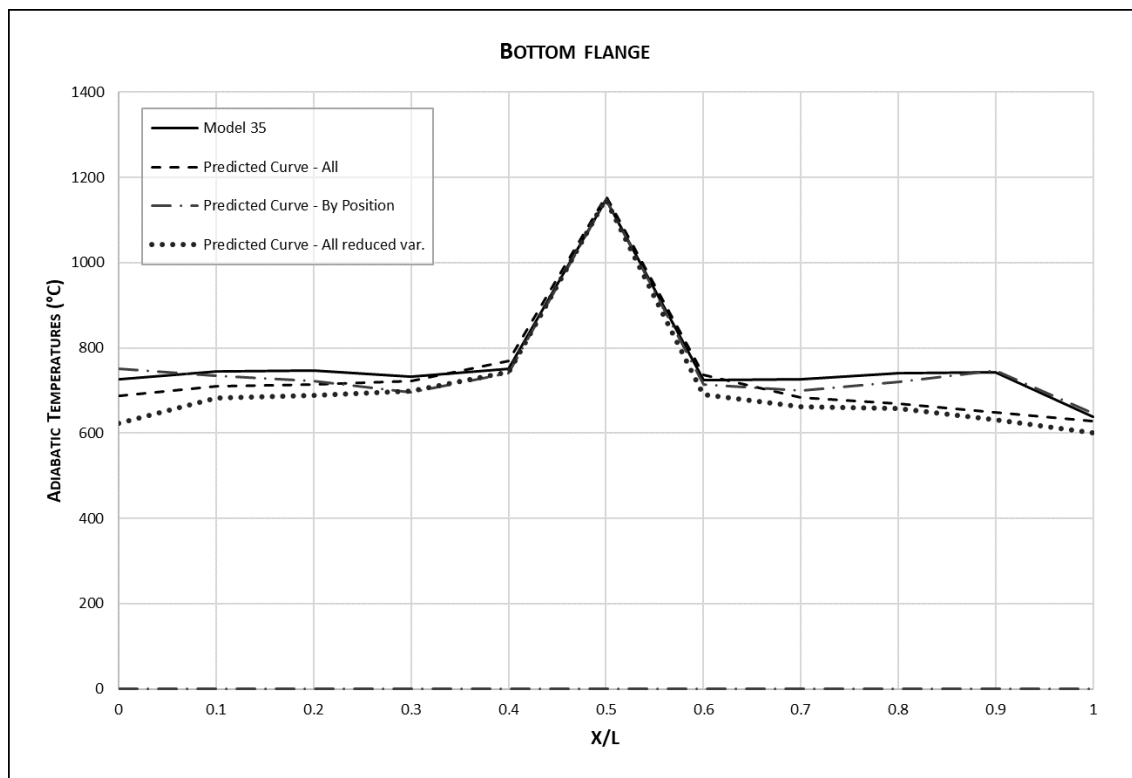


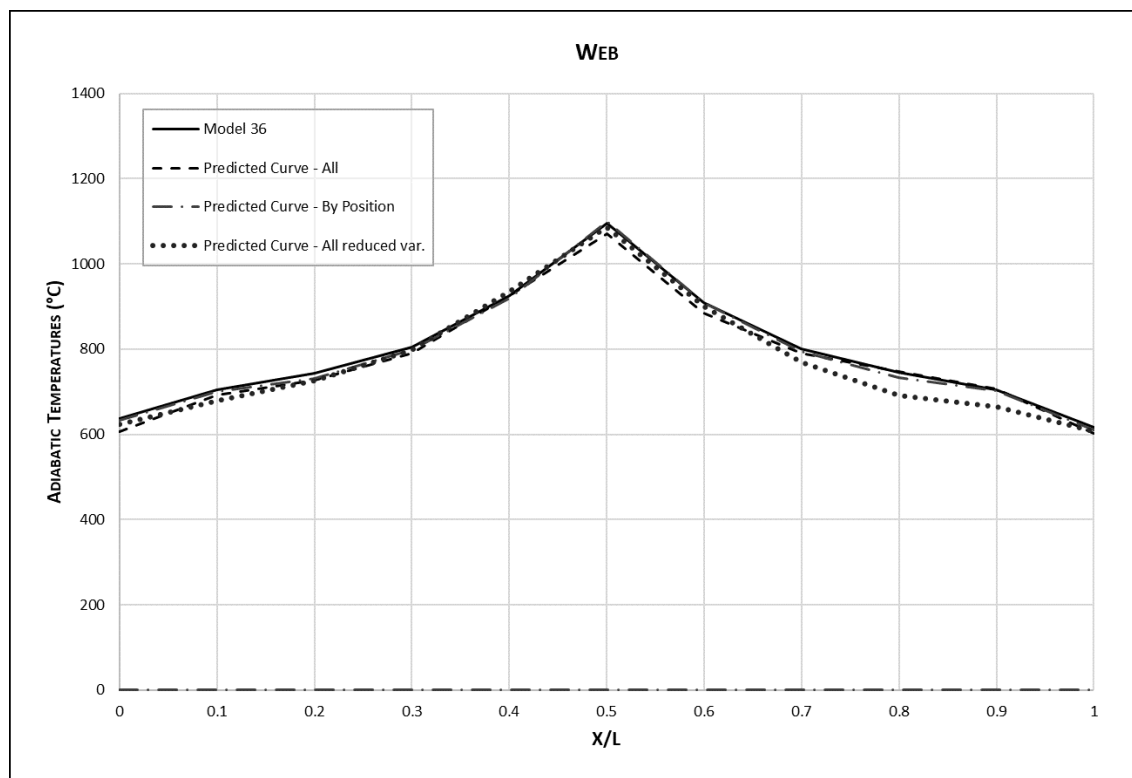
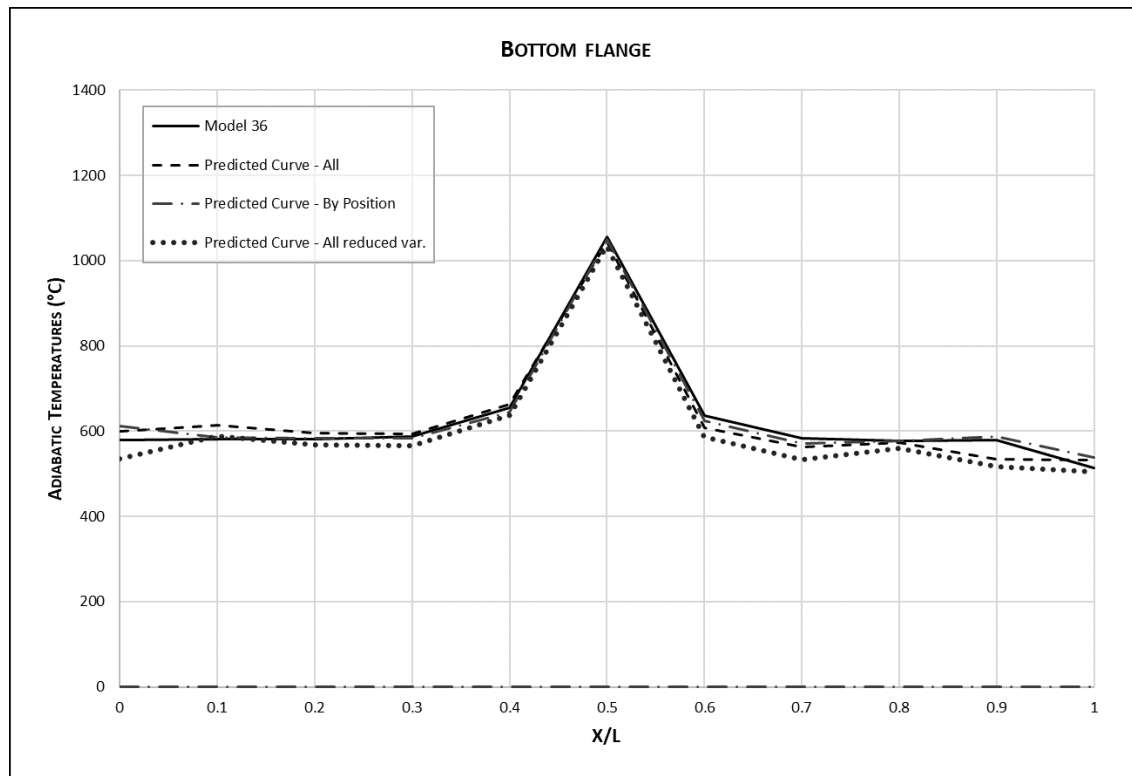


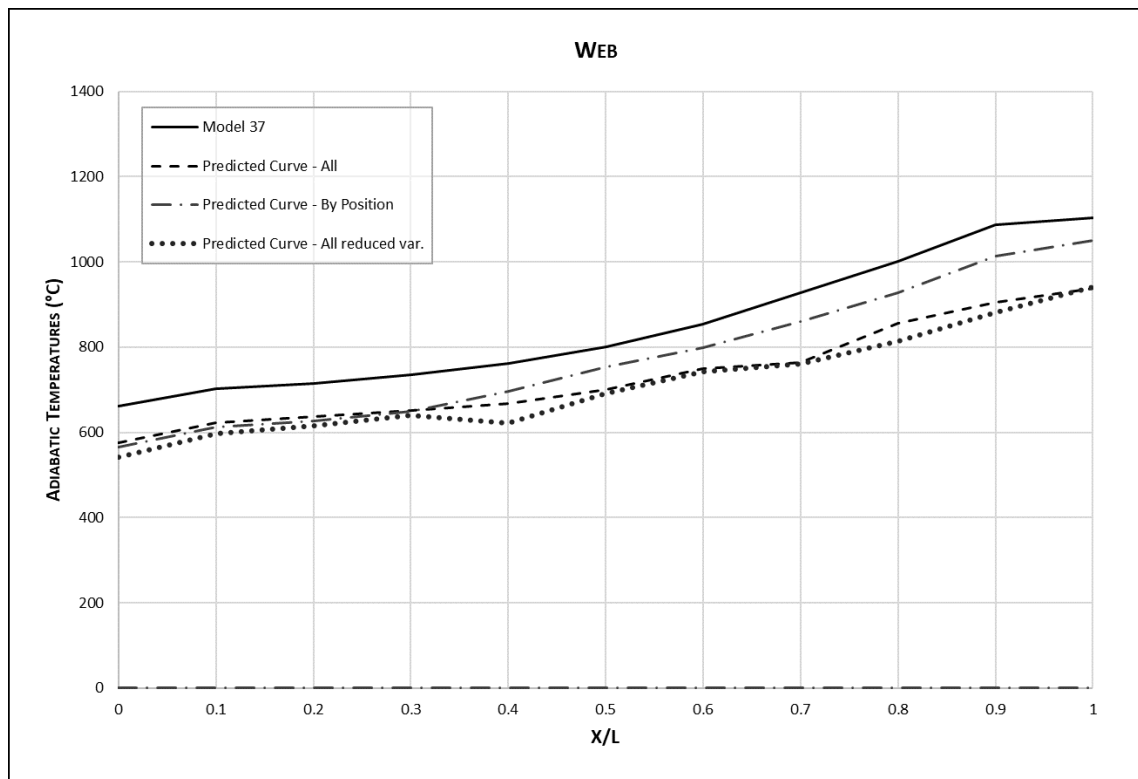
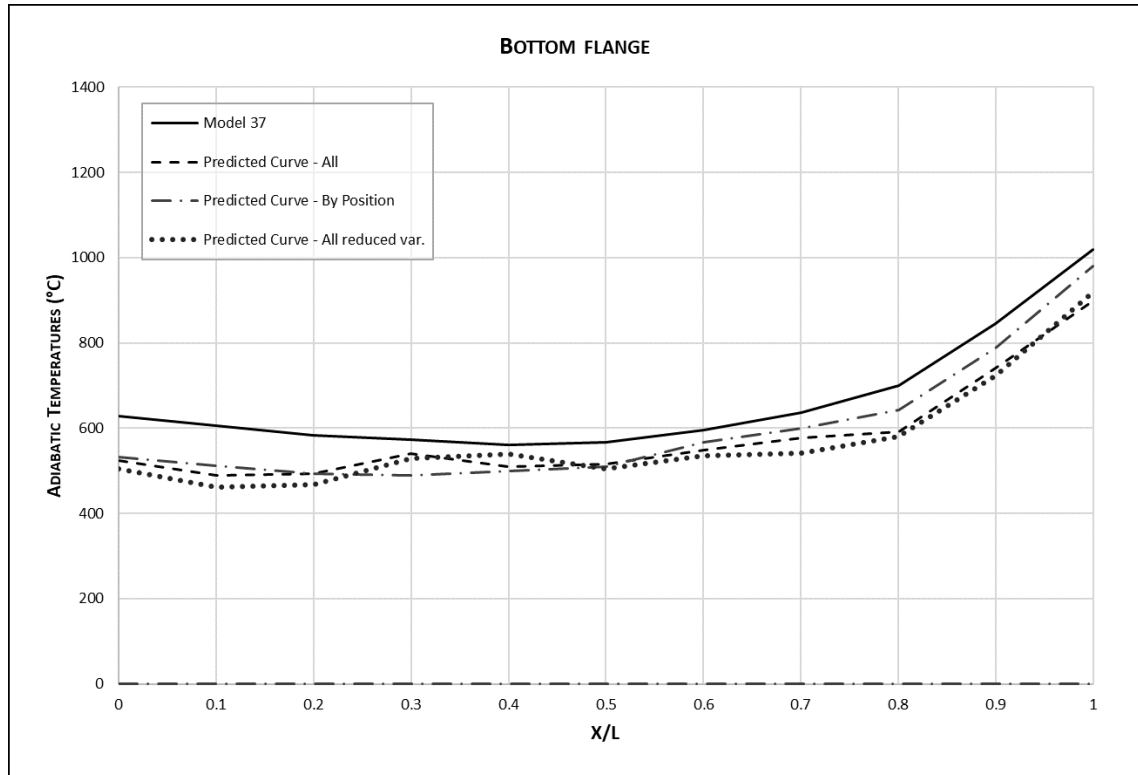


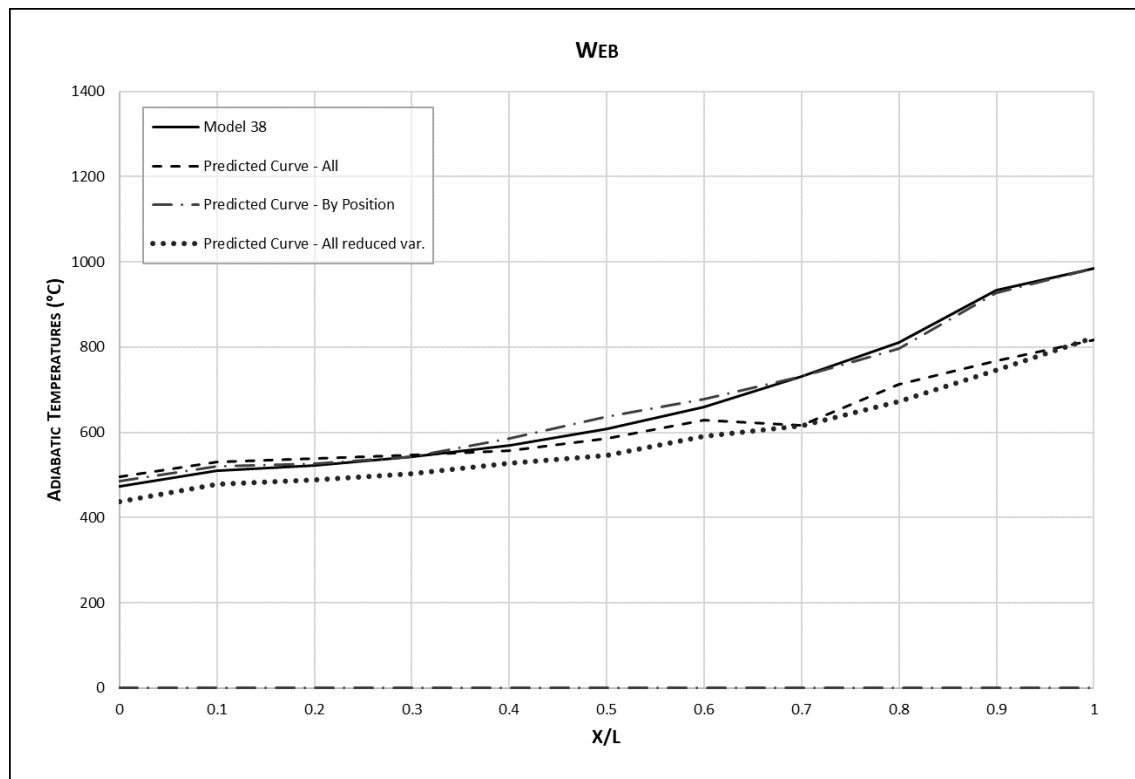
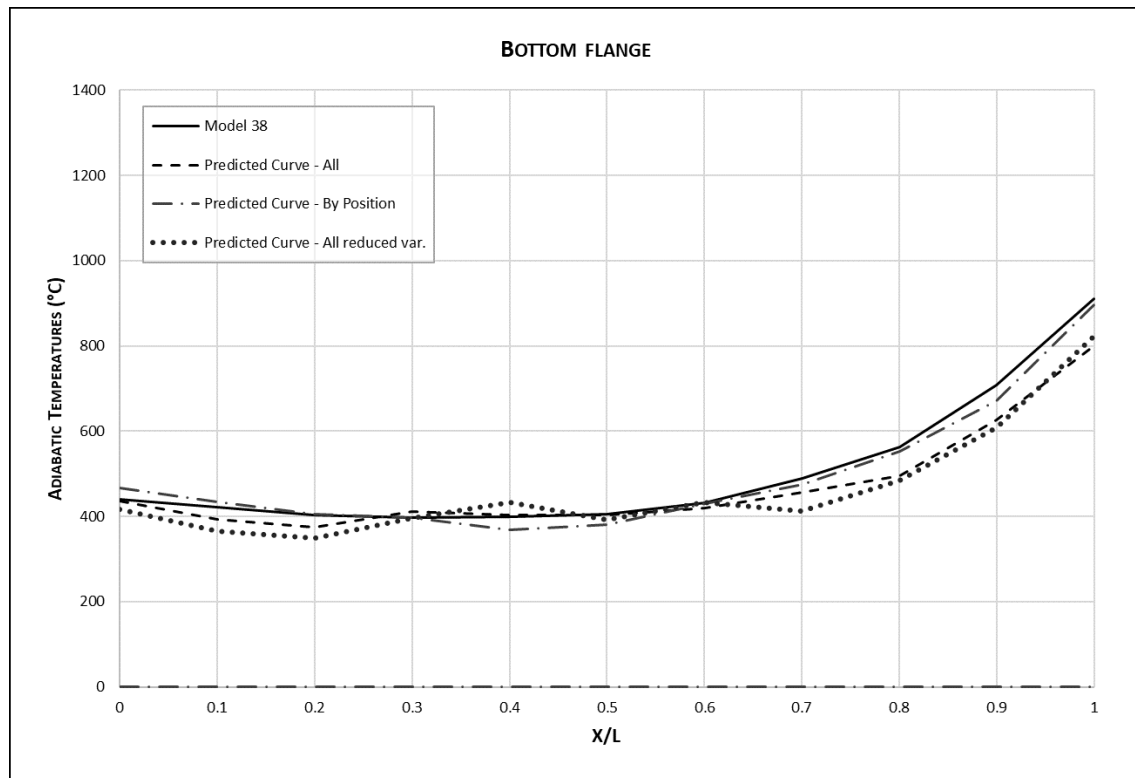


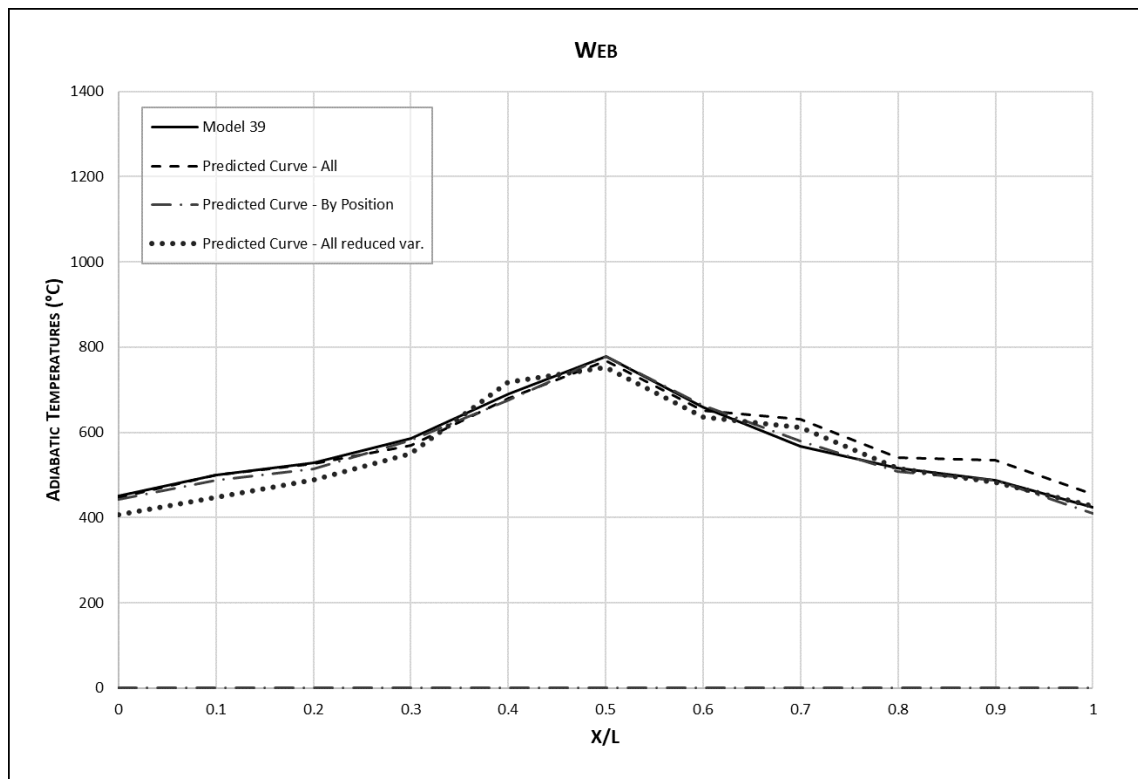
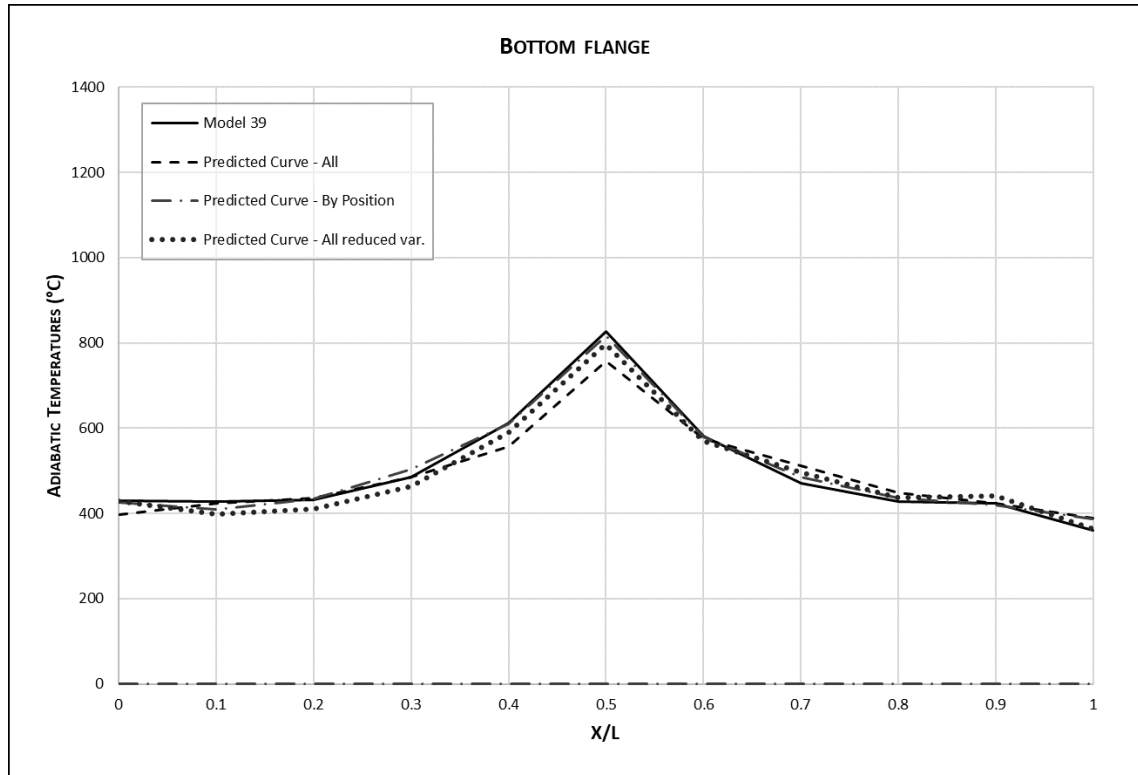


