

Dynamic Performance of Cantilevered Sign Trusses for Fatigue

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Due to file size, the full report without appendices is available in a separate file located at:

<https://kdotapp.ksdot.org/kdotlib/kdotlib2.aspx>

or by contacting the KDOT Library at KDOT#Research.Library@ks.gov.

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Appendix A1

A1.1: Y-Component of Velocity Behind Large Sign at V=30 mph (13.4 m/s)

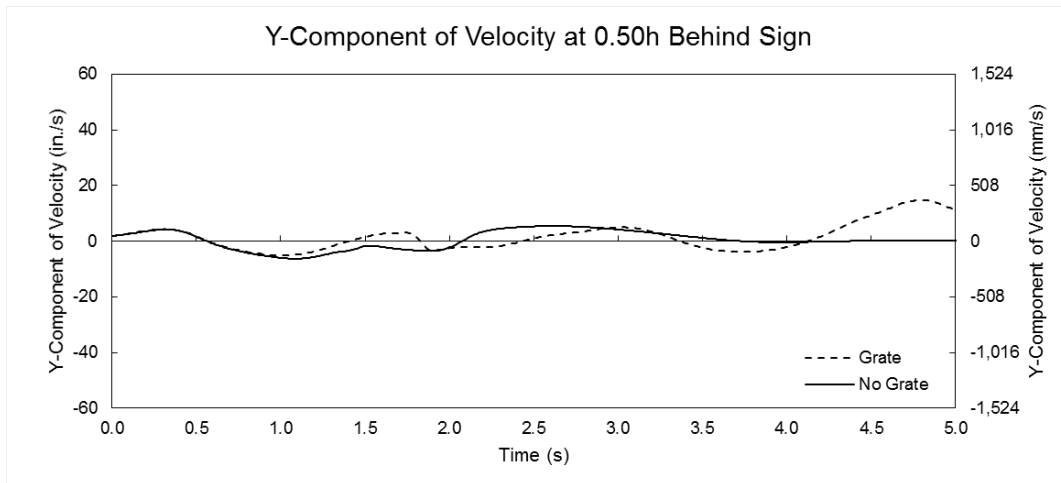


Figure A1.1: Y-component of velocity for the large sign at V=30 mph (13.4 m/s) at a distance = 0.5h behind the sign

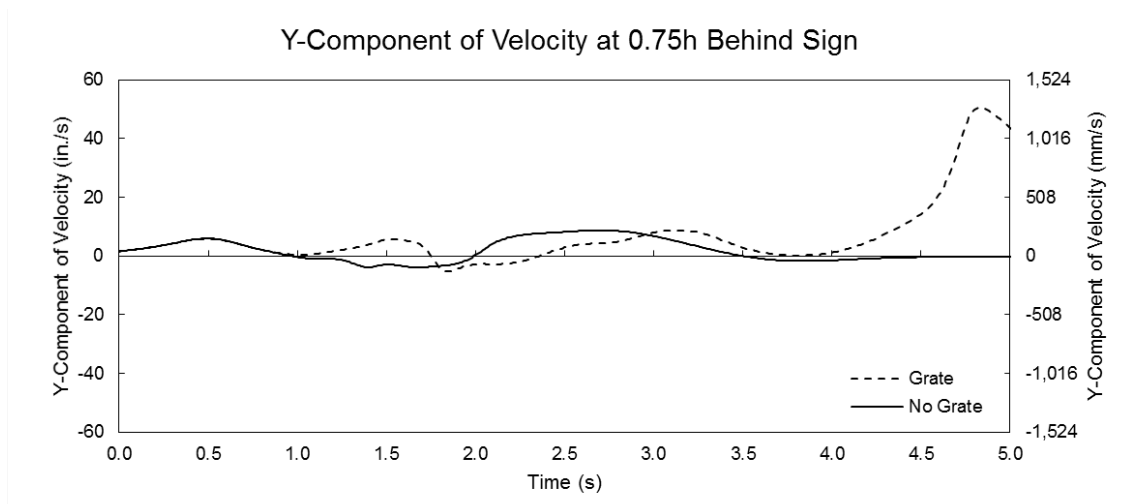


Figure A1.2: Y-component of velocity for the large sign at V=30 mph (13.4 m/s) at a distance = 0.75h behind the sign

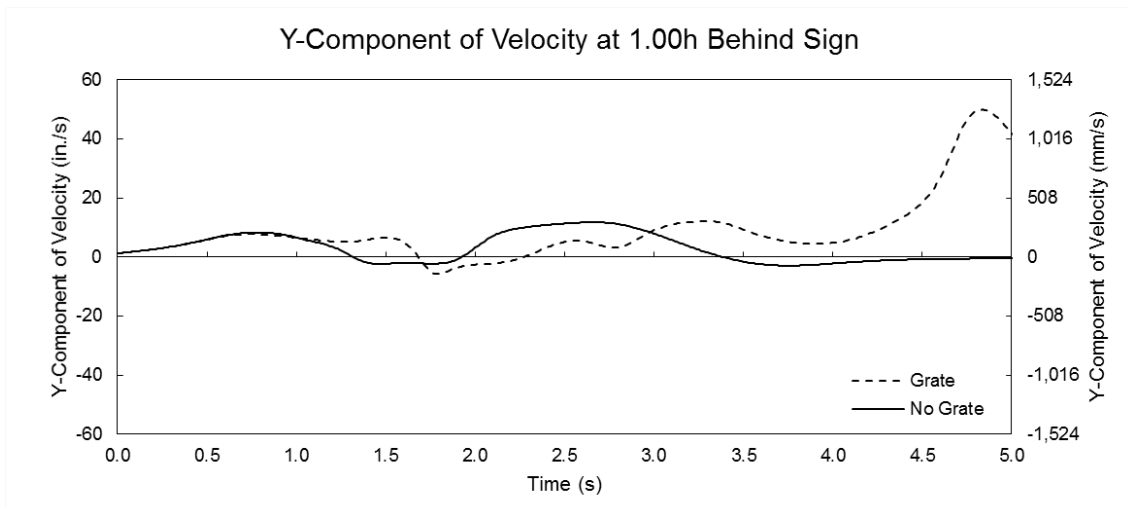


Figure A1.3: Y-component of velocity for the large sign at V=30 mph (13.4 m/s) at a distance = 1.0h behind the sign

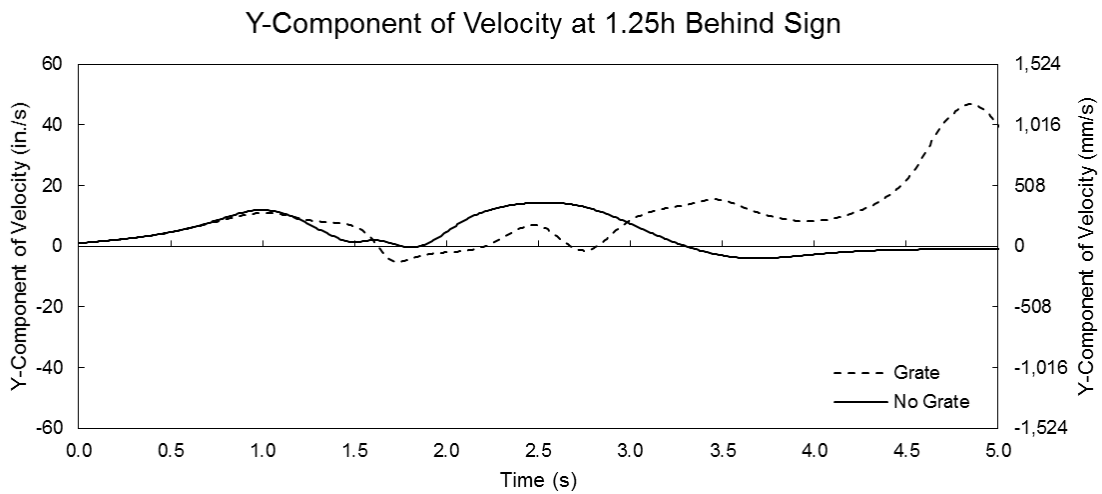


Figure A1.4: Y-component of velocity for the large sign at V=30 mph (13.4 m/s) at a distance = 1.25h behind the sign

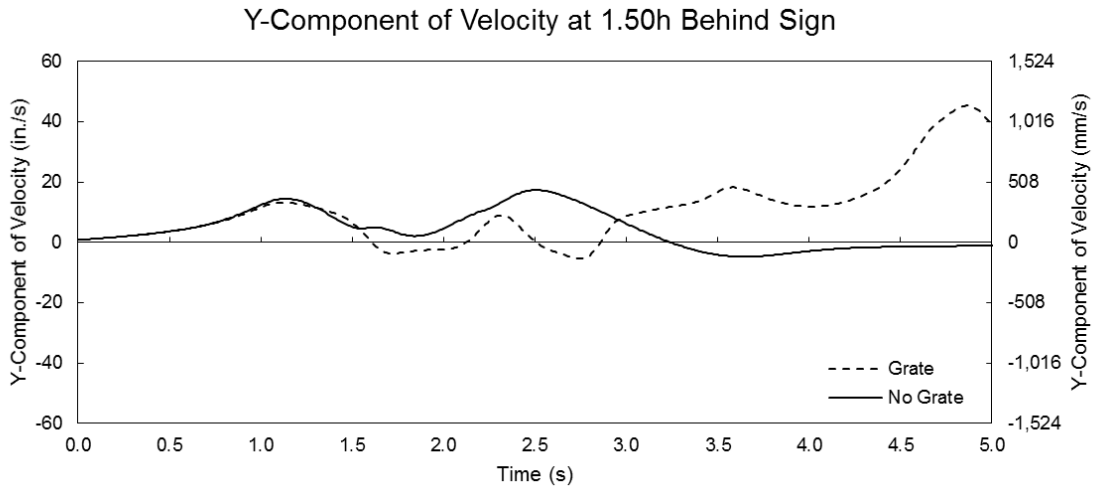


Figure A1.5: Y-component of velocity for the large sign at V=30 mph (13.4 m/s) at a distance = 1.5h behind the sign