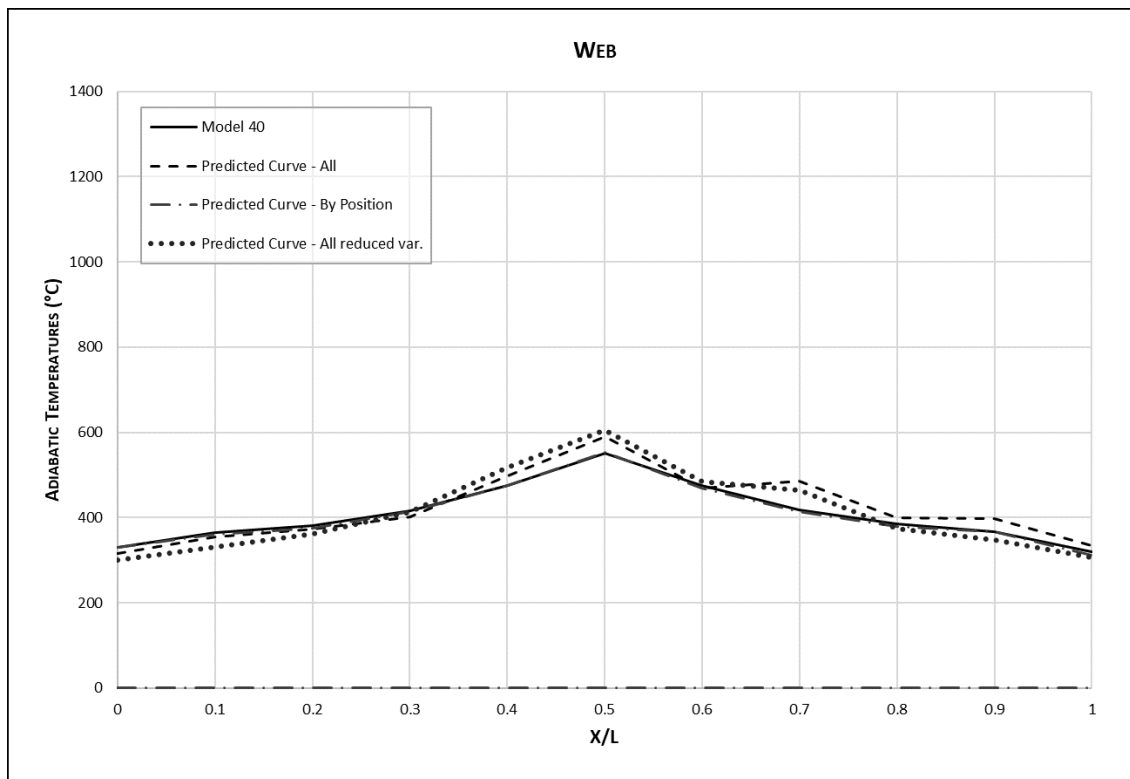
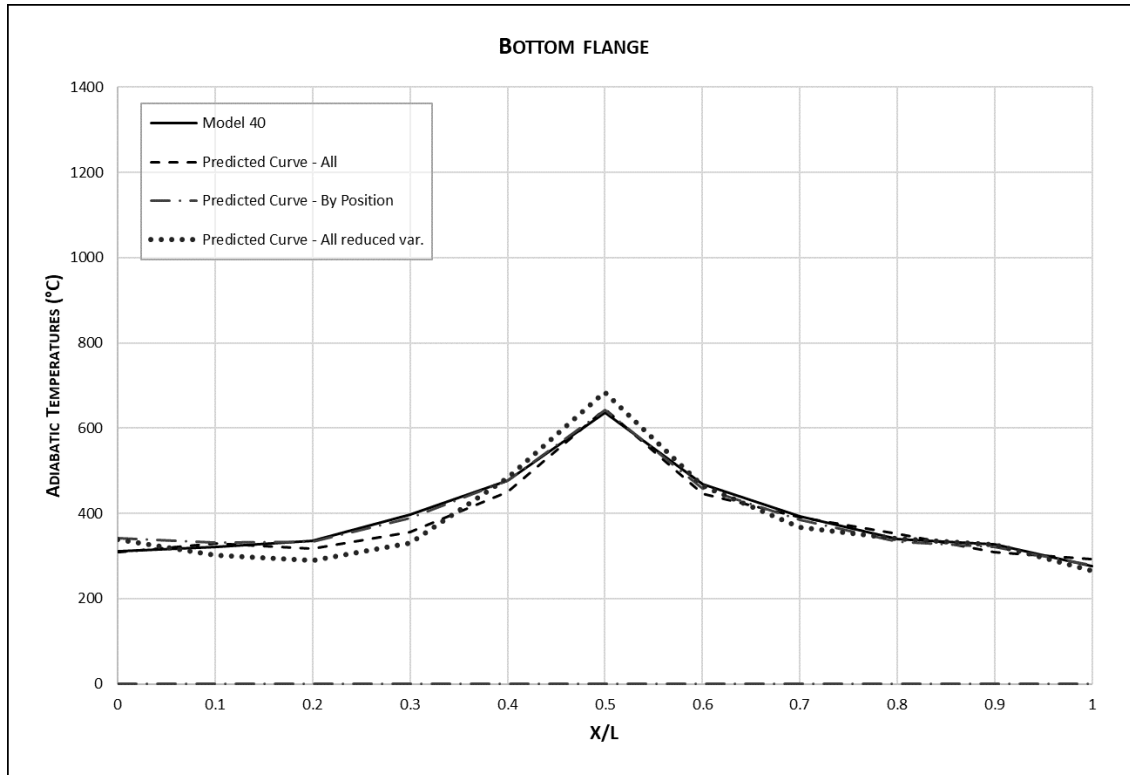


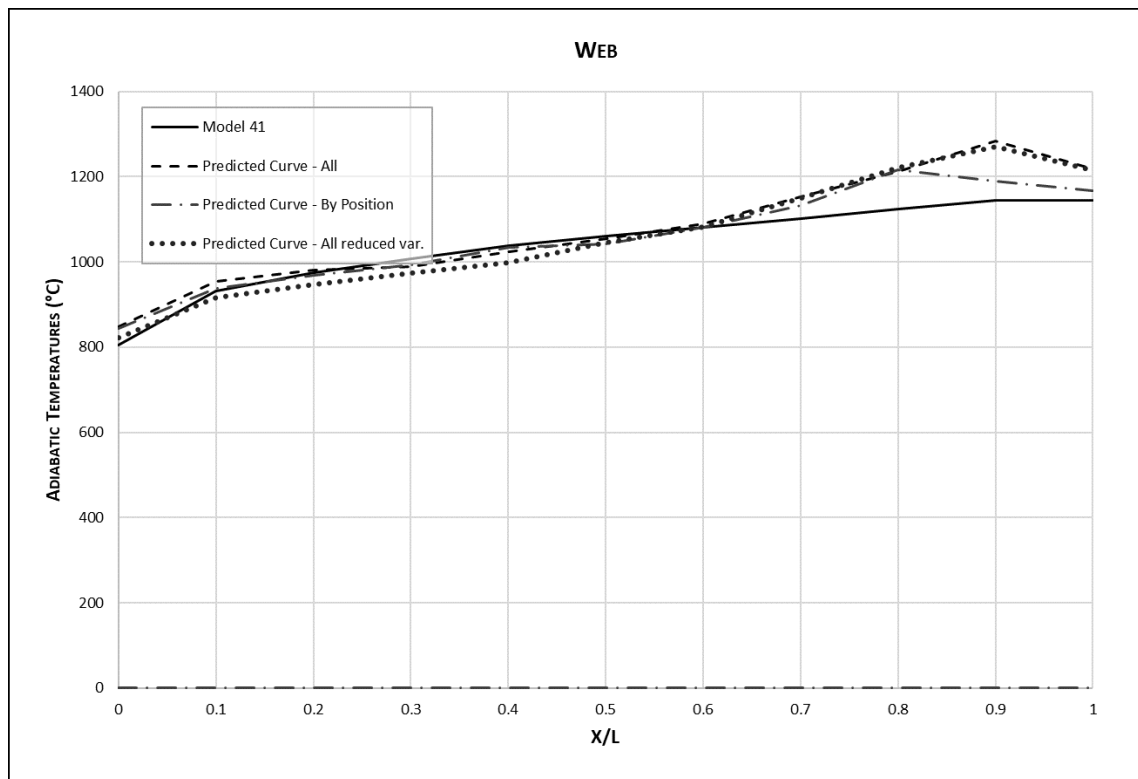
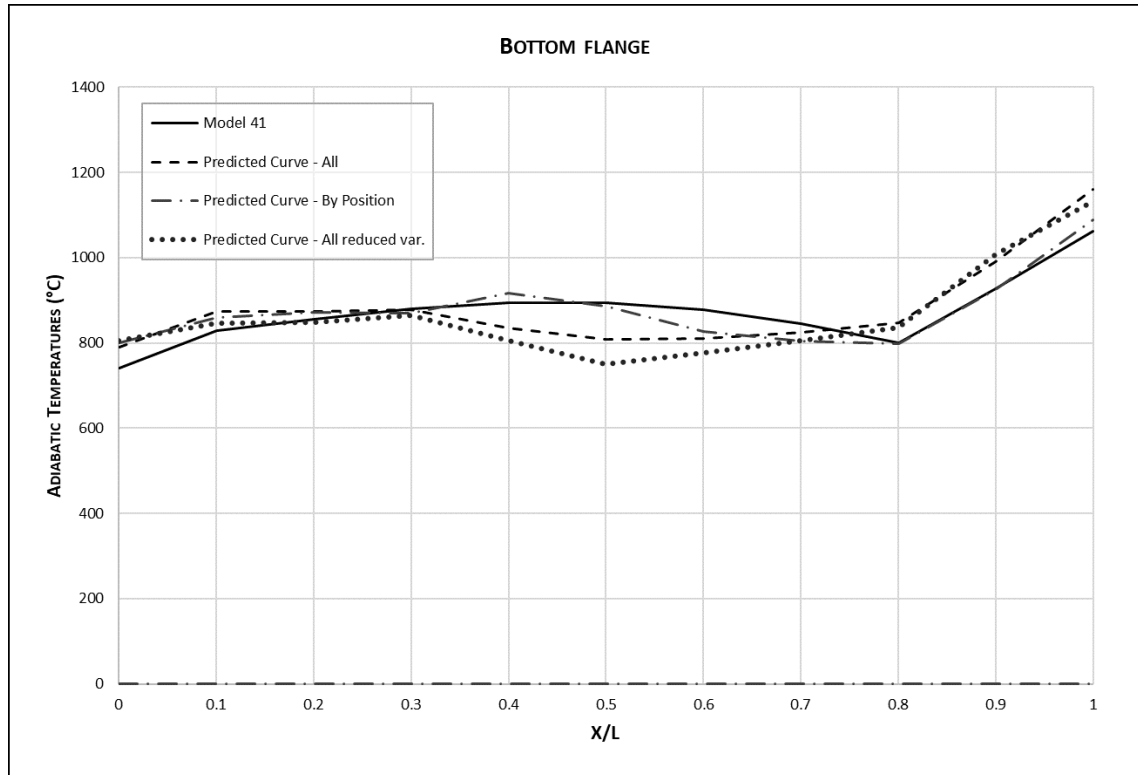


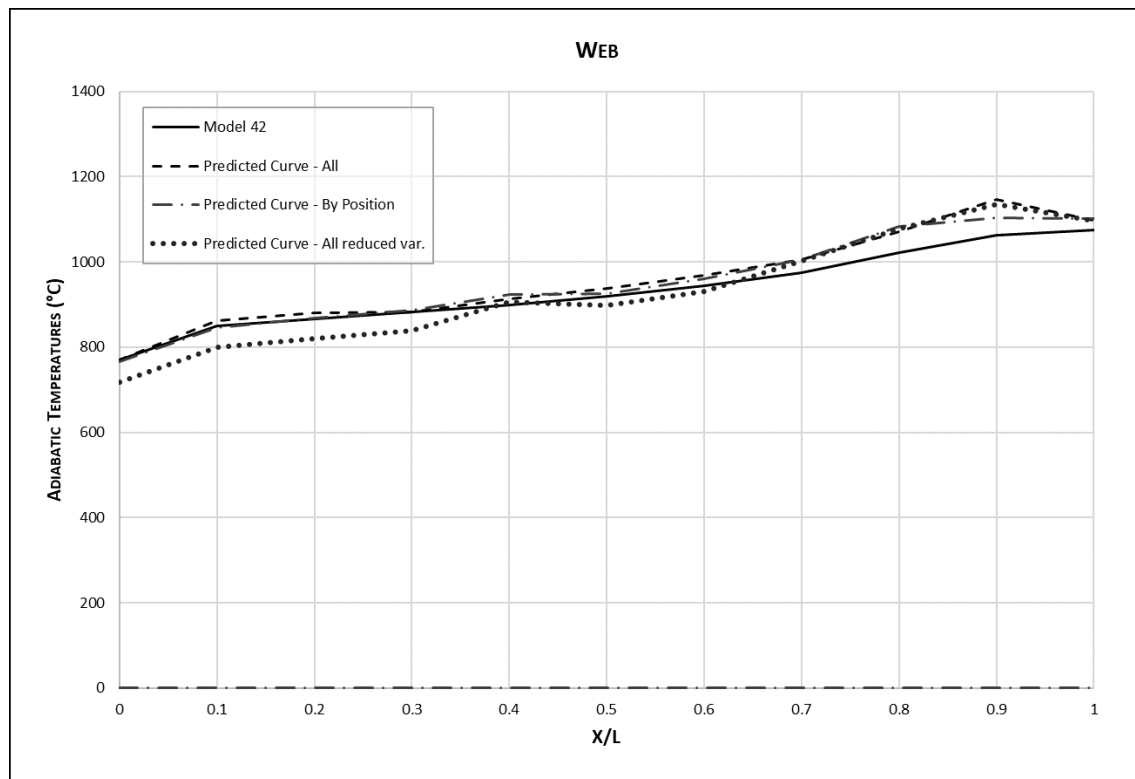
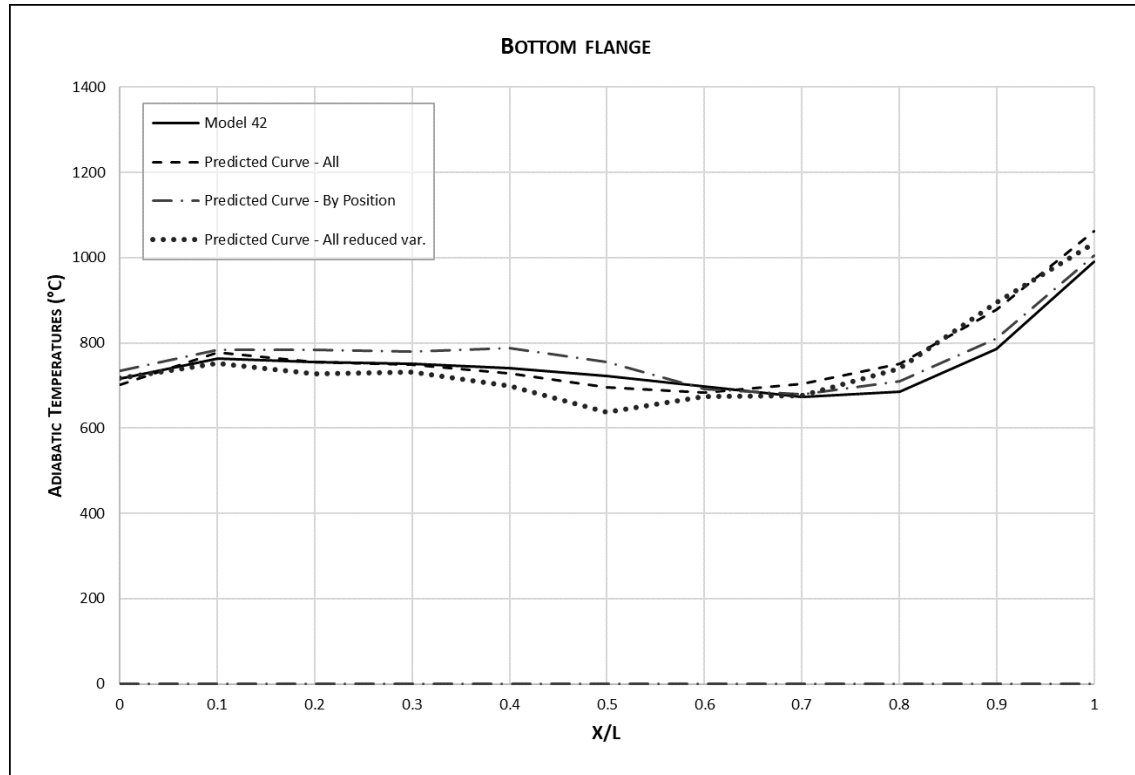


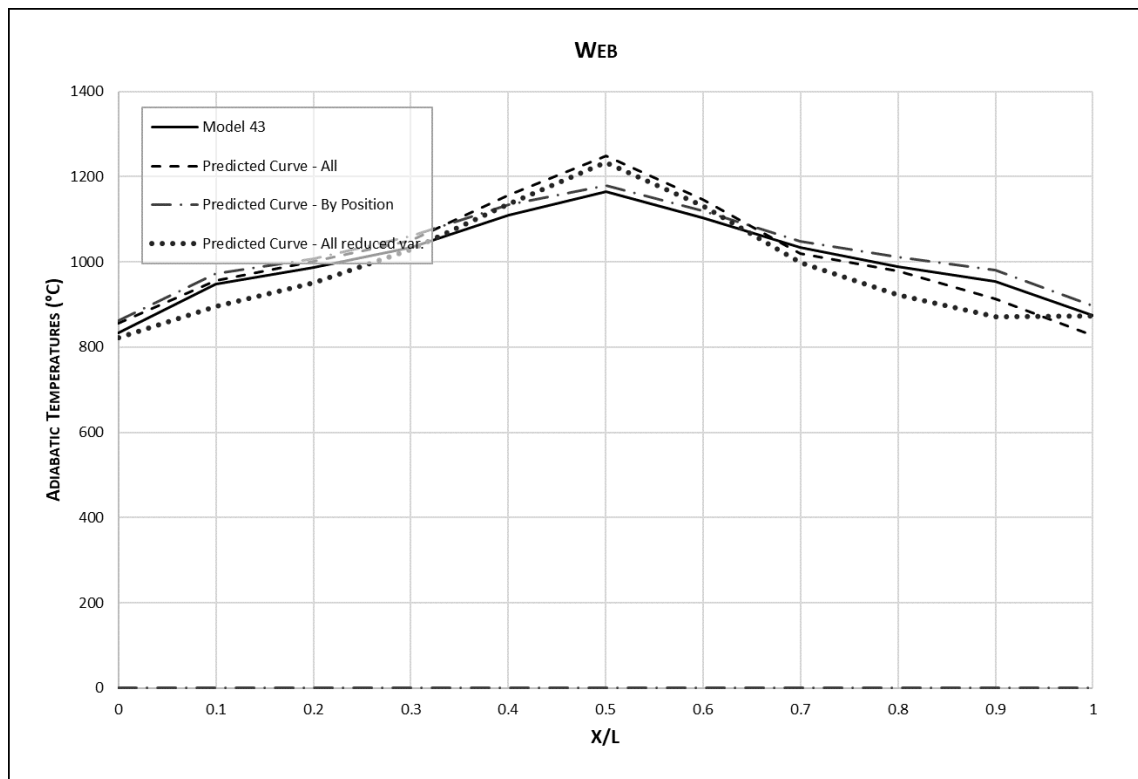
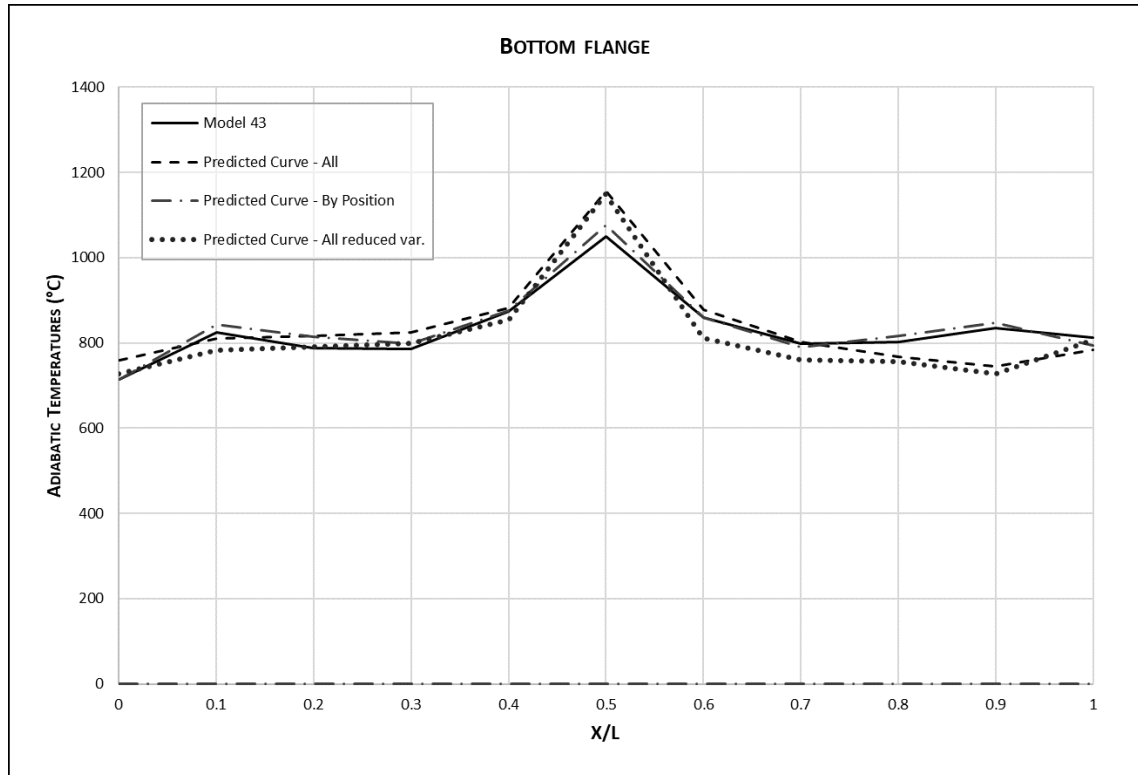