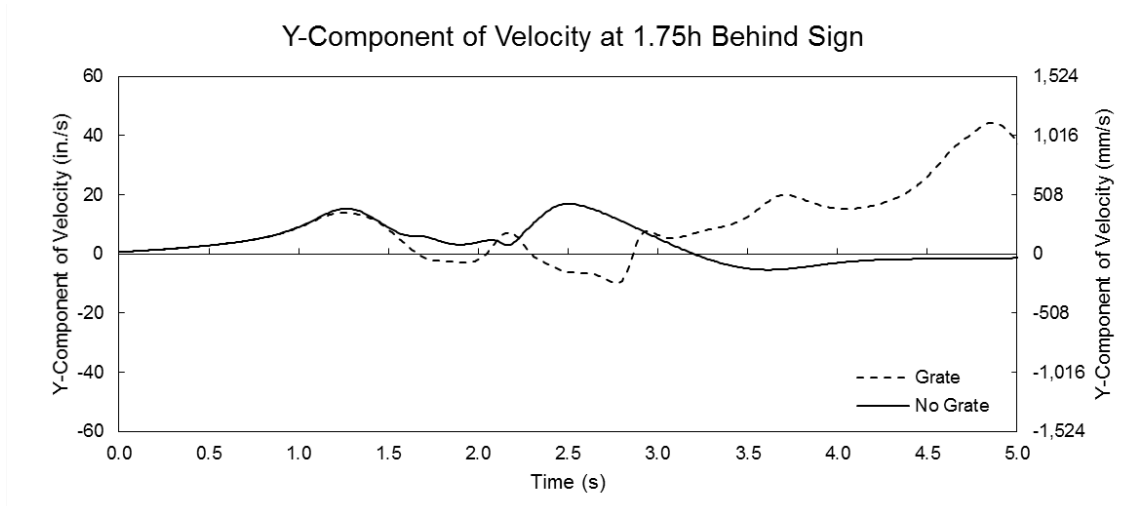


Figure A1.6: Y-component of velocity for the large sign at V=30 mph (13.4 m/s) at a distance = 1.75h behind the sign

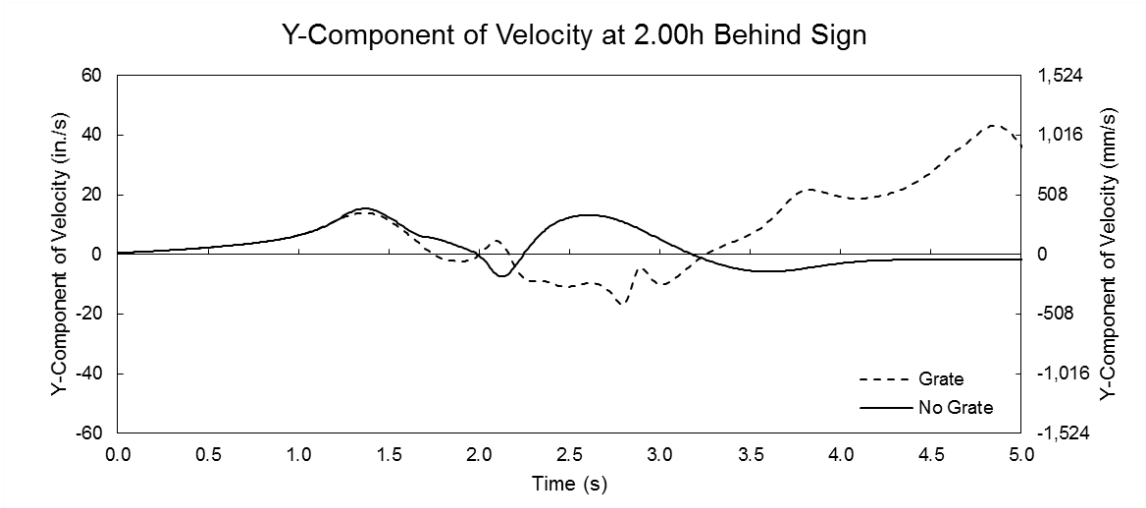


Figure A1.7: Y-component of velocity for the large sign at V=30 mph (13.4 m/s) at a distance = 2.0h behind the sign

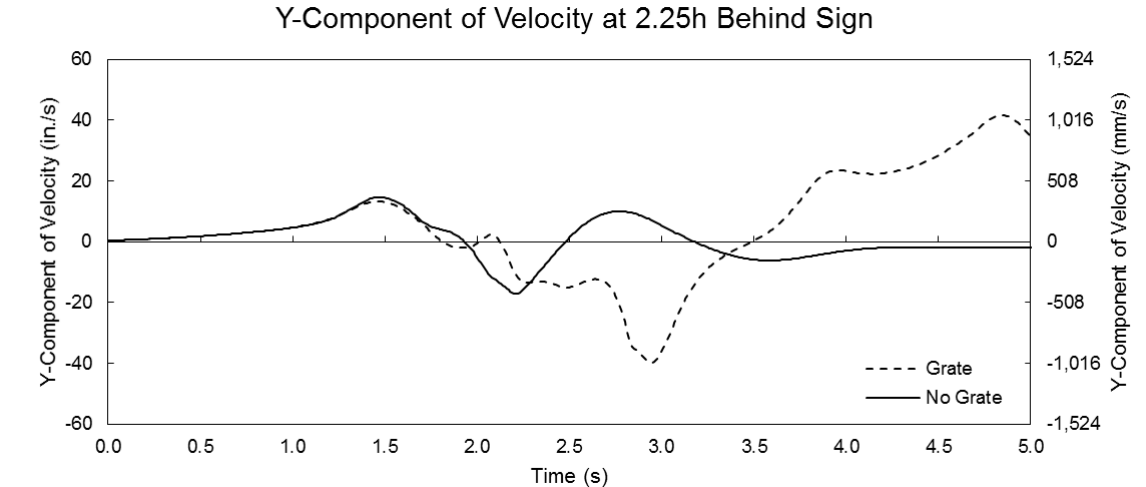


Figure A1.8: Y-component of velocity for the large sign at V=30 mph (13.4 m/s) at a distance = 2.25h behind the sign

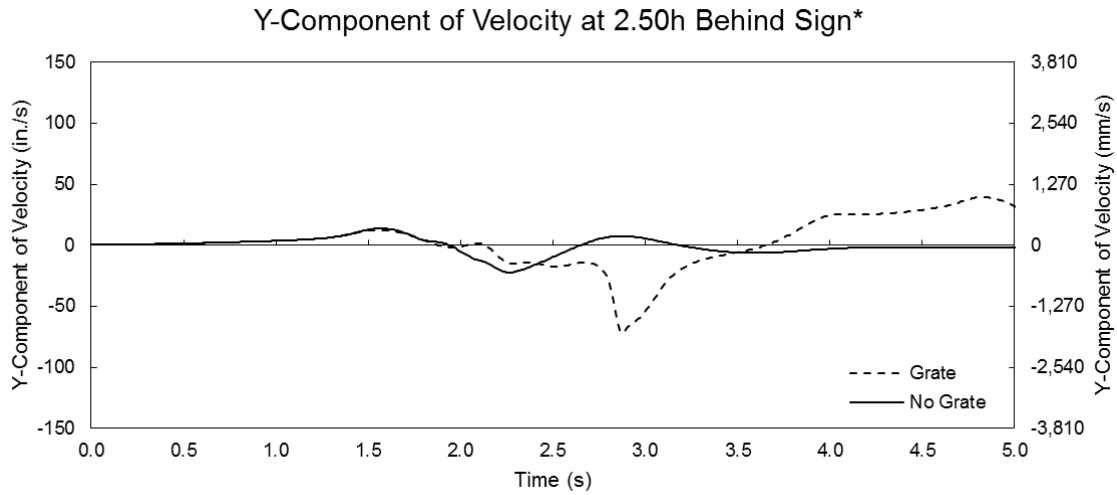


Figure A1.9: Y-component of velocity for the large sign at V=30 mph (13.4 m/s) at a distance = 2.5h behind the sign

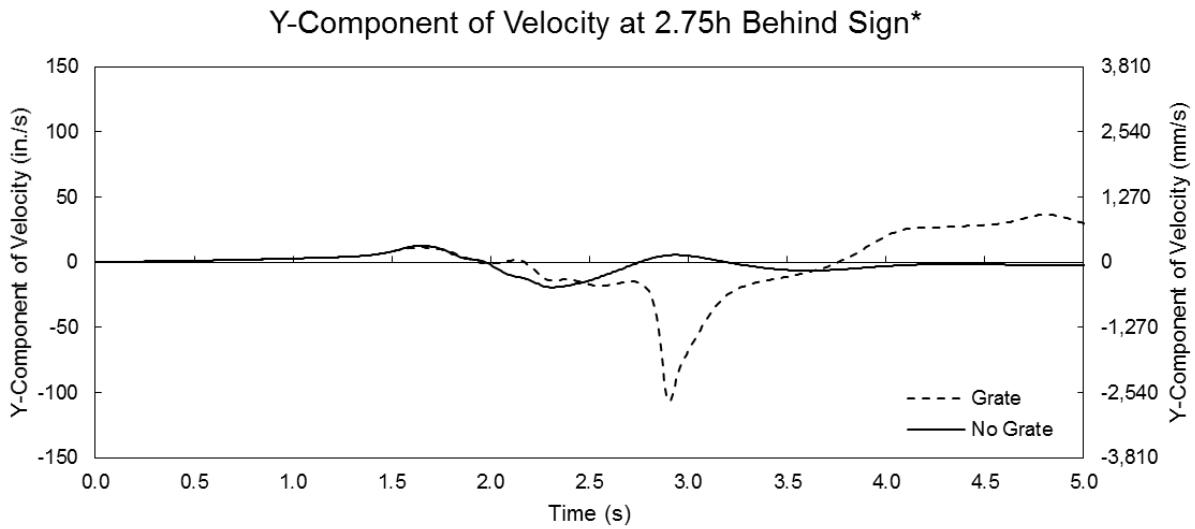


Figure A1.10: Y-component of velocity for the large sign at V=30 mph (13.4 m/s) at a distance = 2.75h behind the sign