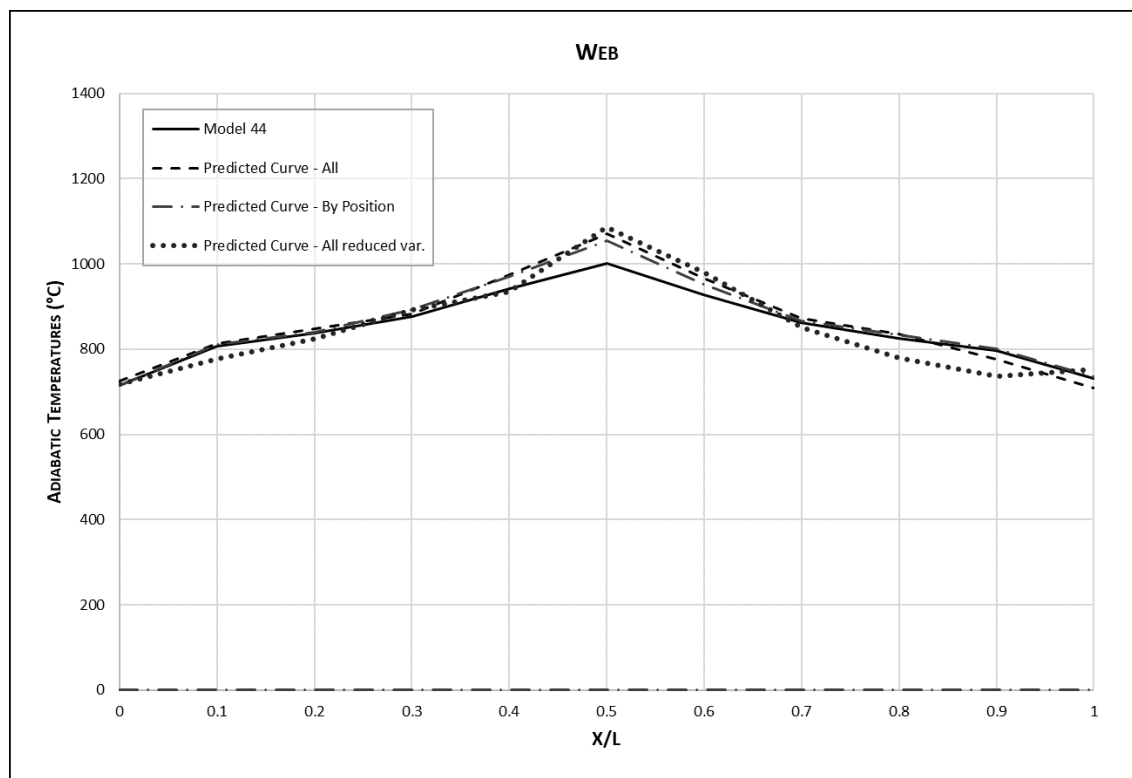
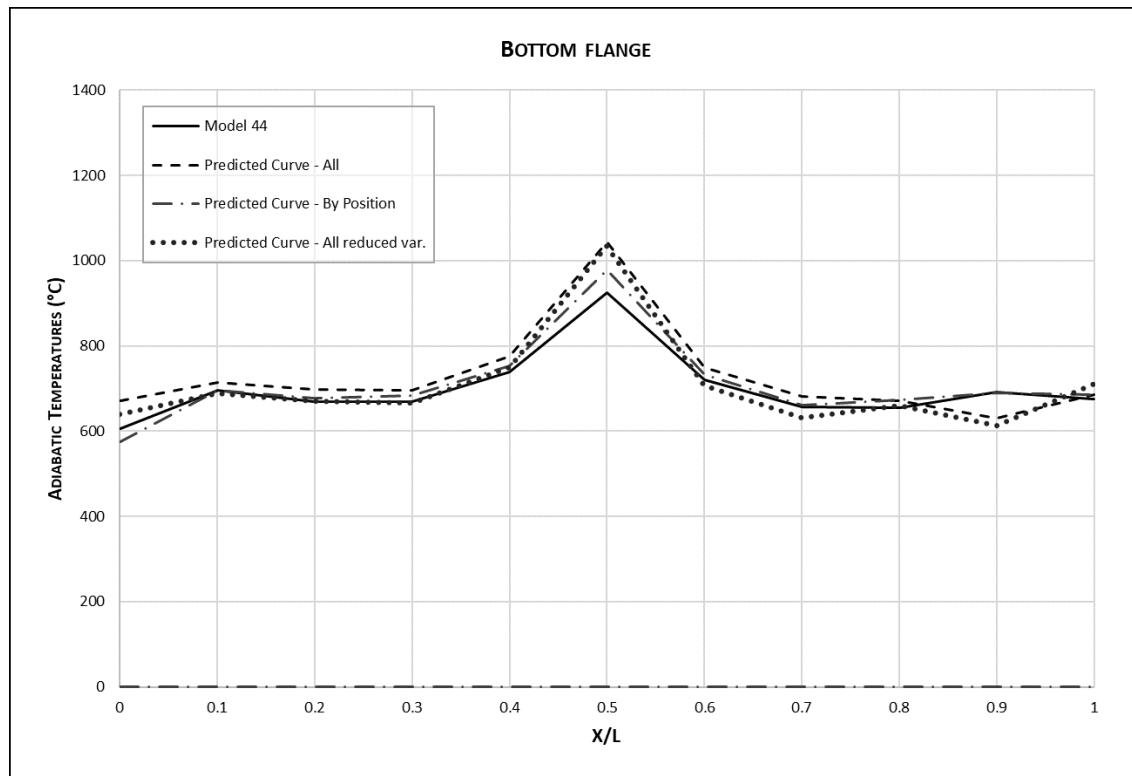


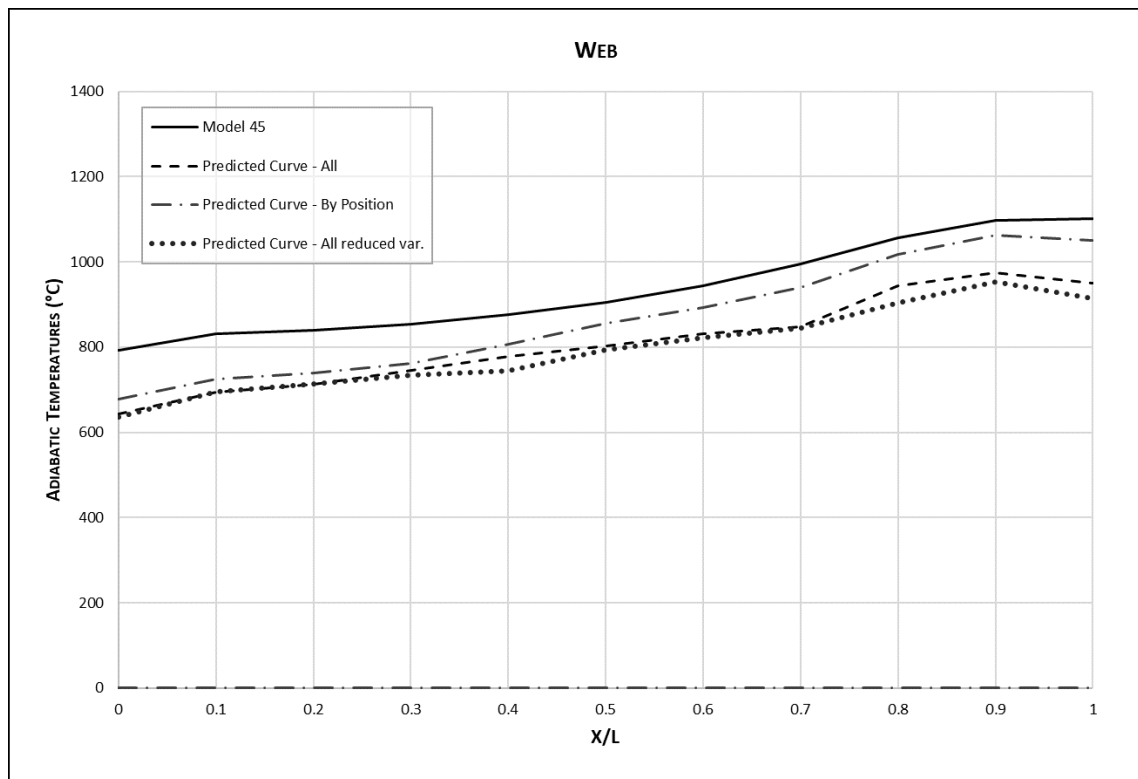
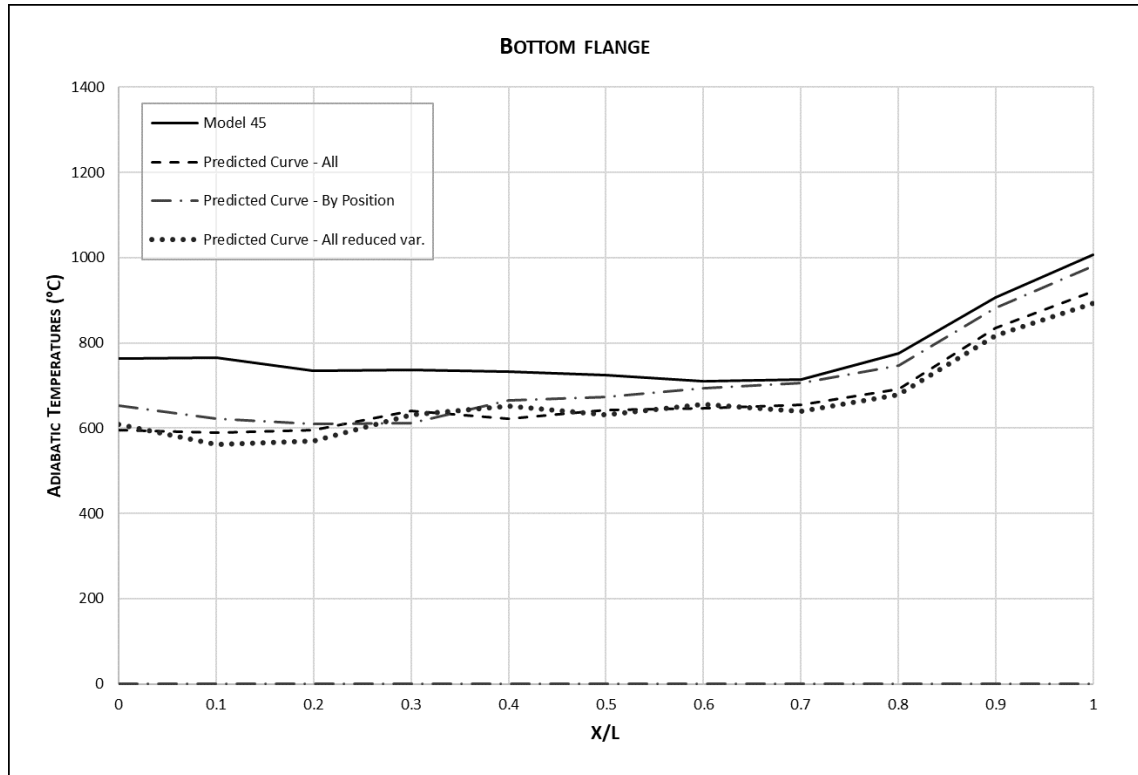


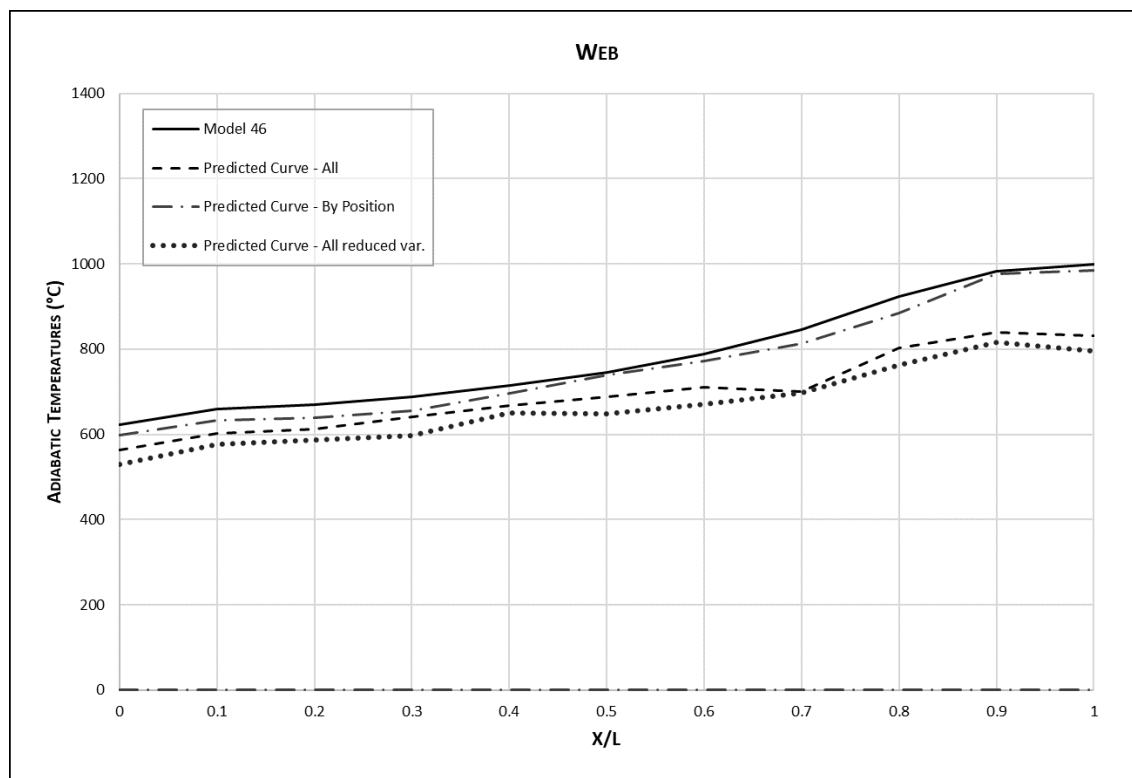
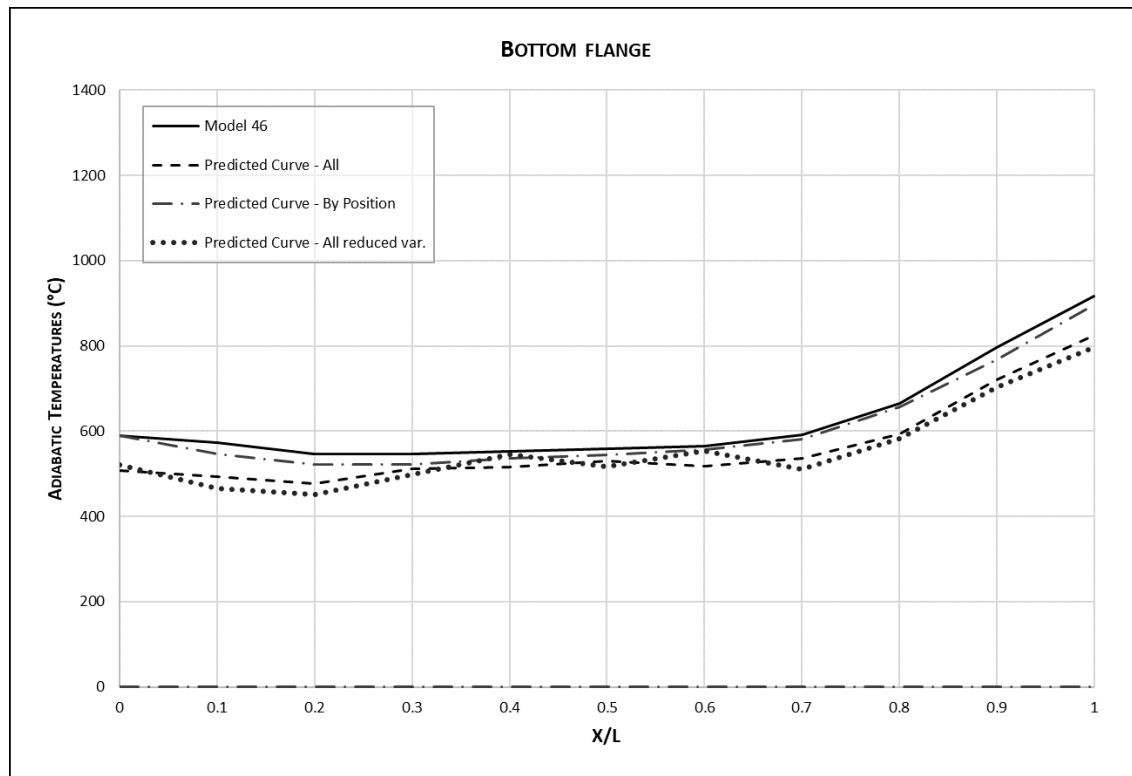


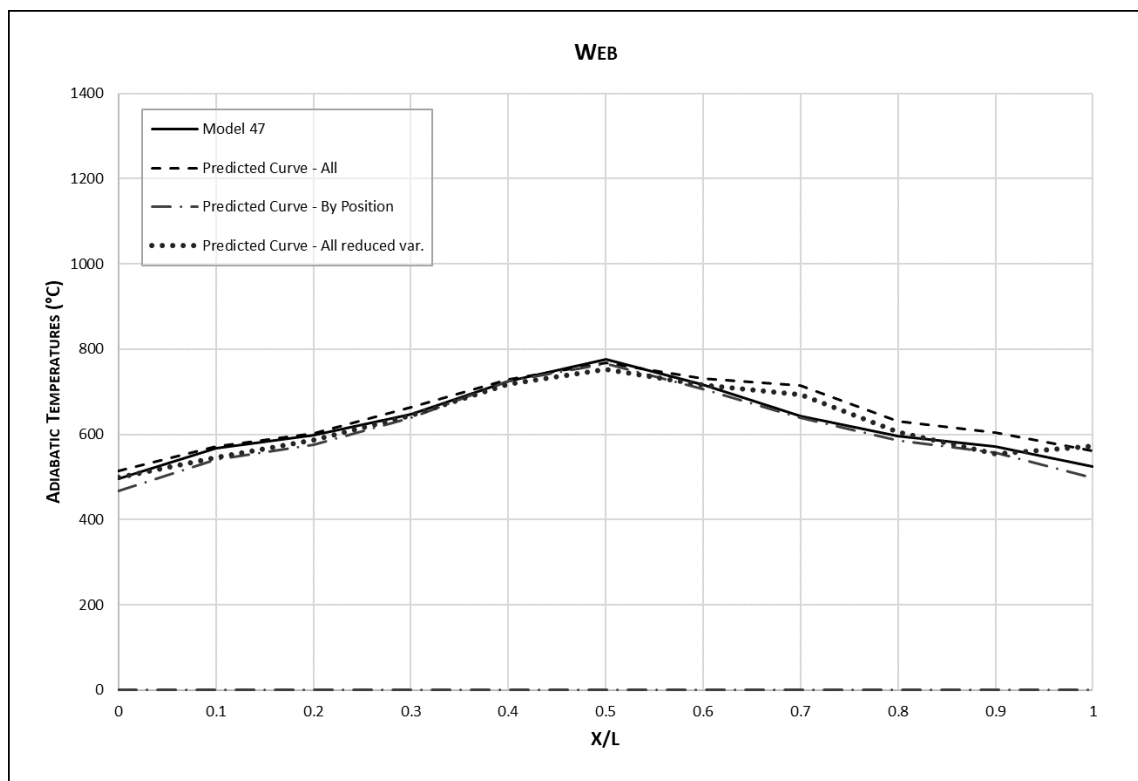
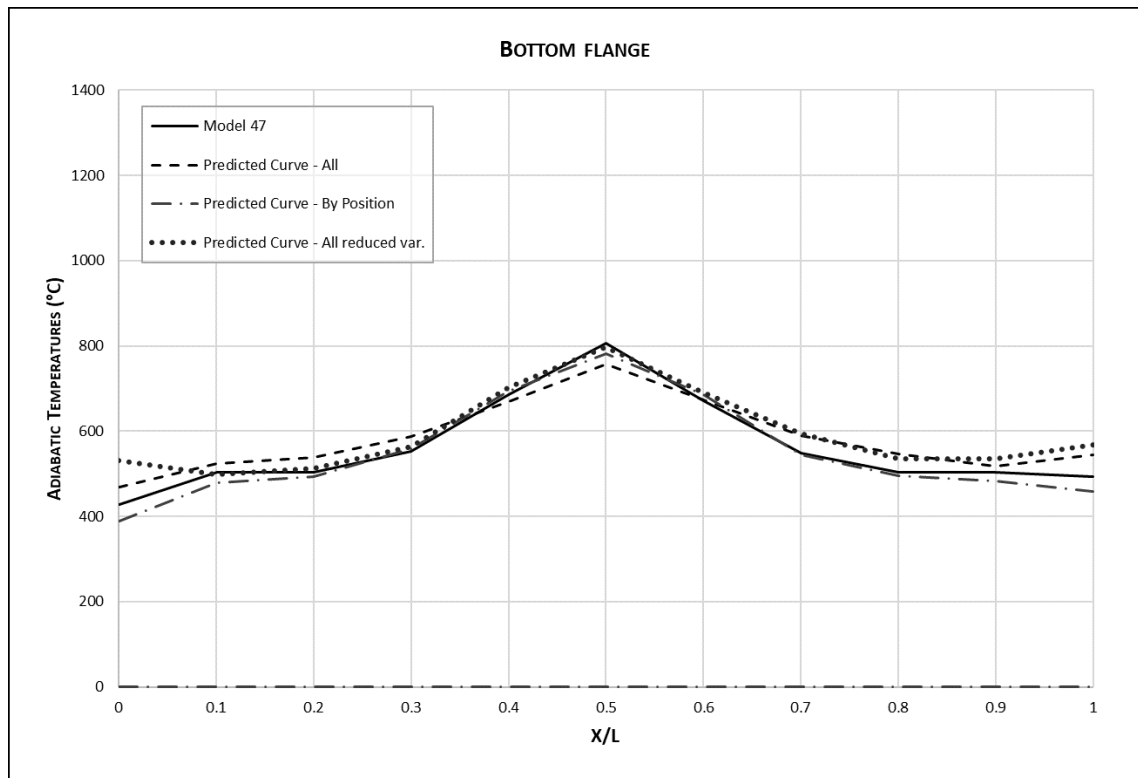