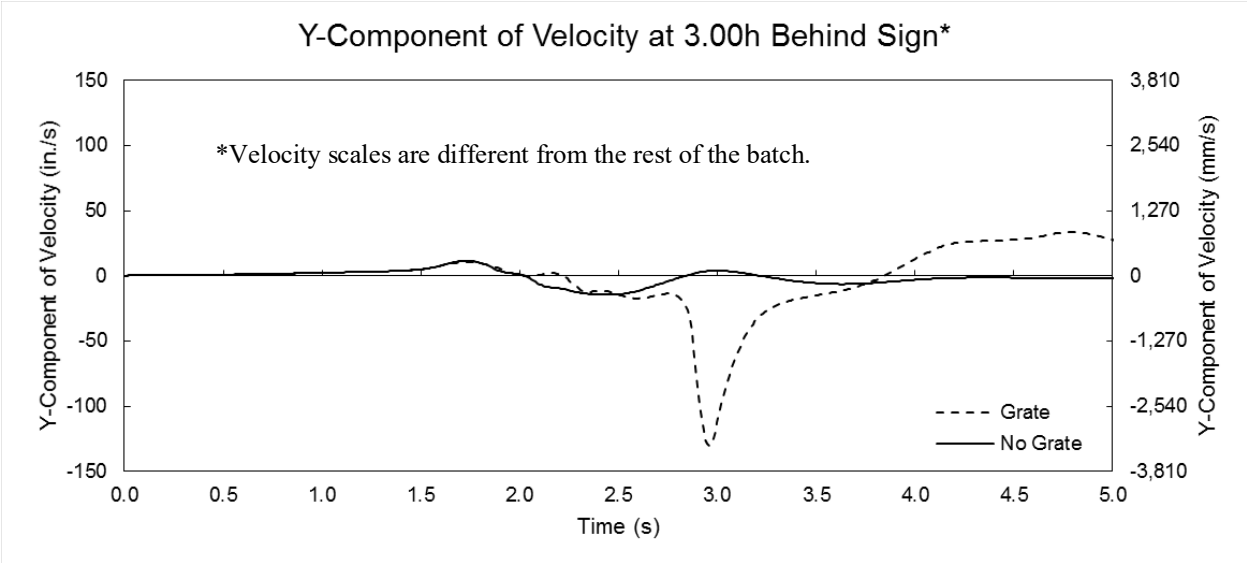


Figure A1.11: Y-component of velocity for the large sign at V=30 mph (13.4 m/s) at a distance = 3.0h behind the sign

A1.2: Y-Component of Velocity Behind Large Sign at V=61.2 mph (27.4 m/s)

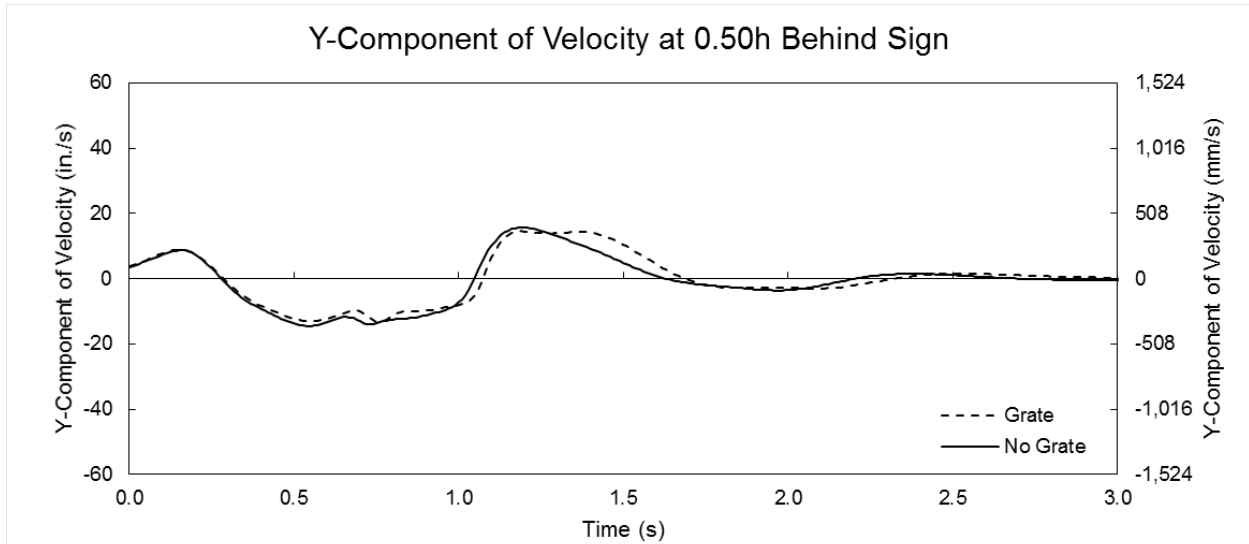


Figure A1.12: Y-component of velocity for the large sign at V=61.2 mph (27.4 m/s) at a distance = 0.5h behind the sign