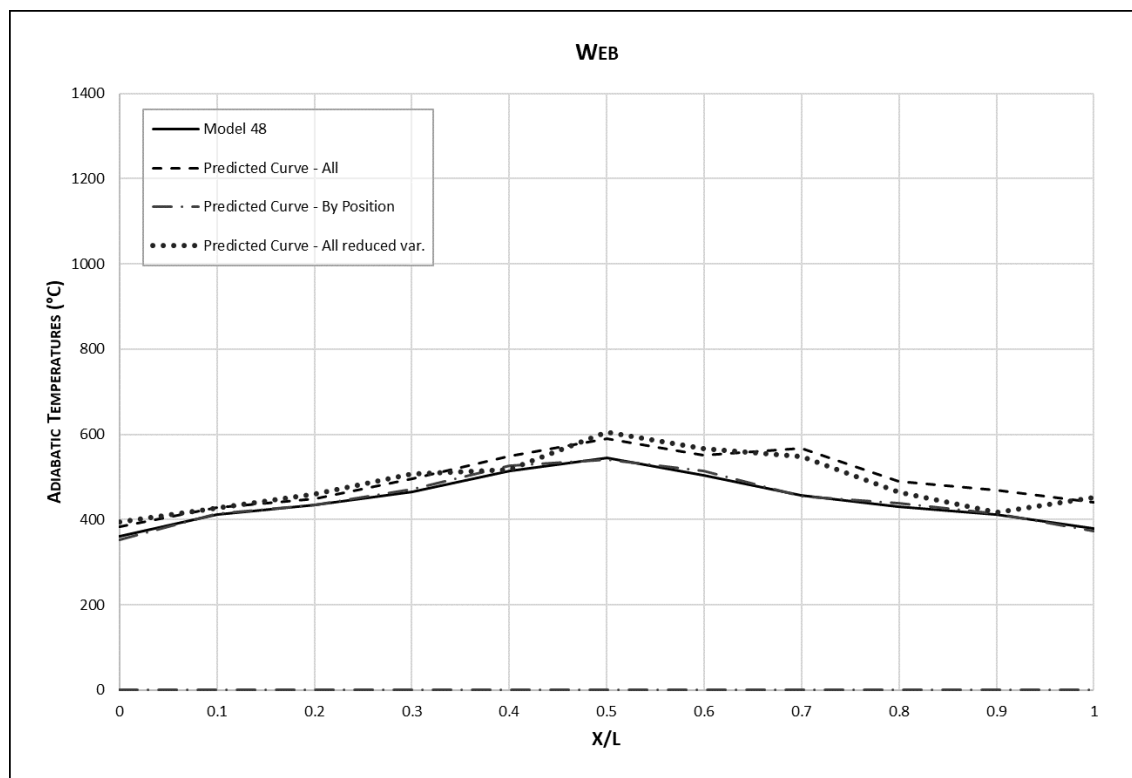
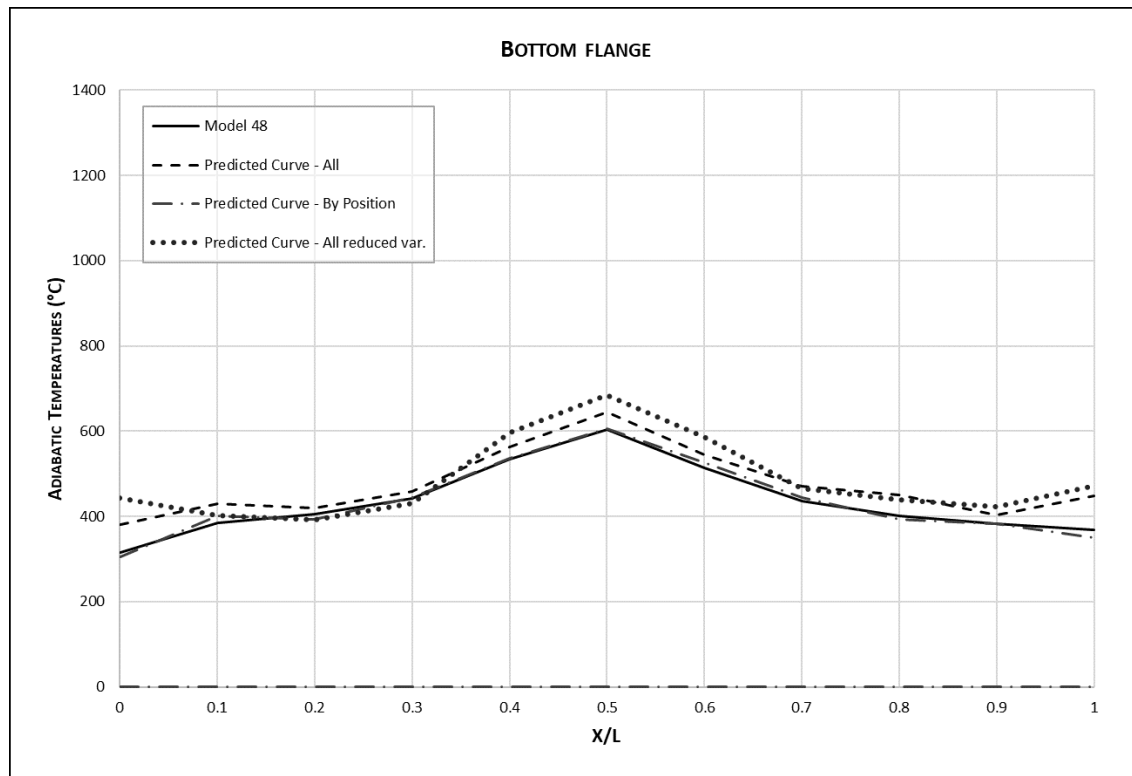


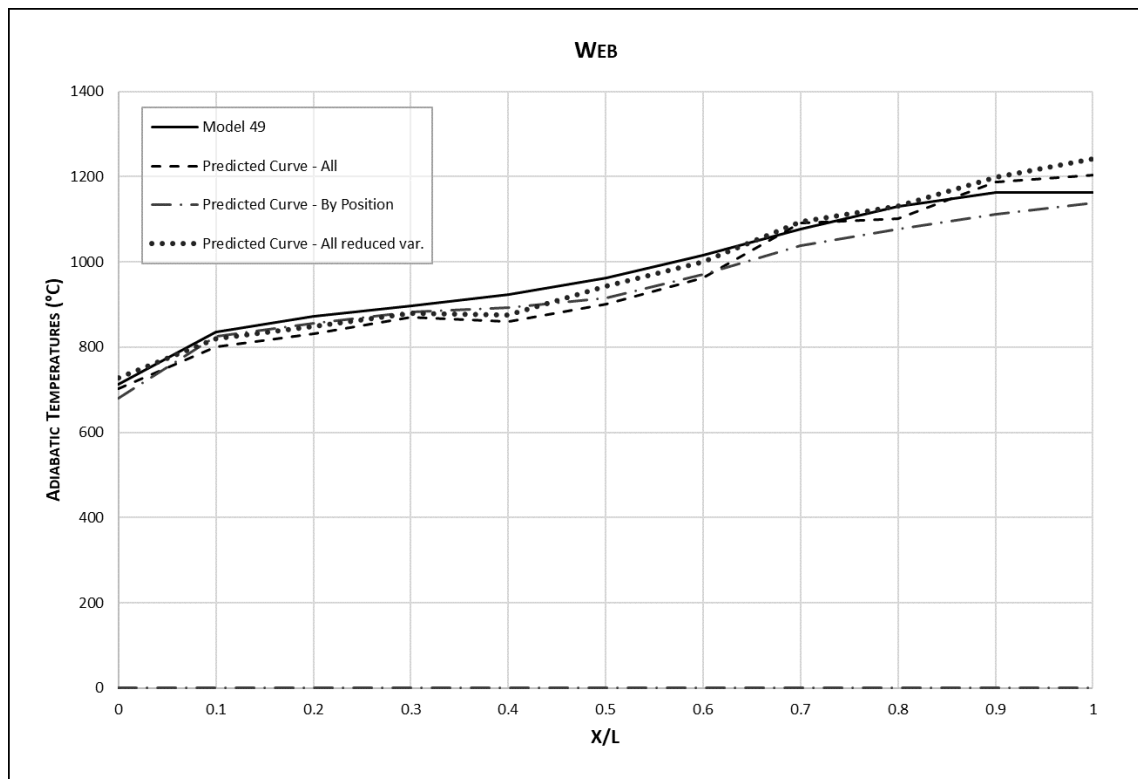
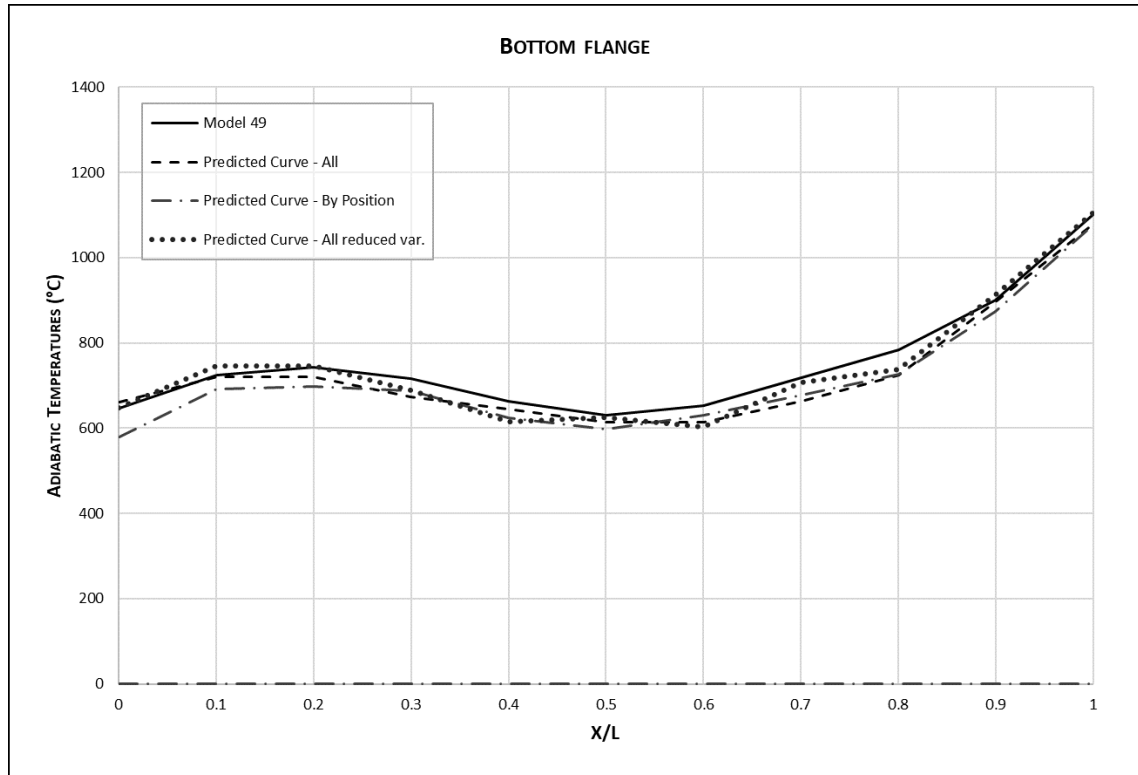


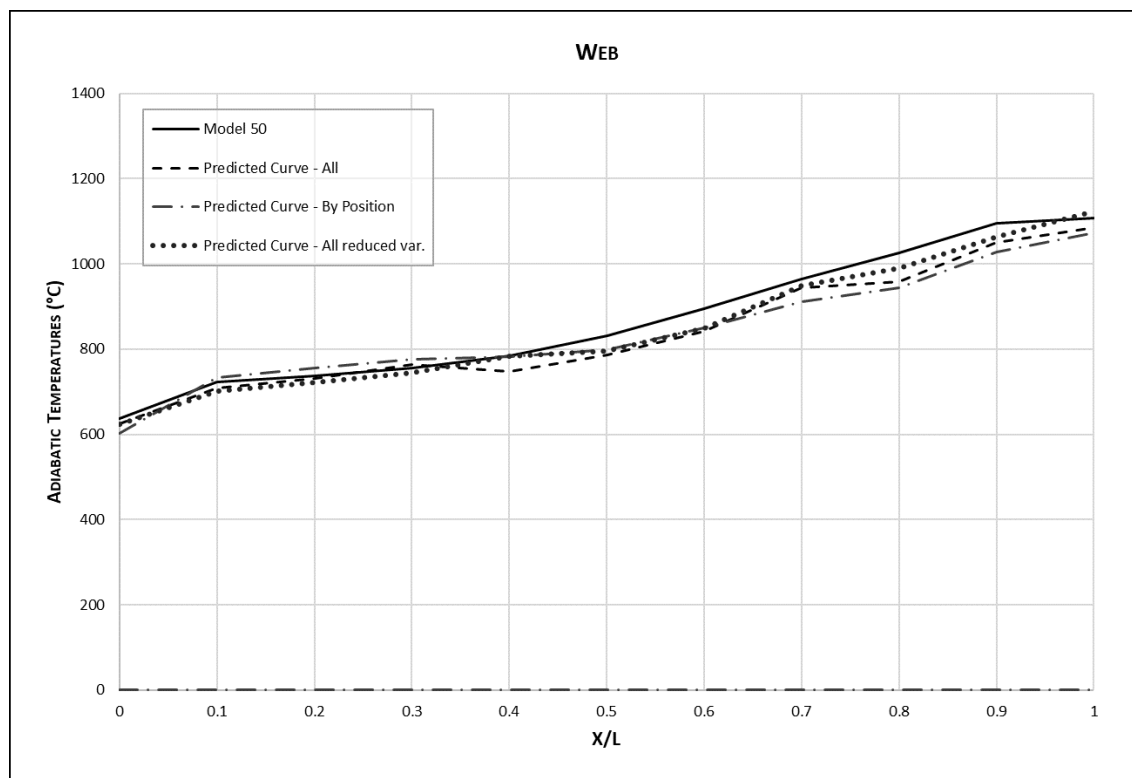
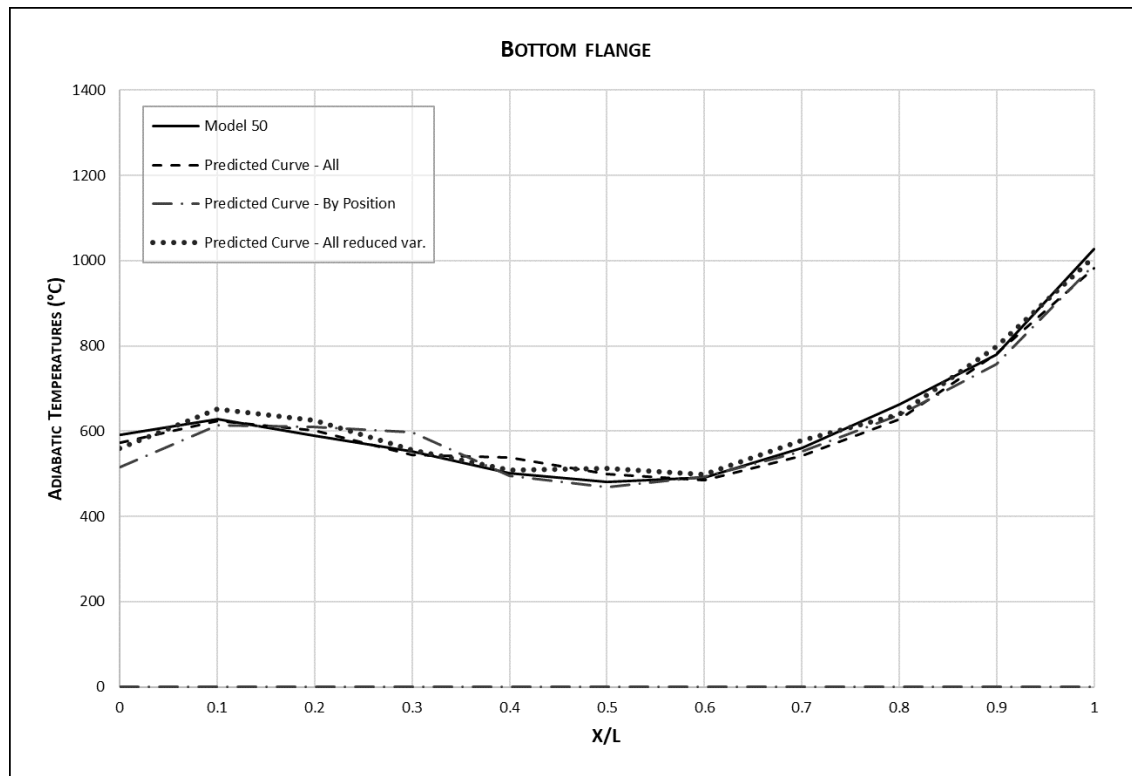


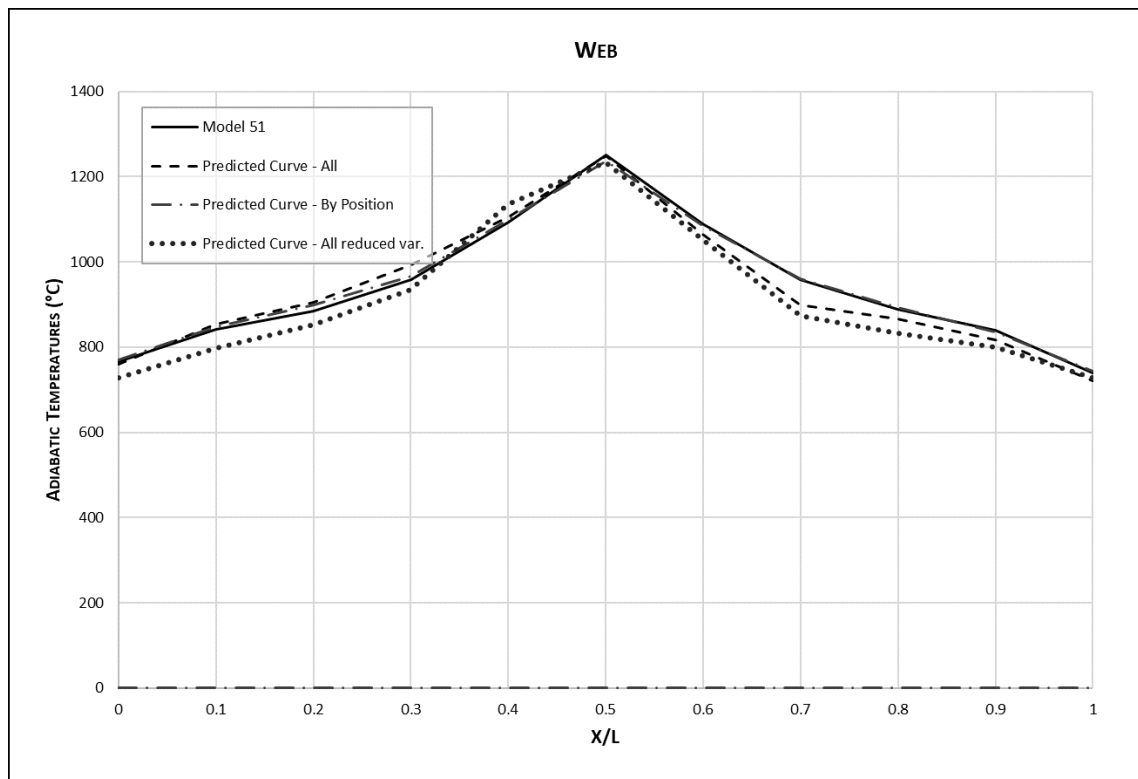
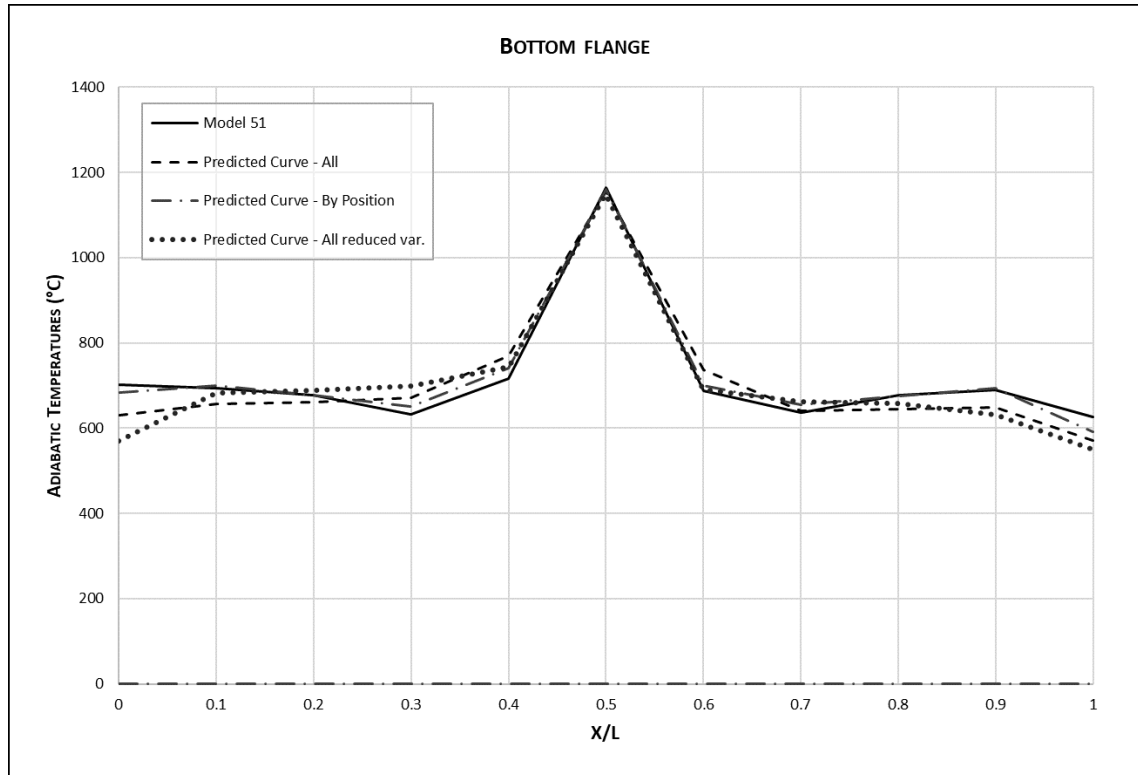