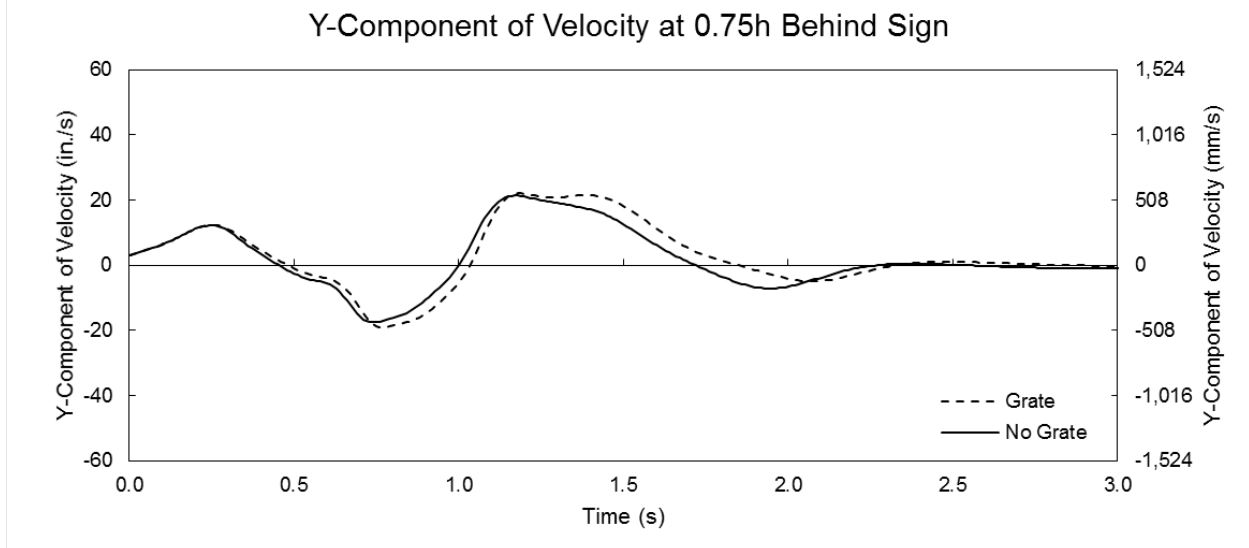


Figure A1.13: Y-component of velocity for the large sign at V=61.2 mph (27.4 m/s) at a distance = 0.75h behind the sign

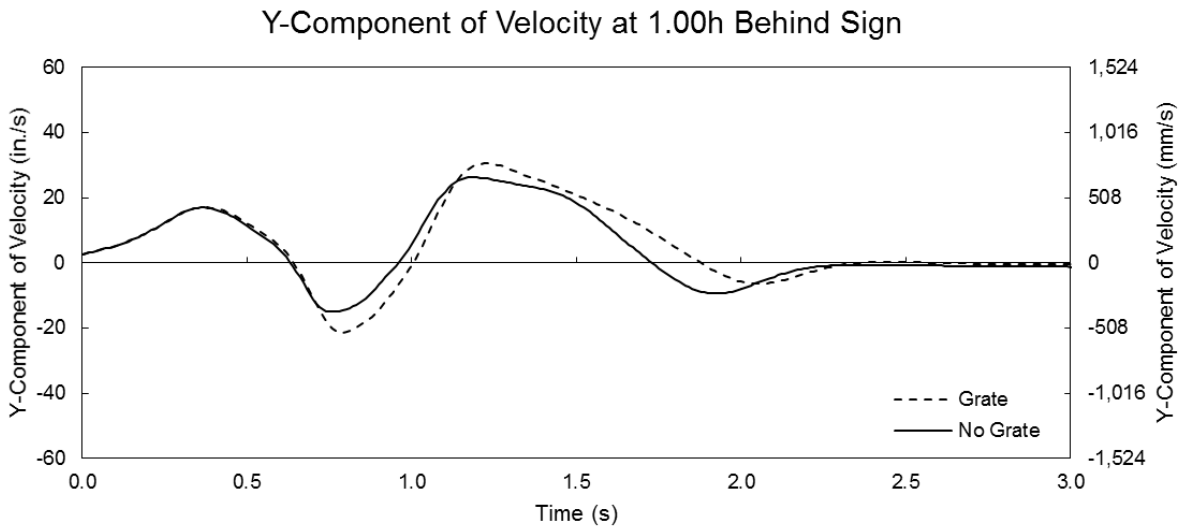


Figure A1.14: Y-component of velocity for the large sign at V=61.2 mph (27.4 m/s) at a distance = 1.0h behind the sign

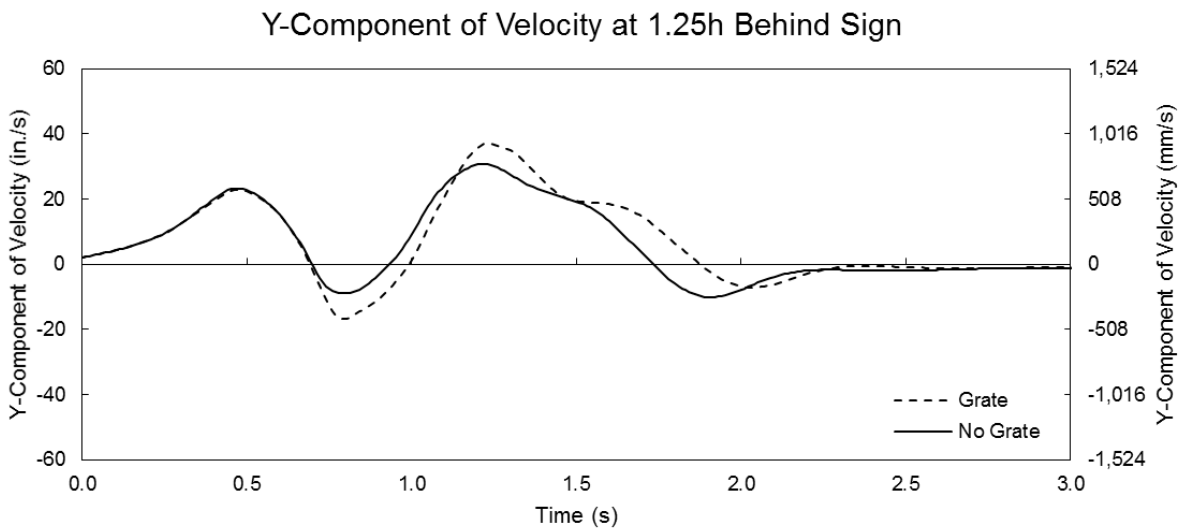


Figure A1.15: Y-component of velocity for the large sign at V=61.2 mph (27.4 m/s) at a distance = 1.25h behind the sign