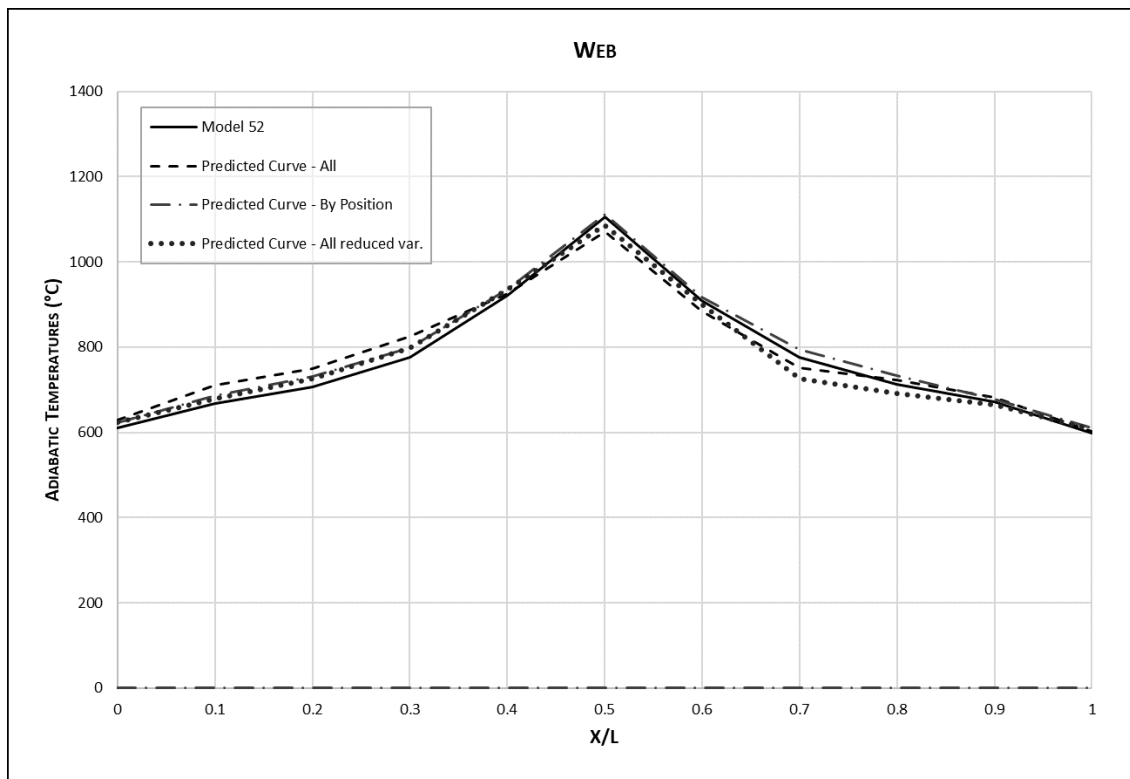
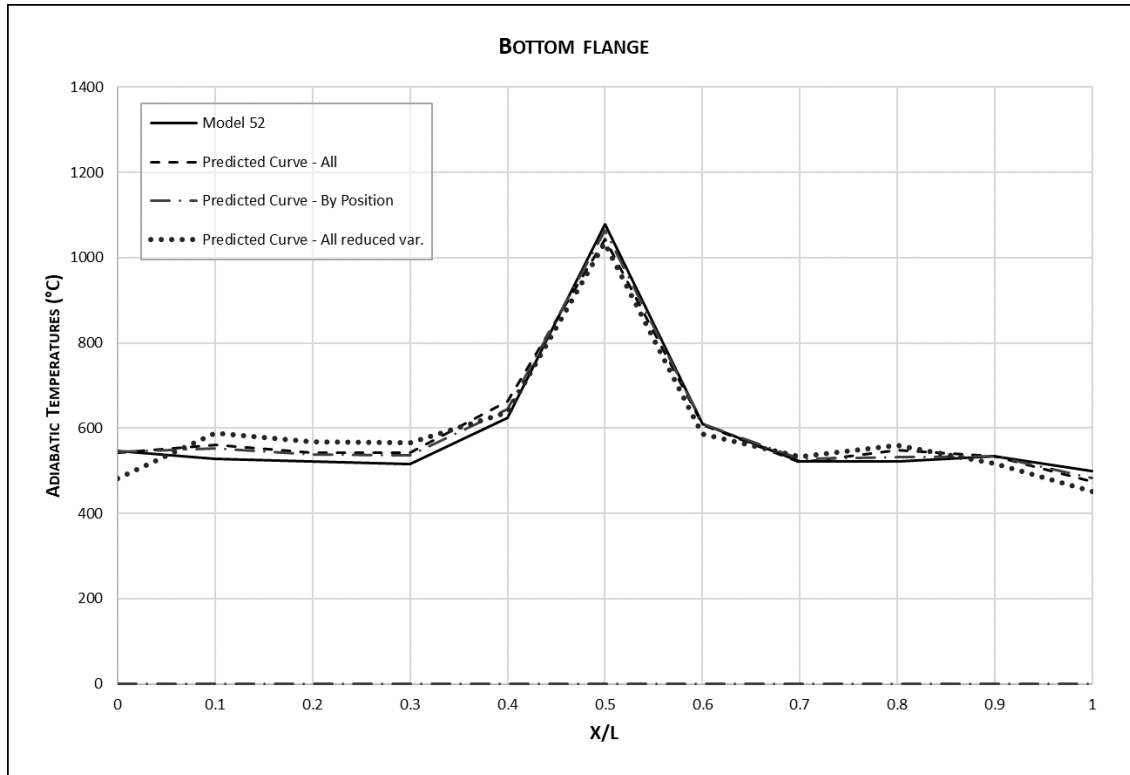


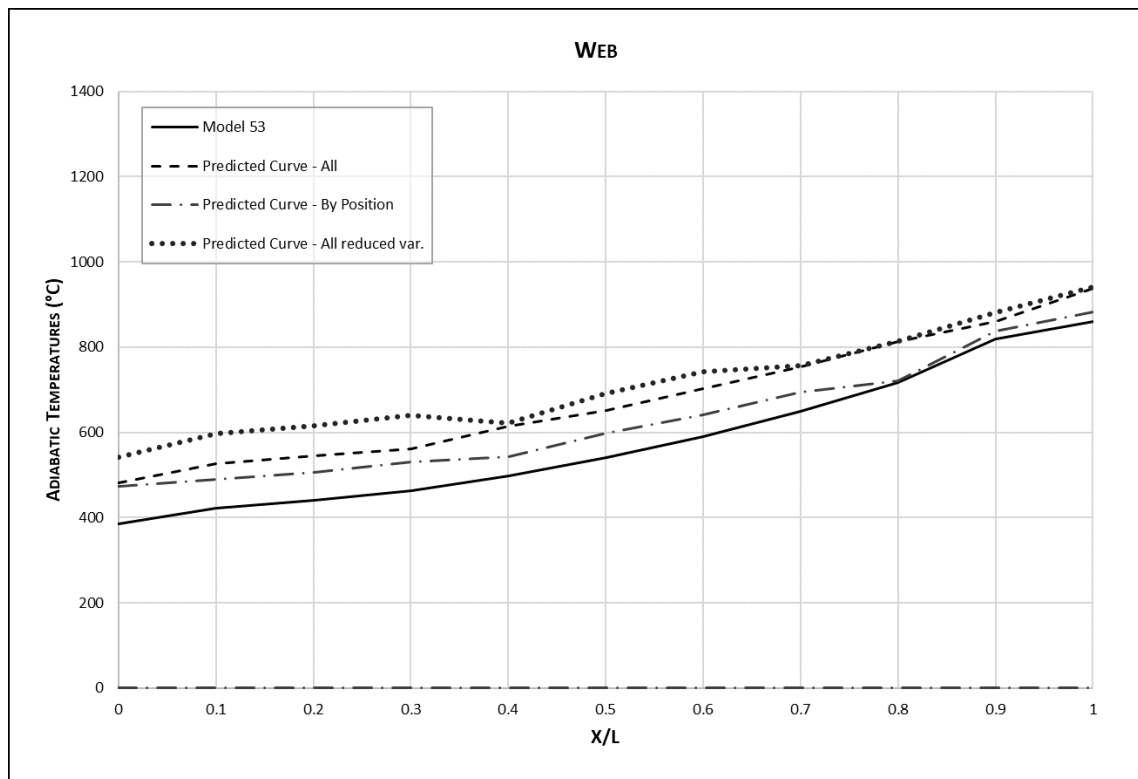
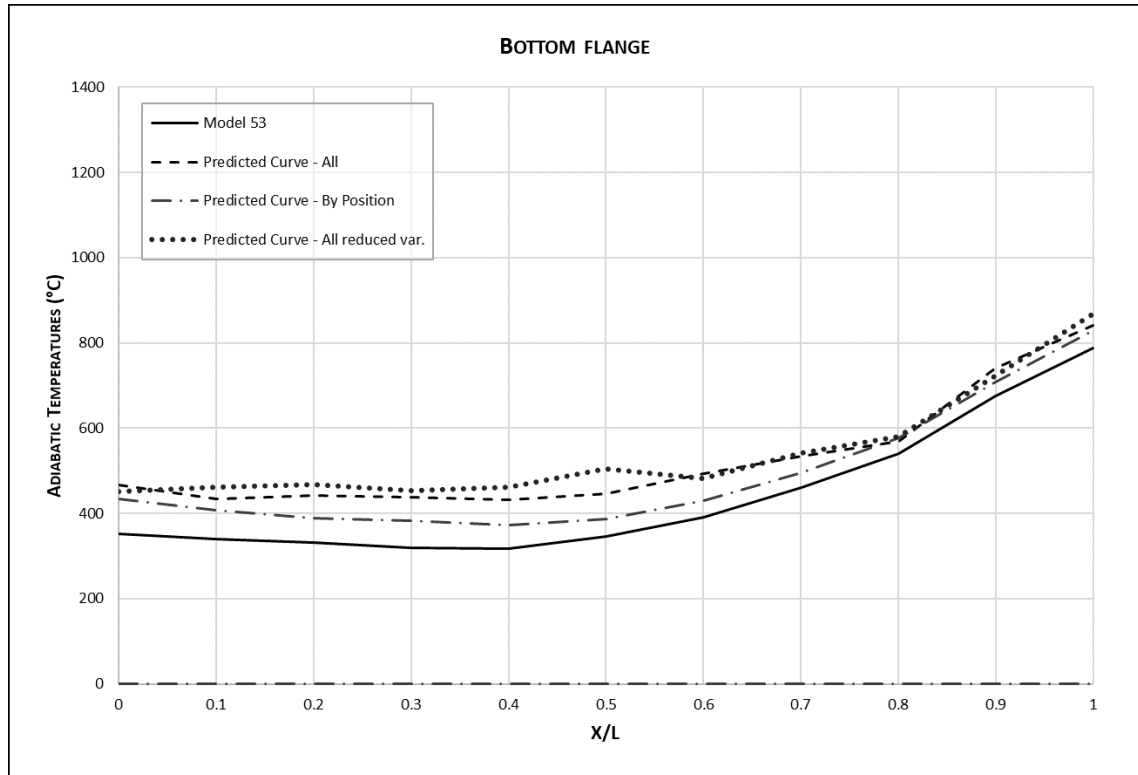


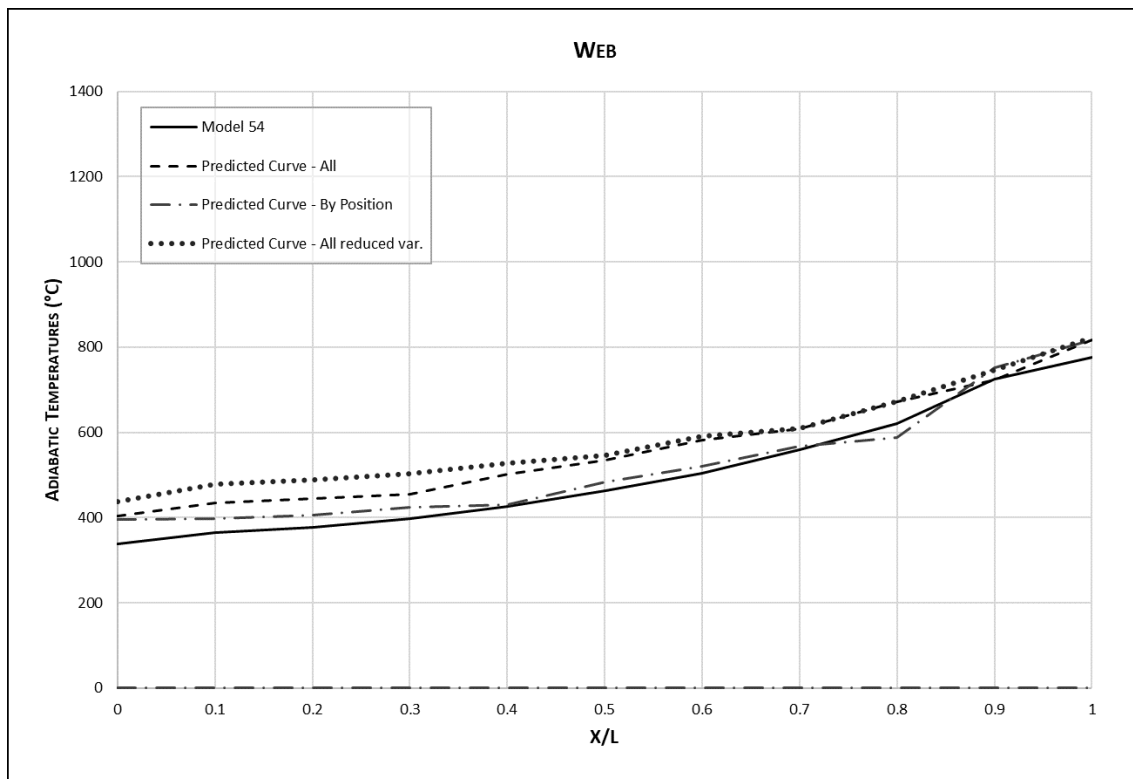
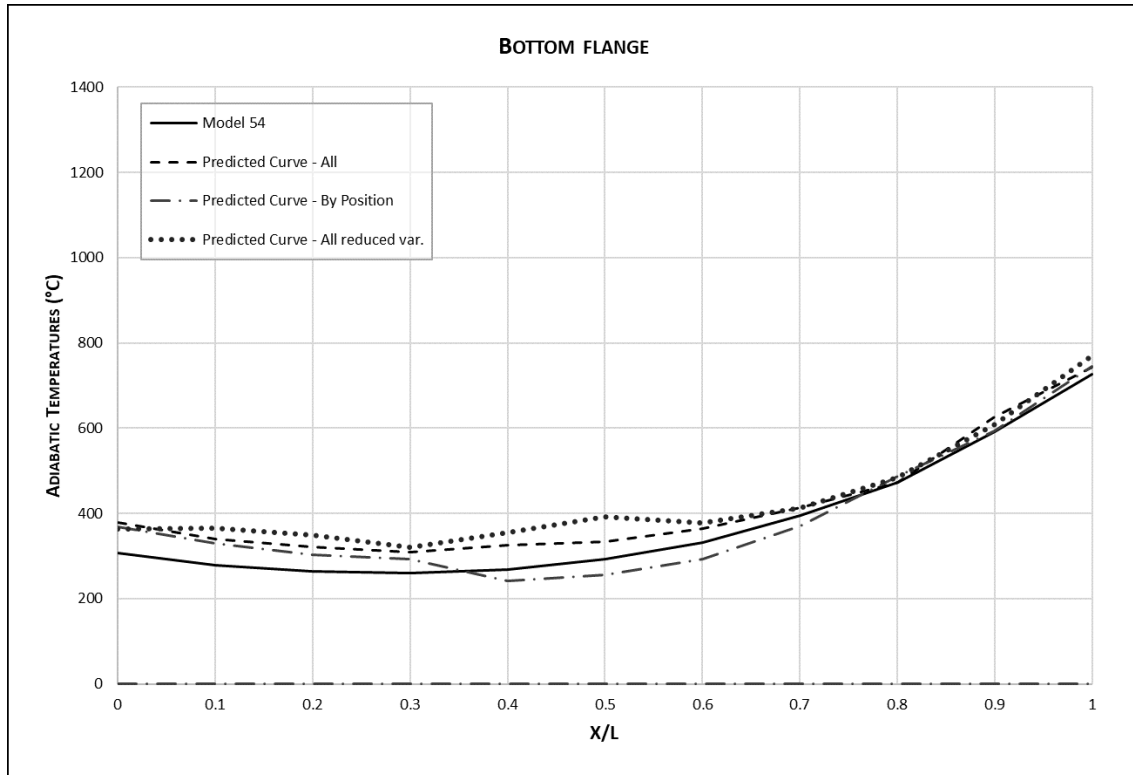


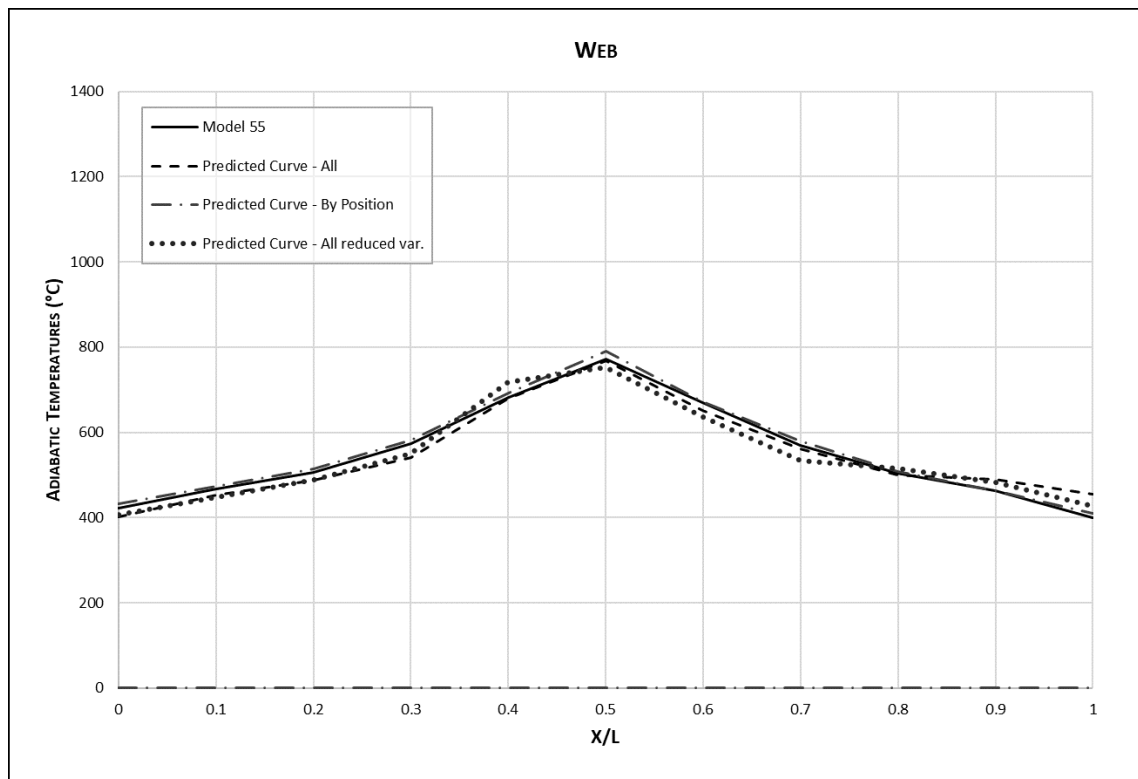
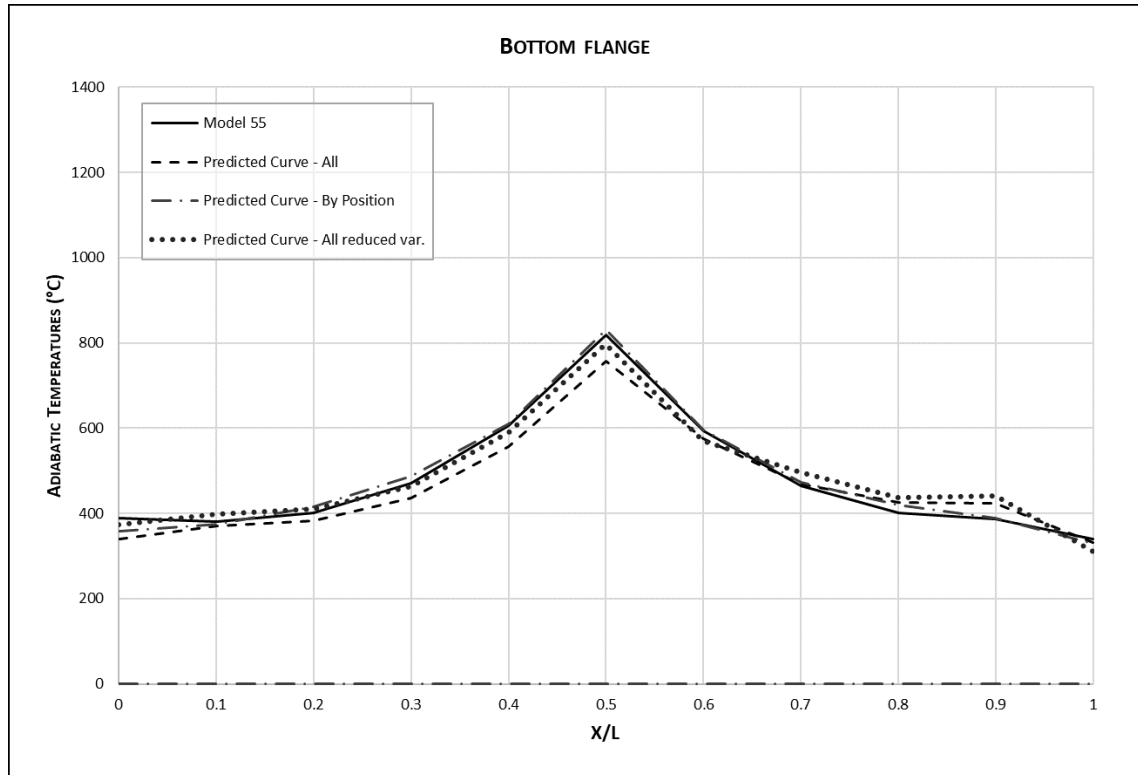