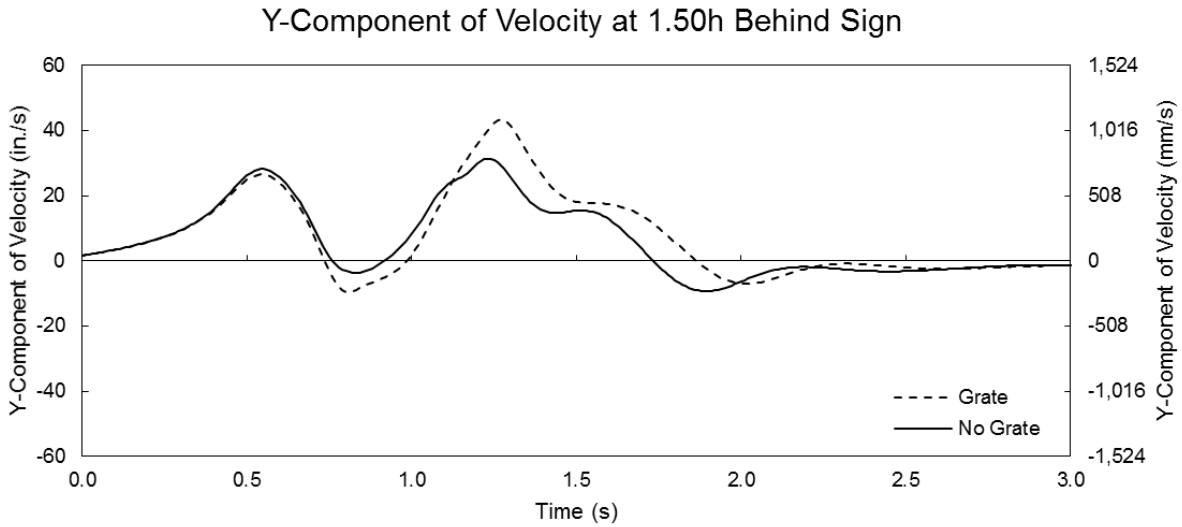


Figure A1.16: Y-component of velocity for the large sign at V=61.2 mph (27.4 m/s) at a distance = 1.5h behind the sign

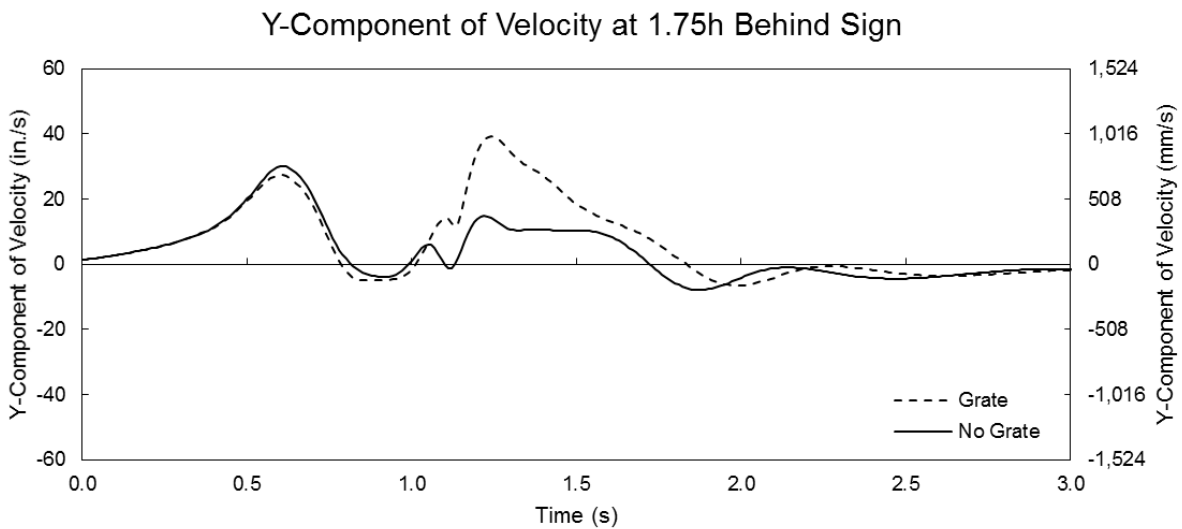


Figure A1.17: Y-component of velocity for the large sign at V=61.2 mph (27.4 m/s) at a distance = 1.75h behind the sign