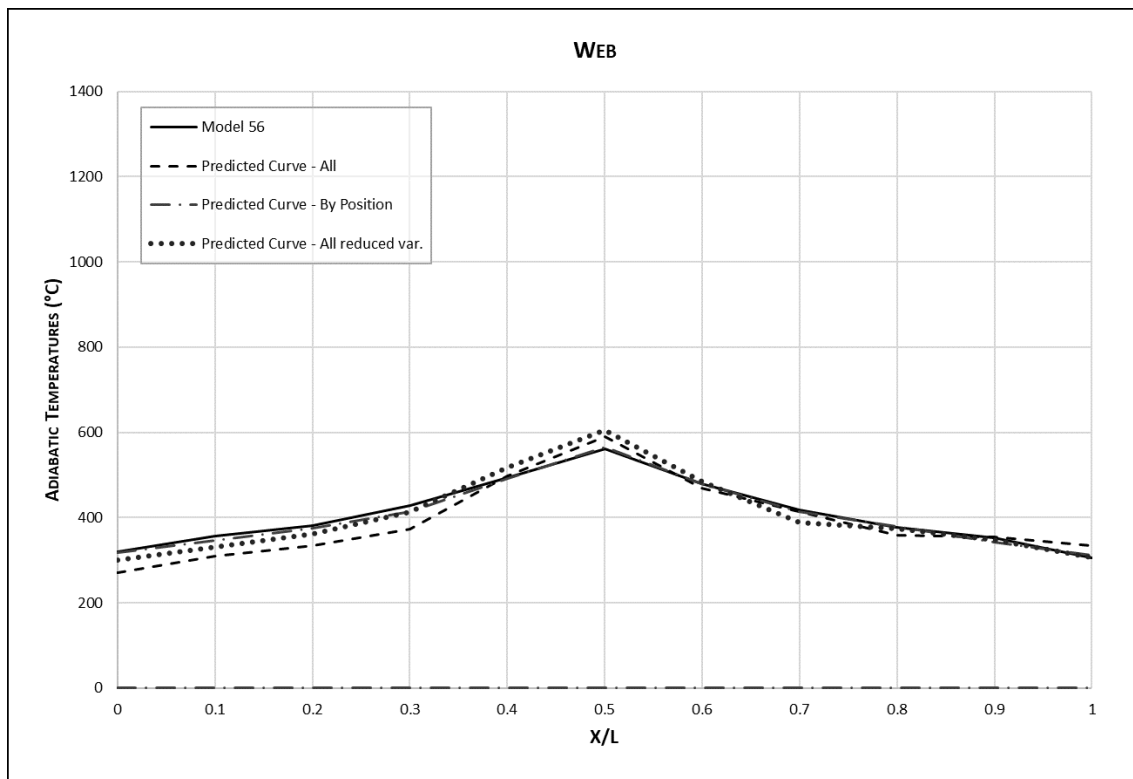
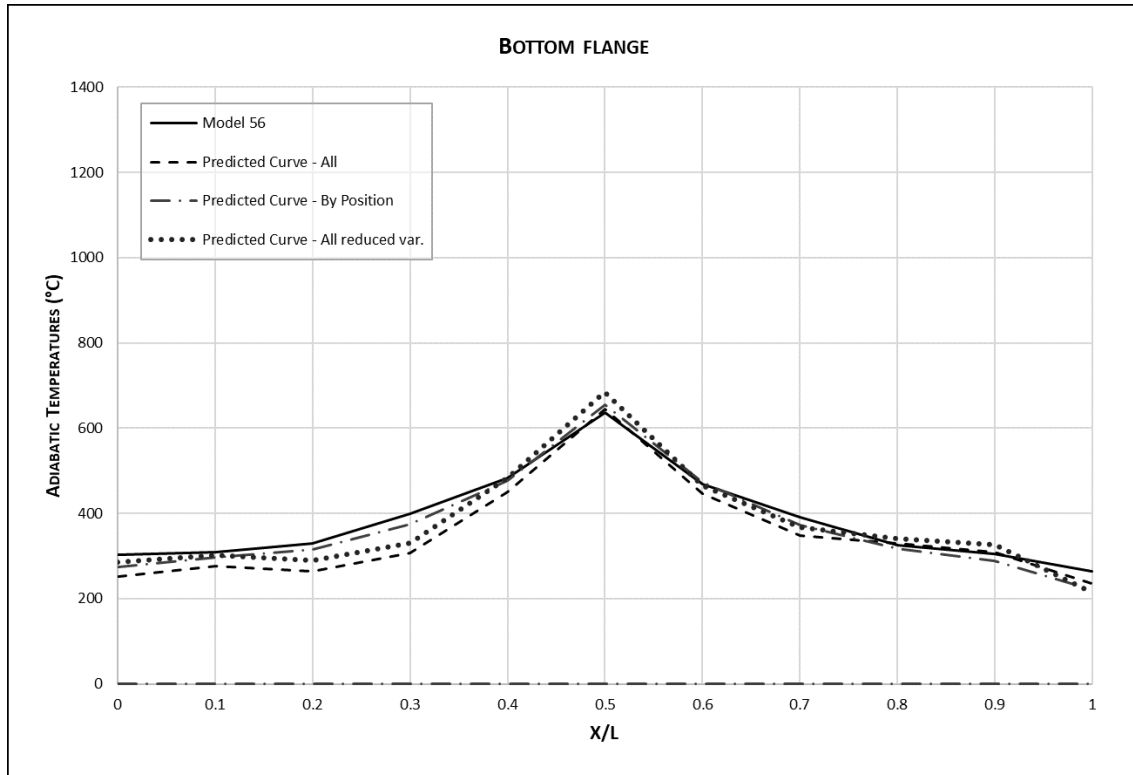


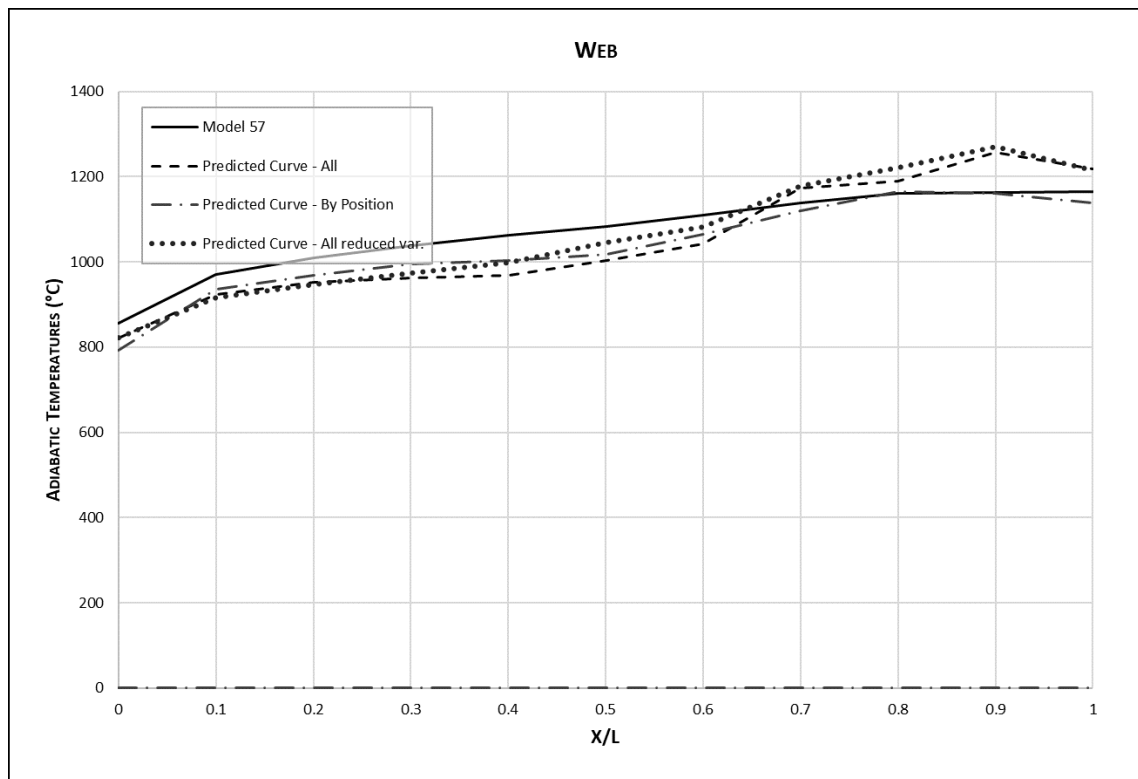
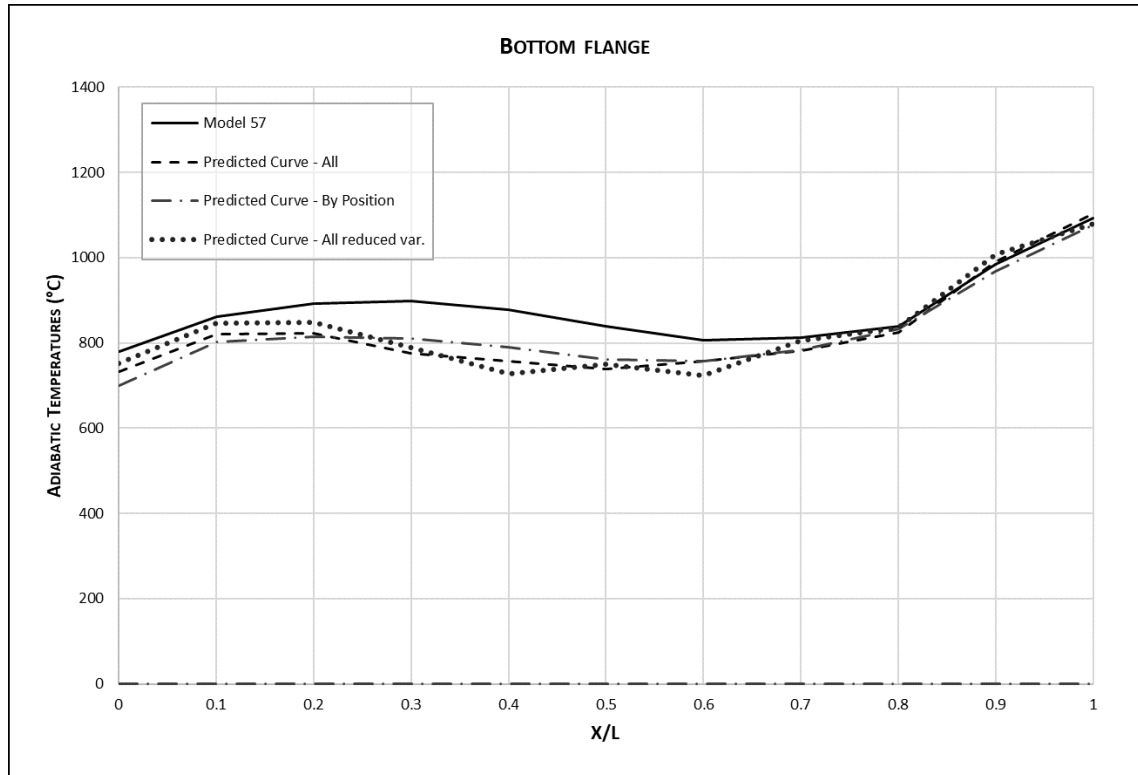


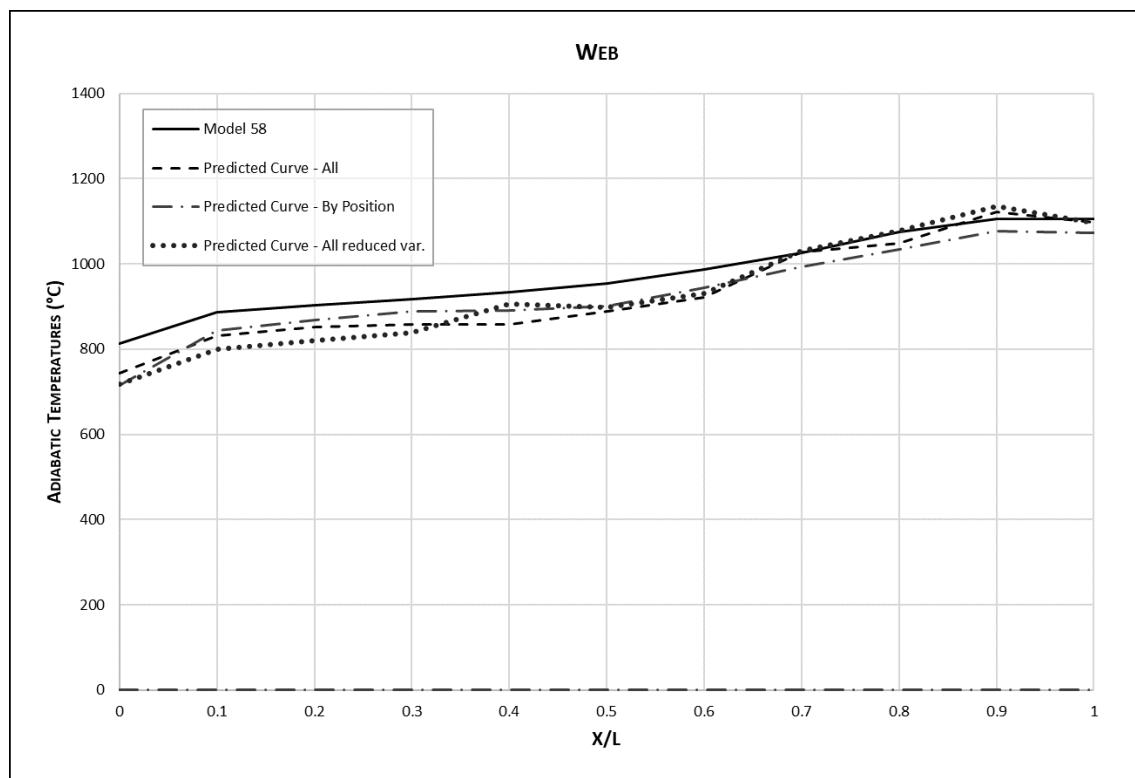
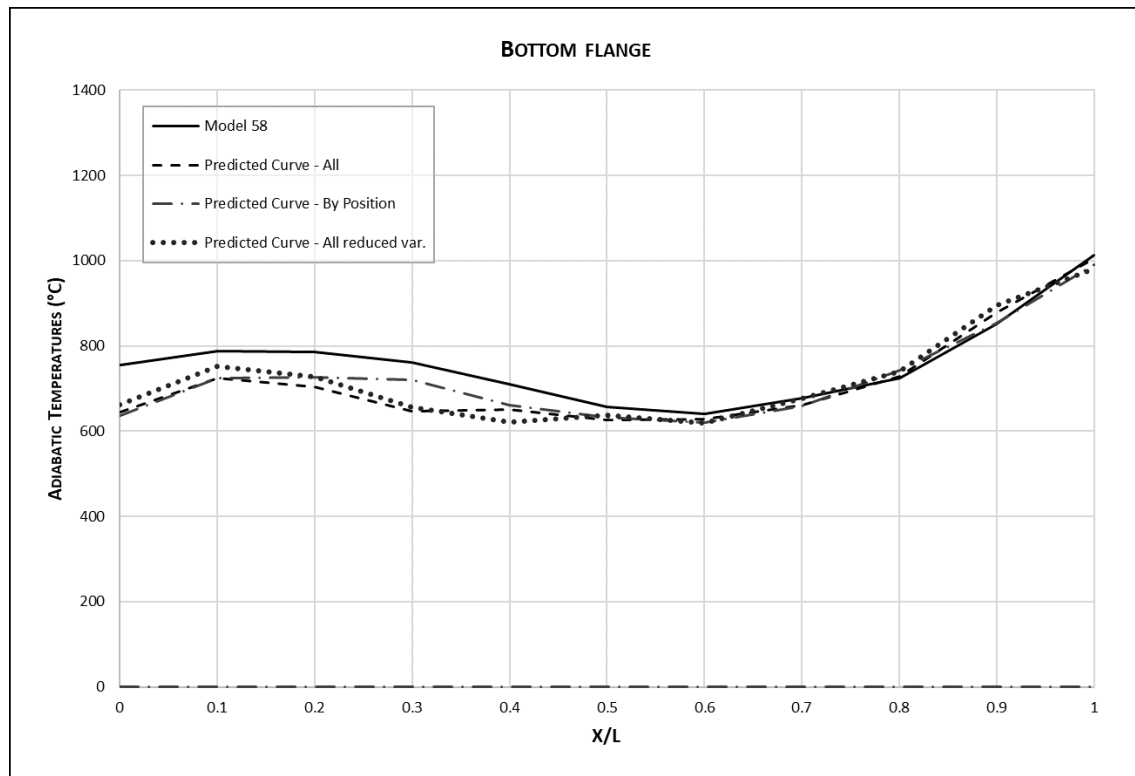


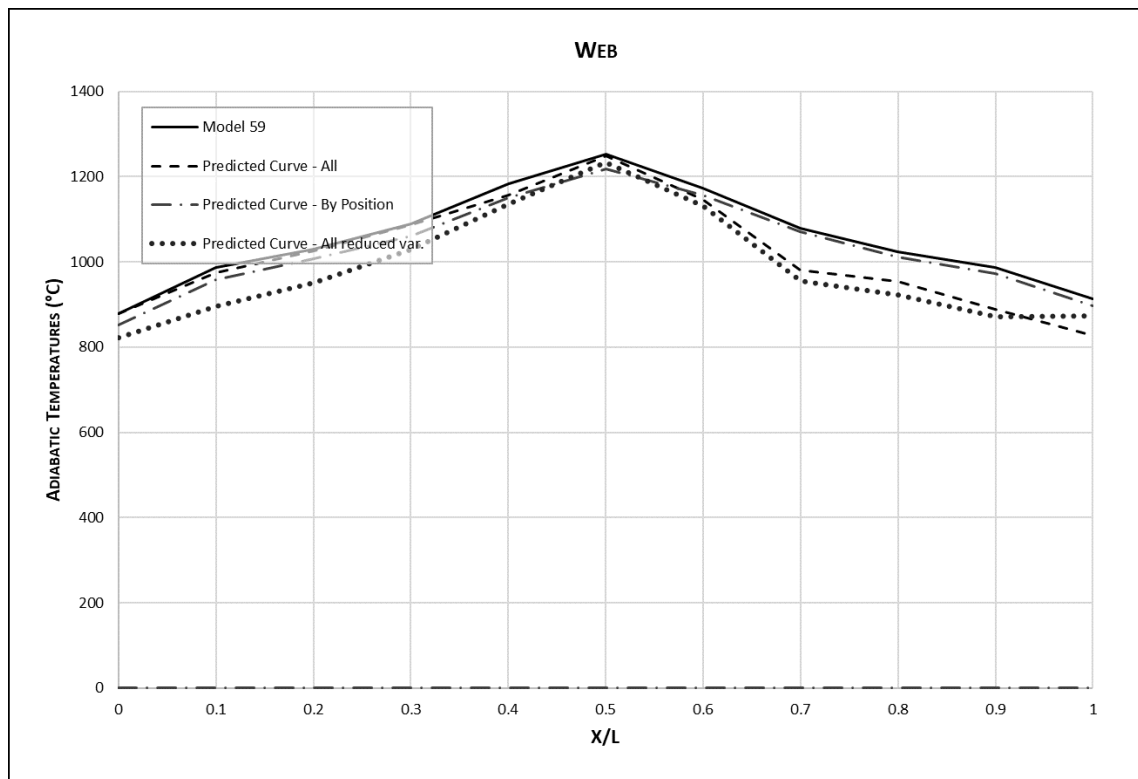
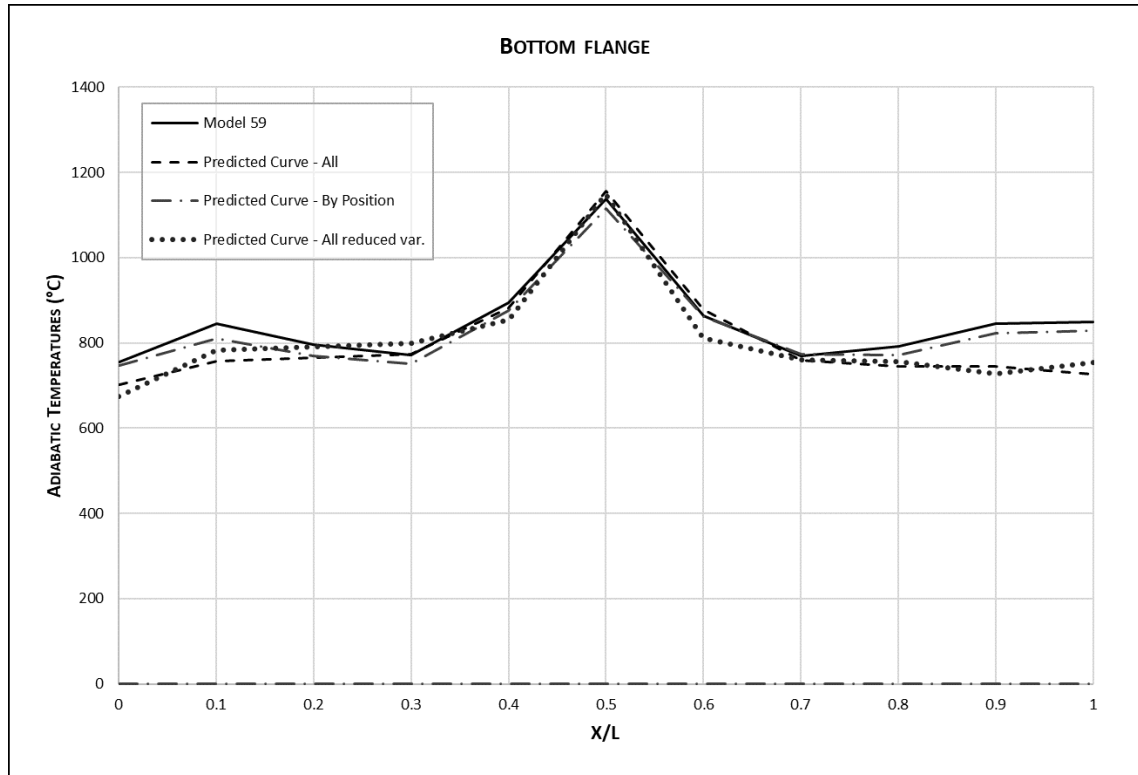


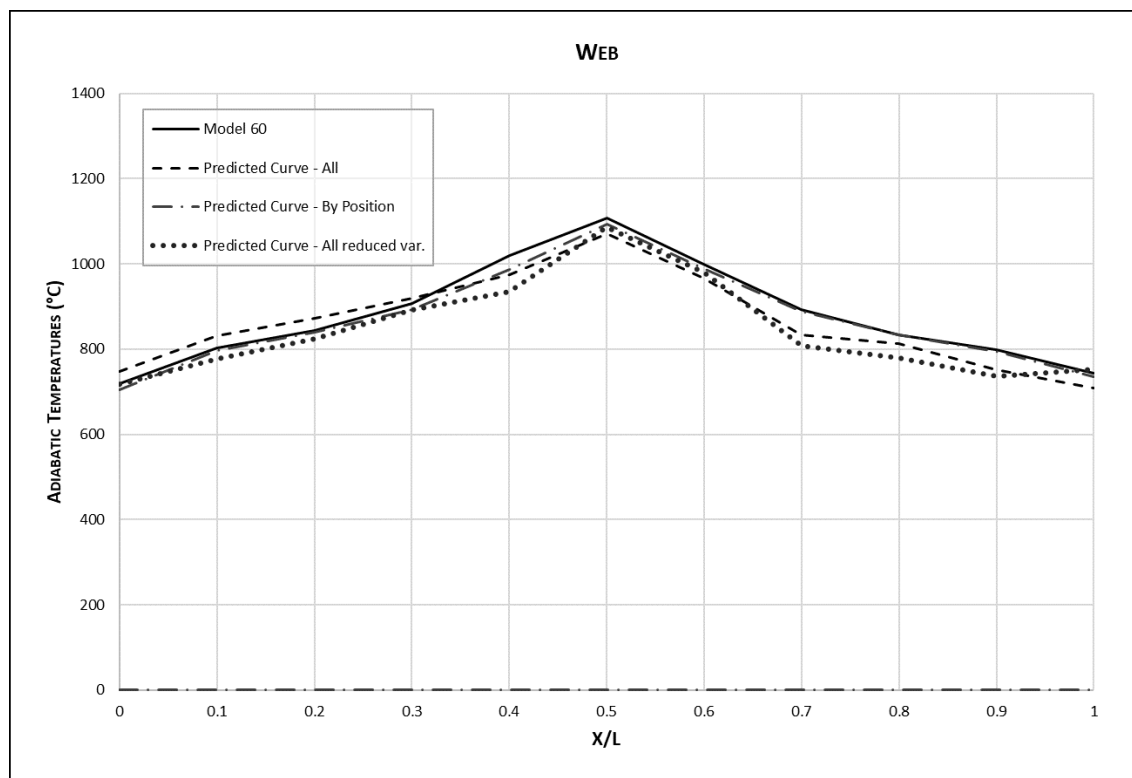
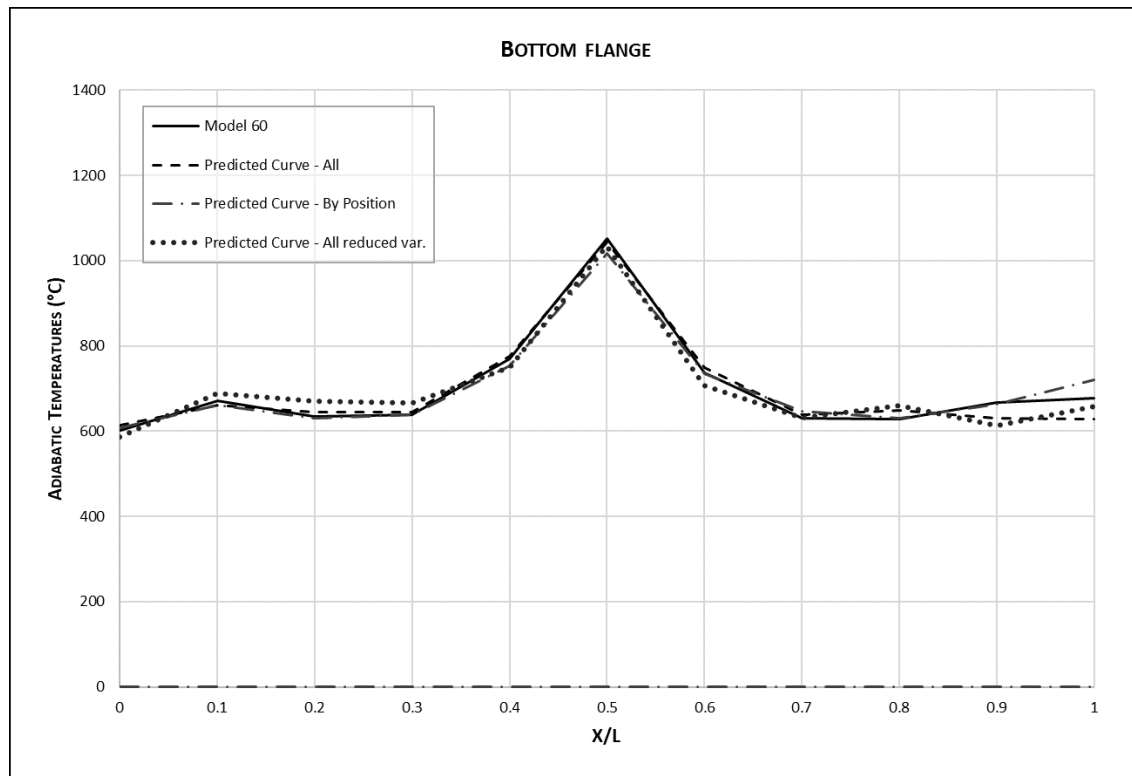


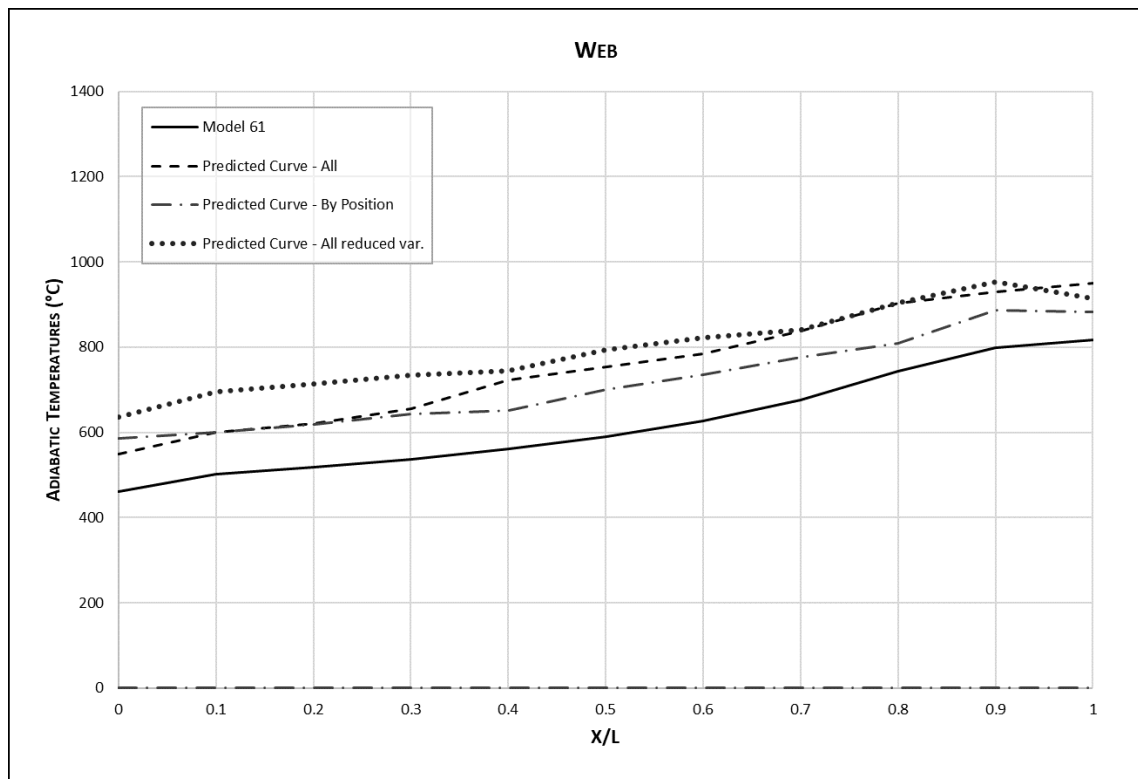
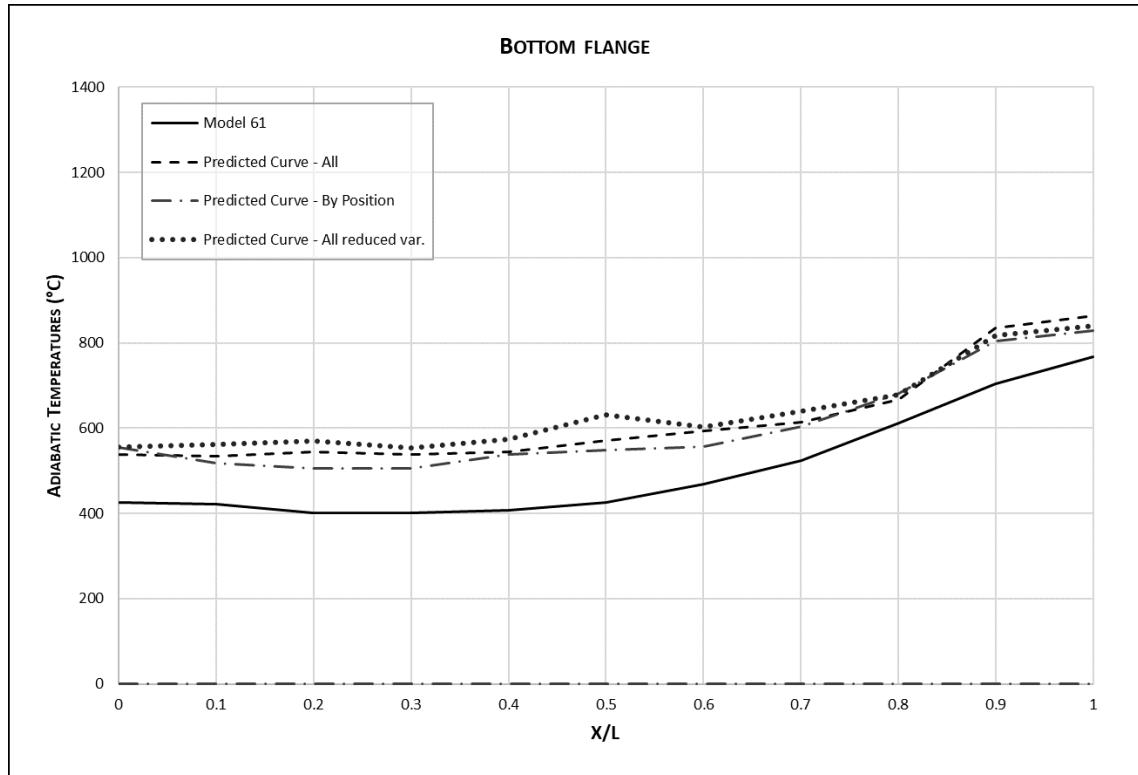


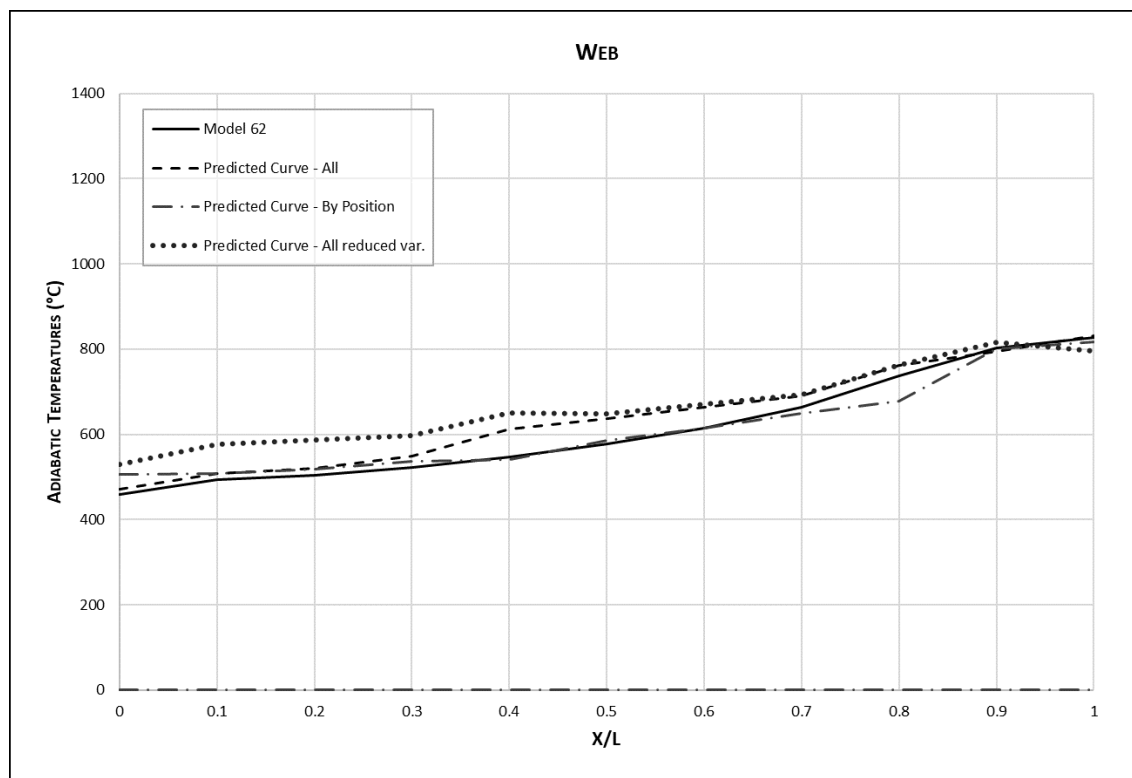
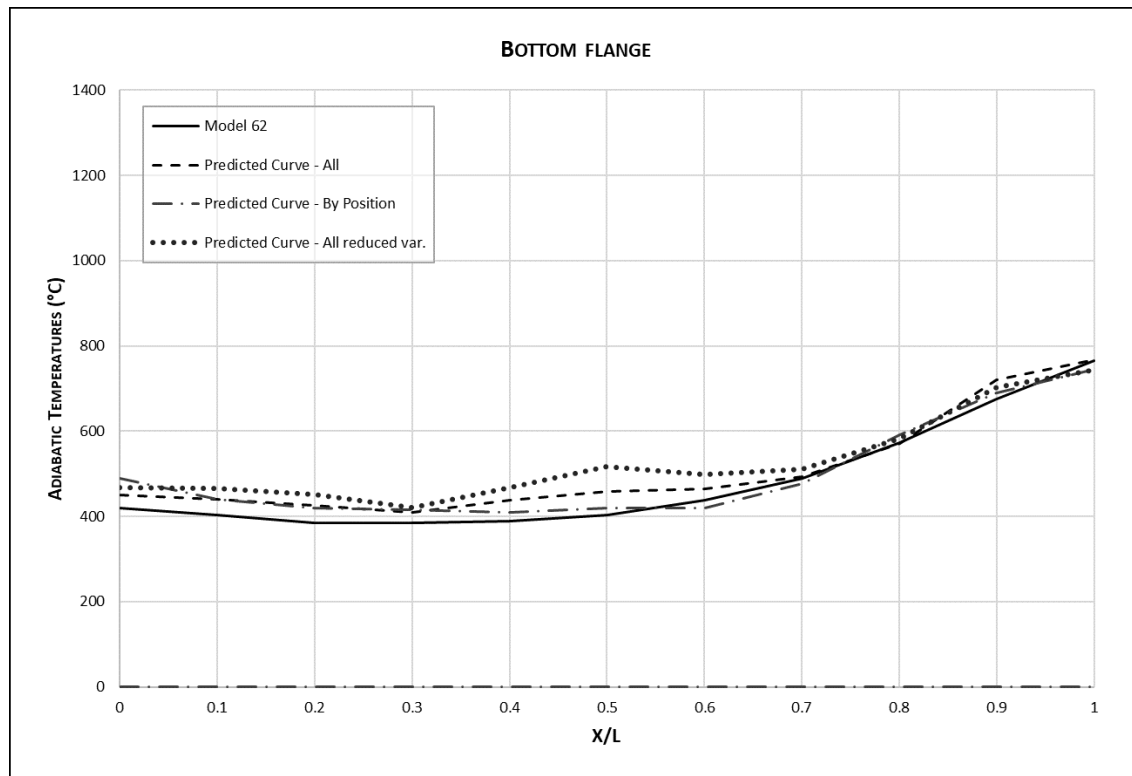


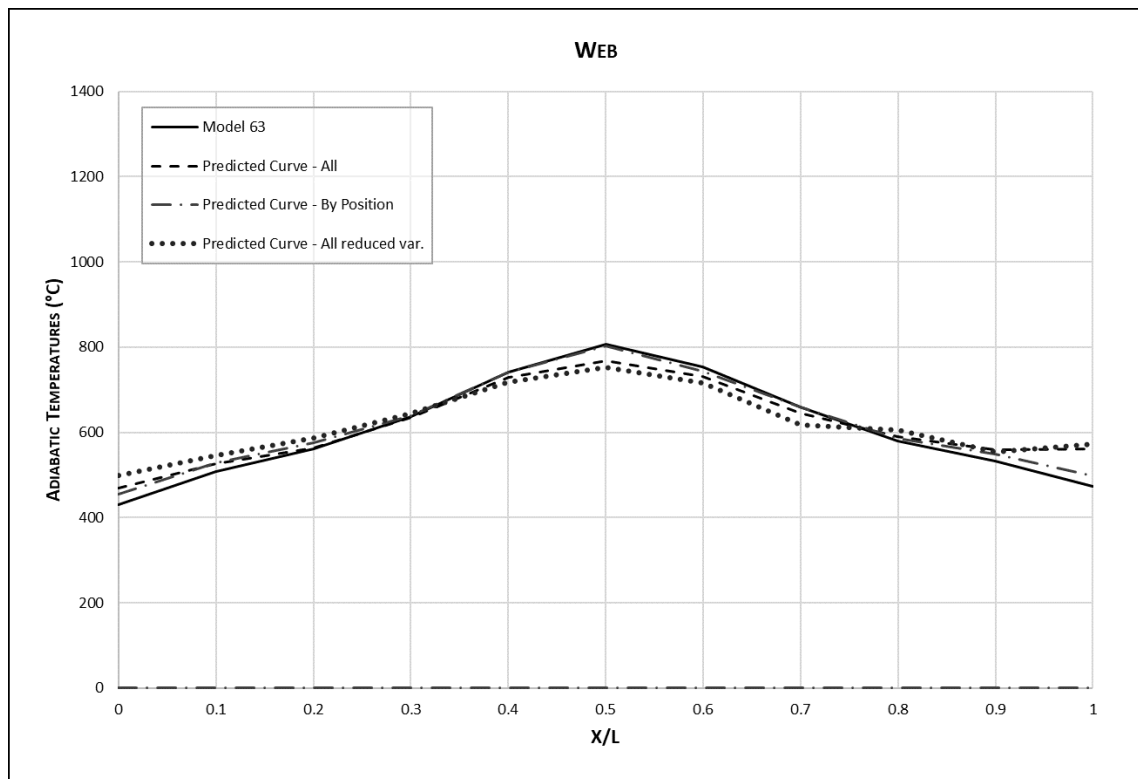
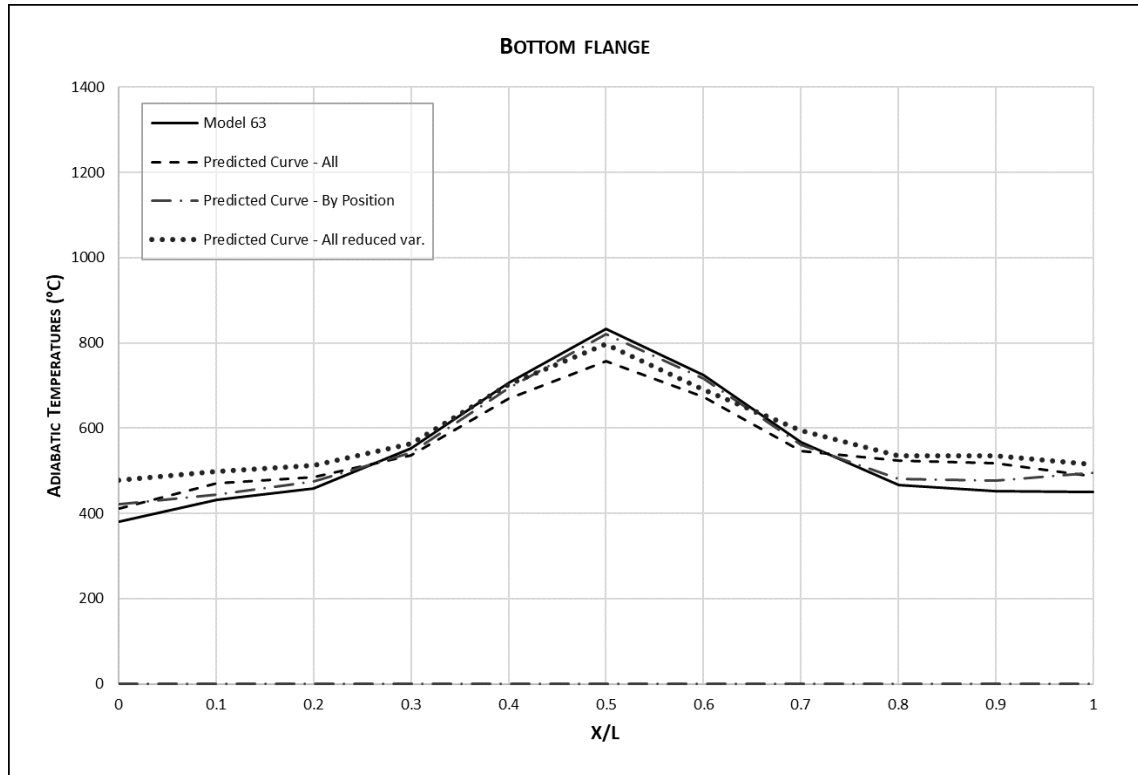


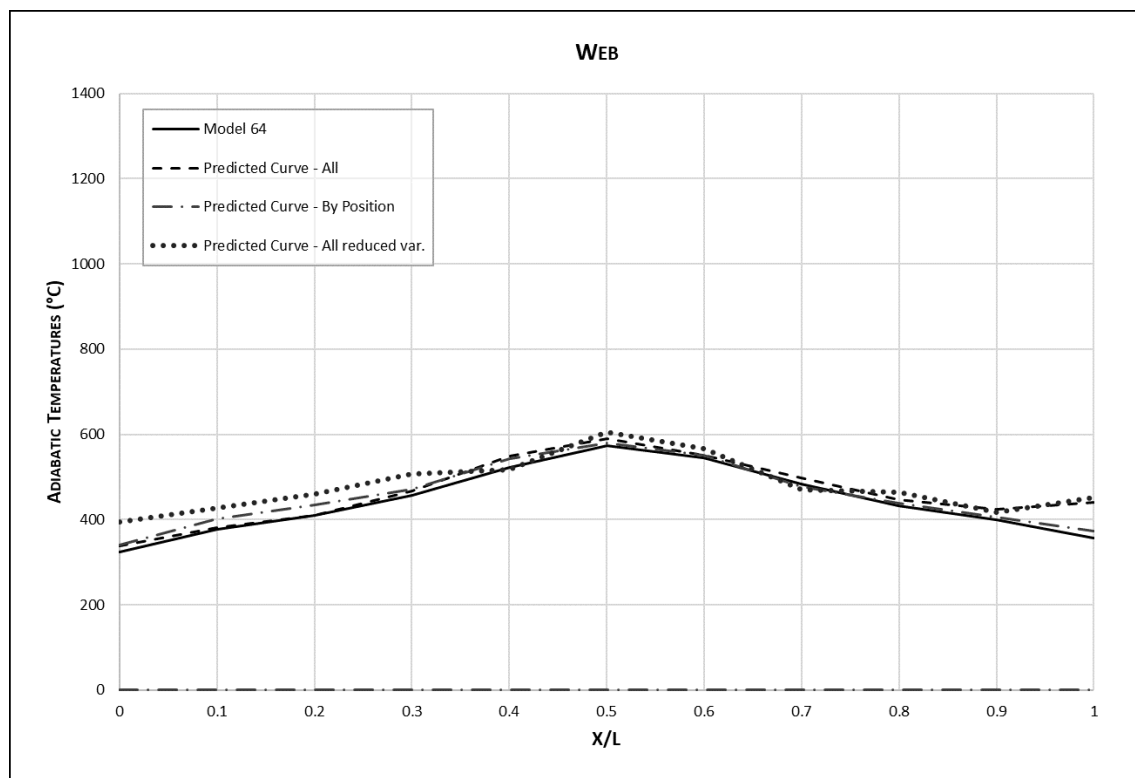
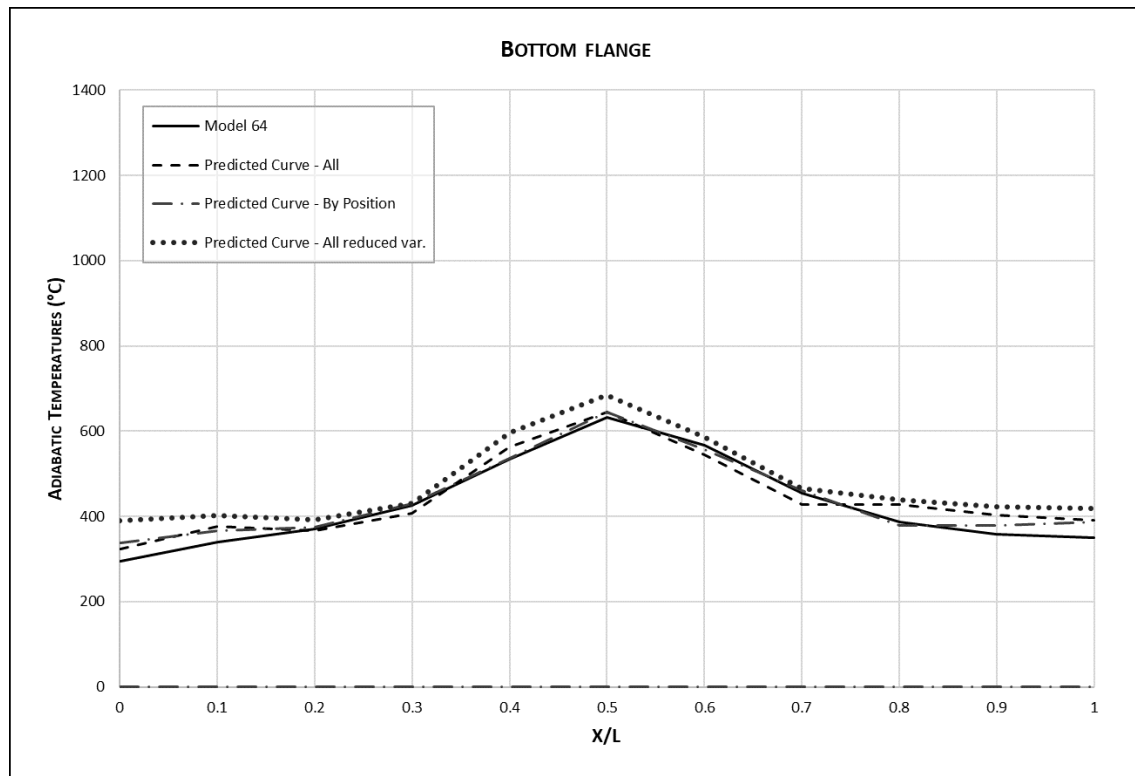












MATRIX TABLE FORMAT

ALL MODELS

BOTTOM FLANGE FIRE CURVE	X/L=0	X/L=0.1	X/L=0.2	X/L=0.3	X/L=0.4	X/L=0.5	X/L=0.6	X/L=0.7	X/L=0.8	X/L=0.9	X/L=1
Constant	788.203	470.456	525.964	692.326	744.810	1069.090	1012.620	824.589	519.012	675.654	876.399
Position	-333.104	-176.759	-196.894	-349.192	-545.484	-852.511	-451.065	-151.301	0	159.005	272.857
Bridge Substructure Config.	0	395.226	251.123	0	203.650	131.744	0	0	284.412	85.756	0
Width	0	5.145	5.017	0	0	0	0	0	2.216	0	0
Span	-16.785	-12.530	-12.813	-12.626	-14.022	0	-24.529	-21.039	-12.382	-11.893	-19.387
Vertical Clearance	-49.485	-31.253	-22.861	-19.158	-23.281	-76.142	-51.601	-46.443	-32.075	-56.541	-59.731
HRR	0.147	0.159	0.116	0.097	0.177	0.188	0.131	0.113	0.161	0.190	0.161
Position - Bridge Substructure Config.	240.348	240.701	254.489	287.198	322.696	310.459	210.165	119.275	0	0	-160.500
Position - Width	0	0	0	4.925	7.481	6.775	5.233	0	0	0	0
Position - Span	0	0	0	0	0	-15.709	0	0	0	0	16.507
Position - Vertical Clearance	24.486	0	0	0	0	57.658	10.245	10.860	15.953	17.584	0
Position - HRR	0	0	0	0	0	0	0	0	0	0	0
Bridge Substructure Config. - Width	5.500	0	0	4.866	0	0	0	4.110	0	0	5.512
Bridge Substructure Config. - Span	7.755	0	0	0	0	0	0	0	0	0	0
Bridge Substructure Config. - Vertical Clearance	-23.437	-40.122	-46.768	-40.045	-29.965	-23.272	-21.255	-26.360	-23.012	0	0
Bridge Substructure Config. - HRR	0	0	0.082	0.118	0	0	0.083	0.088	0	0	0
Width - Span	0	0	0	0	0	0	0	0	0	0	0
Width - Vertical Clearance	0	0	0	0	0	0	0	0	0	0	0
Width - HRR	0	0	0	0	0	0	0	0	0	0	0
Span - Vertical Clearance	0	0	0	0	0	0	1.349	1.248	0	0	0
Span - HRR	0	0	0	0	0	0	0	0	0	0	0
Vertical Clearance - HRR	0	0	0	0	0	0	0	0	0	0	0

WEB FIRE CURVE	X/L=0	X/L=0.1	X/L=0.2	X/L=0.3	X/L=0.4	X/L=0.5	X/L=0.6	X/L=0.7	X/L=0.8	X/L=0.9	X/L=1
Constant	1260.430	1250.780	1295.490	1178.440	1063.210	1137.400	1103.740	934.964	974.353	837.456	1021.100
Position	-341.421	-344.753	-389.829	-456.754	-413.665	-476.466	-454.216	0	-116.917	217.301	202.612
Bridge Substructure Config.	104.697	202.142	181.844	136.396	0	0	0	45.489	47.299	58.404	-125.539
Width	-10.172	-9.501	-9.943	-11.169	0	0	0	0	0	0	0
Span	-22.904	-22.952	-22.472	-11.736	-6.251	0.000	-10.091	-10.364	-11.150	-8.843	-13.275
Vertical Clearance	-135.703	-135.252	-137.262	-115.635	-106.605	-120.022	-103.709	-93.835	-97.084	-88.175	-90.543
HRR	0.218	0.240	0.256	0.279	0.302	0.296	0.301	0.245	0.237	0.226	0.199
Position - Bridge Substructure Config.	261.295	281.506	301.557	321.929	335.125	335.128	334.151	268.131	253.173	152.668	0
Position - Width	4.615	4.720	5.120	5.927	5.231	4.831	4.543	-5.788	0	0	0
Position - Span	0	0	0	0	-7.508	-12.773	0	0	0	0	11.698
Position - Vertical Clearance	34.093	31.509	32.643	36.075	45.209	57.320	38.954	0	19.702	0	0
Position - HRR	-0.086	-0.087	-0.090	-0.102	-0.118	-0.103	-0.099	0	0	0	0
Bridge Substructure Config. - Width	0	0	0	0	0	0	0	0	0	0	0
Bridge Substructure Config. - Span	0	0	0	0	0	0	0	0	0	0	0
Bridge Substructure Config. - Vertical Clearance	-13.269	-22.025	-21.294	-17.494	0	0	0	0	0	0	23.730
Bridge Substructure Config. - HRR	0	0	0	0	0	0	0	0	0	0	0
Width - Span	0	0	0	0	0	0	0	0	0	0	0
Width - Vertical Clearance	1.615	1.544	1.522	1.549	0	0	0	0.745	0.441	0.480	0
Width - HRR	0	0	0	0	0	0	0	0	0	0	0
Span - Vertical Clearance	1.609	1.544	1.450	0	0	0	0	0	0	0	0
Span - HRR	0	0	0	0	0	0	0	0	0	0	0
Vertical Clearance - HRR	0	0	0	0	0	0	0	0	0	0	0

ALL MODELS – REDUCED VARIABLES

BOTTOM FLANGE FIRE CURVE	X/L=0	X/L=0.1	X/L=0.2	X/L=0.3	X/L=0.4	X/L=0.5	X/L=0.6	X/L=0.7	X/L=0.8	X/L=0.9	X/L=1
Constant	705.882	564.103	862.282	762.661	846.635	1134.960	787.883	649.300	559.335	614.110	1012.200
Position	-160.603	-176.759	-197.087	-394.046	-542.433	-713.626	-392.535	-76.465	0	282.093	0
Bridge Substructure Config.	0	395.226	0	0	0	0	0	0	284.412	85.756	0
Width	0	0	0	0	0	0	0	0	0	0	0
Span	-12.908	-12.530	-12.813	-12.626	-14.022	0	-15.085	-12.305	-12.382	-11.893	-25.732
Vertical Clearance	-48.961	-31.253	-23.030		-38.264	-87.778	-30.123	-17.094	-32.075	-47.749	-59.731
HRR	0.147	0.159	0	0	0.177	0.188	0.173	0.099	0.161	0.190	0.161
Position - Bridge Substructure Config.	238.142	240.701	254.875	288.351	316.594	279.302	236.533	121.641	0	0	142.695
Position - Width	0	0	0	7.358	7.481		5.233	0	0	0	0
Position - Span	0	0	0	0	0	-15.709	0	0	0	0	29.198
Position - Vertical Clearance	0	0	0	0	0	57.658	0	0	15.953	0	0
Position - HRR	0	0	0	0	0	0	0	0	0	0	0
Bridge Substructure Config. - Width	5.129	0	0	0	0	0	0	0	0	0	5.091
Bridge Substructure Config. - Span	0	0	0	0	0	0	0	0	0	0	0
Bridge Substructure Config. - Vertical Clearance	0	-40.122	-46.430	-58.699	0	0	0	-24.290	-23.012	0	0
Bridge Substructure Config. - HRR	0	0	0.200	0.222	0	0	0	0.115	0	0	0
Width - Span	0	0	0	0	0	0	0	0	0	0	0
Width - Vertical Clearance	0	0	0	0	0	0	0	0	0	0	0
Width - HRR	0	0	0	0	0	0	0	0	0	0	0
Span - Vertical Clearance	0	0	0	0	0	0	0	0	0	0	0
Span - HRR	0	0	0	0	0	0	0	0	0	0	0
Vertical Clearance - HRR	0	0	0	0	0	0	0	0	0	0	0

WEB FIRE CURVE	X/L=0	X/L=0.1	X/L=0.2	X/L=0.3	X/L=0.4	X/L=0.5	X/L=0.6	X/L=0.7	X/L=0.8	X/L=0.9	X/L=1
Constant	992.583	1053.580	1096.410	1150.820	858.179	1245.720	1207.330	956.827	928.161	866.658	1059.640
Position	-443.826	-464.570	-501.037	-570.751	0	-605.194	-578.715	0	0	188.099	0
Bridge Substructure Config.	0	0	0	0	0	0	0	0	0	0	0
Width	0	0	0	0	0	0	0	0	0	0	0
Span	-11.639	-12.141	-12.320	-11.736	0	0	-10.091	-10.364	-11.150	-8.843	-18.146
Vertical Clearance	-80.750	-87.268	-91.203	-96.196	-104.356	-120.022	-103.709	-95.162	-79.207	-79.446	-82.253
HRR	0.175	0.197	0.212	0.228	0.332	0.245	0.252	0.245	0.237	0.226	0.199
Position - Bridge Substructure Config.	273.106	329.476	334.341	335.870	332.554	335.128	334.151	311.856	298.705	211.072	0
Position - Width	0	0	0	0	0	0	0	-6.892	0	0	0
Position - Span	0	0	0	0	-15.366	-12.773	0	0	0	0	21.439
Position - Vertical Clearance	34.093	31.509	32.643	36.075	40.711	57.320	38.954	0	0	0	0
Position - HRR	0	0	0	0	-0.178	0	0	0	0	0	0
Bridge Substructure Config. - Width	0	0	0	0	0	0	0	0	0	0	0
Bridge Substructure Config. - Span	0	0	0	0	0	0	0	0	0	0	0
Bridge Substructure Config. - Vertical Clearance	0	0	0	0	0	0	0	0	0	0	7.149
Bridge Substructure Config. - HRR	0	0	0	0	0	0	0	0	0	0	0
Width - Span	0	0	0	0	0	0	0	0	0	0	0
Width - Vertical Clearance	0	0	0	0	0	0	0	0.818	0	0	0
Width - HRR	0	0	0	0	0	0	0	0	0	0	0
Span - Vertical Clearance	0	0	0	0	0	0	0	0	0	0	0
Span - HRR	0	0	0	0	0	0	0	0	0	0	0
Vertical Clearance - HRR	0	0	0	0	0	0	0	0	0	0	0

FIRE ADJACENT TO ABUTMENT/PIERS

BOTTOM FLANGE FIRE CURVE	X/L=0	X/L=0.1	X/L=0.2	X/L=0.3	X/L=0.4	X/L=0.5	X/L=0.6	X/L=0.7	X/L=0.8	X/L=0.9	X/L=1
Constant	586.773	436.544	382.624	351.811	297.744	314.738	729.787	832.266	926.635	1277.460	1762.350
Bridge Substructure Config.	158.460	633.453	700.820	723.359	463.631	364.279	0	0	141.056	1846.413	-517.389
Width	0	0	0	0	0	0	-10.745	-14.041	-15.068	-18.566	-29.190
Span	-15.110	-13.878	-14.589	-15.416	-11.188	-11.054	-15.802	-13.467	-13.105	-11.892	0
Vertical Clearance	-36.718	-45.826	-41.086	-36.539	0	0	-37.169	-49.127	-68.694	-104.635	-134.375
HRR	0.107	0.129	0.145	0.152	0.090	0.094	0.086	0.094	0.150	0.192	0.141
Bridge Substructure Config. - Width	9.507	0	0	0	12.213	11.952	9.549	5.991	0	0	13.851
Bridge Substructure Config. - Span	0	0	0	0	-9.565	-9.309	0	0	0	0	0
Bridge Substructure Config. - Vertical Clearance	0	-39.768	-50.028	-54.349	-63.153	-53.063	-33.919	-22.424	0	25.894	29.303
Bridge Substructure Config. - HRR	0	0	0	0	0.126	0.121	0.142	0.115	0	0	0
Width - Span	0	0	0	0	0	0	0	0	0	0	0
Width - Vertical Clearance	0	1.123	1.097	1.129	0	0	1.600	2.007	2.376	2.897	3.331
Width - HRR	0	0	0	0	0	0	0	0	0	0	0
Span - Vertical Clearance	0	0	0	0	0	0	0	0	0	0	0
Span - HRR	0	0	0	0	0	0	0	0	0	0	0
Vertical Clearance - HRR	0	0	0	0	0	0	0	0	0	0	0

WEB FIRE CURVE	X/L=0	X/L=0.1	X/L=0.2	X/L=0.3	X/L=0.4	X/L=0.5	X/L=0.6	X/L=0.7	X/L=0.8	X/L=0.9	X/L=1
Constant	686.808	886.323	891.939	912.422	1020.150	1129.330	1184.990	1242.040	1443.450	1462.280	1658.350
Bridge Substructure Config.	273.106	511.806	527.134	515.162	351.256	198.326	196.256	184.768	0	0	-284.372
Width	0	-14.364	-14.456	-14.733	-19.277	-20.906	-23.090	-25.156	-29.975	-25.979	-25.283
Span	-14.029	-13.950	-14.114	-14.058	-13.759	-12.773	-11.718	-10.138	-11.140	-6.148	3.339
Vertical Clearance	-64.477	-95.759	-97.535	-100.176	-104.713	-119.845	-126.752	-133.754	-138.346	-162.035	-170.253
HRR	0.132	0.153	0.167	0.177	0.185	0.193	0.202	0.212	0.220	0.289	0.255
Bridge Substructure Config. - Width	0	0	0	0	7.404	7.517	7.577	7.910	15.912	10.648	11.307
Bridge Substructure Config. - Span	0	0	0	0	0	0	0	0	0	0	0
Bridge Substructure Config. - Vertical Clearance	0	-26.047	-27.542	-25.613	-21.555	0	0	0	0	46.355	63.010
Bridge Substructure Config. - HRR	0	0	0	0	0	0	0	0	0	-0.147	-0.145
Width - Span	0	0	0	0	0	0	0	0	0	0	0
Width - Vertical Clearance	0.979	2.913	2.898	2.904	2.972	3.140	3.406	3.673	3.791	3.593	3.339
Width - HRR	0	0	0	0	0	0	0	0	0	0	0
Span - Vertical Clearance	0	0	0	0	0	0	0	0	0	0	0
Span - HRR	0	0	0	0	0	0	0	0	0	0	0
Vertical Clearance - HRR	0	0	0	0	0	0	0	0	0	0	0

FIRE LOCATED MID-SPAN

BOTTOM FLANGE FIRE CURVE	X/L=0	X/L=0.1	X/L=0.2	X/L=0.3	X/L=0.4	X/L=0.5	X/L=0.6	X/L=0.7	X/L=0.8	X/L=0.9	X/L=1
Constant	966.595	195.223	349.526	661.413	971.460	1591.880	823.857	529.937	357.724	388.419	1579.770
Bridge Substructure Config.	-225.217	402.293	208.827	109.344	0	-180.594	0	175.949	194.442	286.255	177.483
Width	-30.154	3.287	7.640	5.943	0	-8.443	0	0	7.882	0	-28.309
Span	-41.575	-19.882	-20.048	-19.836	-11.408	0	-10.729	-24.031	-21.402	-26.277	-56.035
Vertical Clearance	0	0	0	-35.360	-97.658	-133.690	-72.203	0	0	0	-92.956
HRR	0.345	0.393	0.252	0.132	0.195	0	0.232	0.214	0.255	0.333	0.181
Bridge Substructure Config. - Width	7.787	0	0	2.147	0	0	0	0	0	0	6.962
Bridge Substructure Config. - Span	18.051	0	3.231	0	0	7.472	0	0	3.709	0	0
Bridge Substructure Config. - Vertical Clearance	-26.686	-41.131	-43.416	-30.120	-7.747	0	-7.568	-30.877	-42.078	-39.946	-28.242
Bridge Substructure Config. - HRR	0	0	0.060	0.057	0.023	0	0.038	0.055	0.063	0.056	0
Width - Span	1.200	0	0	0	0	0.297	0.203	0.342	0	0.314	1.115
Width - Vertical Clearance	0	0	-0.648	0.733	0	0	-0.700	-0.791	-0.717	-0.506	0
Width - HRR	0	0	0	0	0	0	0	0	0	0	0
Span - Vertical Clearance	0	1.243	1.056	1.429	1.542	-1.115	1.281	0.952	1.127	1.238	2.335
Span - HRR	0	0	0	0	-0.005	0	-0.008	0	0	0	0
Vertical Clearance - HRR	-0.023	-0.029	-0.016	0	0.015	0.032	0.013	-0.011	-0.016	-0.025	0

WEB FIRE CURVE	X/L=0	X/L=0.1	X/L=0.2	X/L=0.3	X/L=0.4	X/L=0.5	X/L=0.6	X/L=0.7	X/L=0.8	X/L=0.9	X/L=1
Constant	879.613	855.254	943.129	1123.480	1317.000	1810.910	1386.990	1095.470	710.760	769.827	702.364
Bridge Substructure Config.	0	173.983	138.110	79.559	-11.189	-83.105	0	0	165.634	106.394	131.530
Width	1.136	1.310	0	0	-1.561	-8.878	-8.838	-6.363	0	-4.402	0
Span	-24.632	-22.849	-21.037	-17.731	-6.251	0	-15.709	-15.658	-11.842	-17.238	-15.915
Vertical Clearance	-80.446	-83.915	-90.201	-115.267	-138.003	-186.737	-123.011	-107.330	-79.796	-76.708	-81.869
HRR	0.317	0.340	0.335	0.279	0.198	0	0.227	0.333	0.419	0.418	0.428
Bridge Substructure Config. - Width	0	0	0	0	0	0	0	0	0	1.605	0
Bridge Substructure Config. - Span	5.363	0	0	0	0	3.426	2.457	2.104	0	0	0
Bridge Substructure Config. - Vertical Clearance	-13.681	-18.002	-15.047	-9.374	0	0	-5.663	-10.538	-16.905	-19.148	-15.550
Bridge Substructure Config. - HRR	0	0	0	0	0	0	0	0.029	0	0.027	0
Width - Span	0	0	0	0	0	0.322	0.331	0.264	0	0.214	0
Width - Vertical Clearance	0	0	0	0	0	0	0	0	0	0	0
Width - HRR	0	0	0	0	0	0	0	0	0	0	0
Span - Vertical Clearance	1.815	1.788	1.501	1.188	0	-1.035	0	0.948	1.267	1.609	2.038
Span - HRR	0	0	0	0	0	0	0	0	-0.004	-0.005	-0.006
Vertical Clearance - HRR	-0.014	-0.014	-0.011	0	0.015	0.042	0.011	-0.004	-0.012	-0.015	-0.015