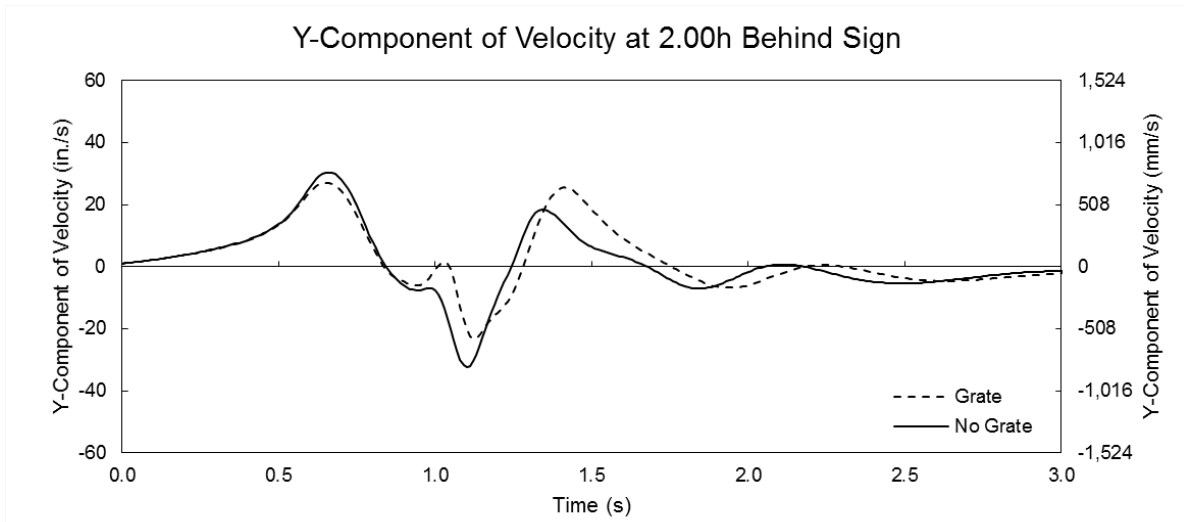


Figure A1.18: Y-component of velocity for the large sign at $V=61.2$ mph (27.4 m/s) at a distance = 2.0h behind the sign

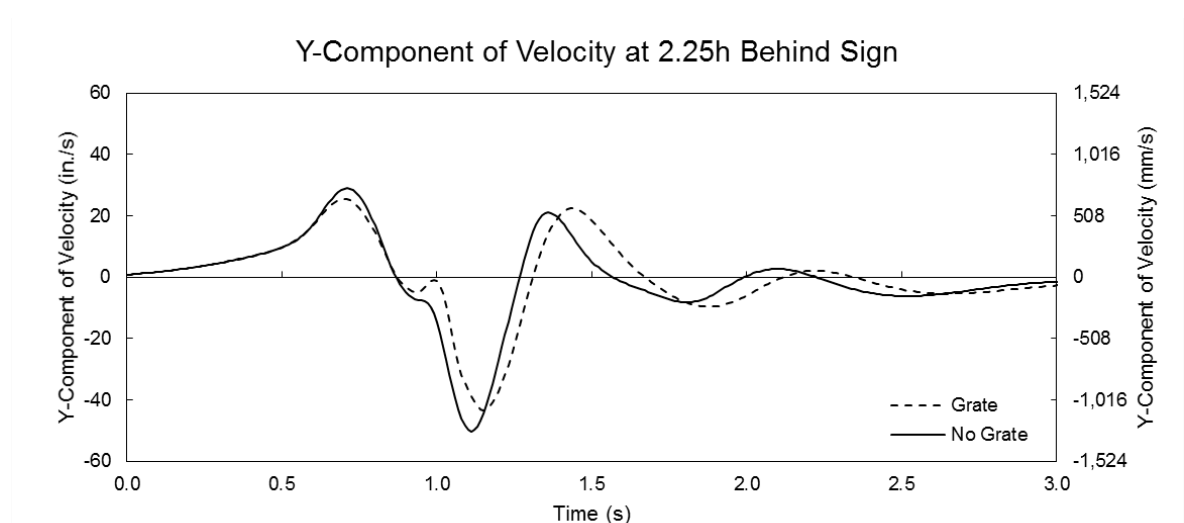


Figure A1.19: Y-component of velocity for the large sign at $V=61.2$ mph (27.4 m/s) at a distance = 2.25h behind the sign

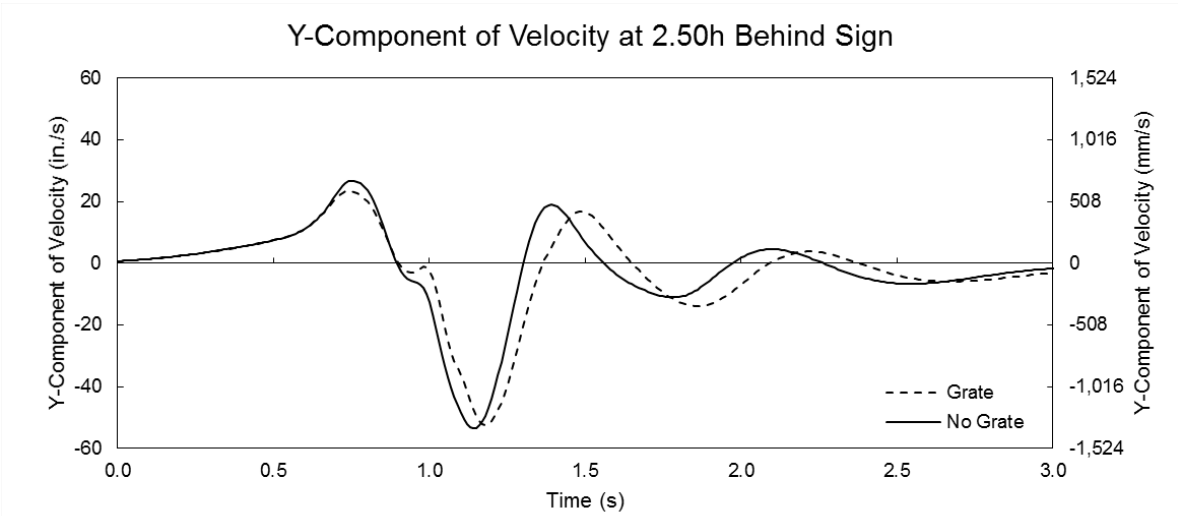


Figure A1.20: Y-component of velocity for the large sign at V=61.2 mph (27.4 m/s) at a distance = 2.5h behind the sign

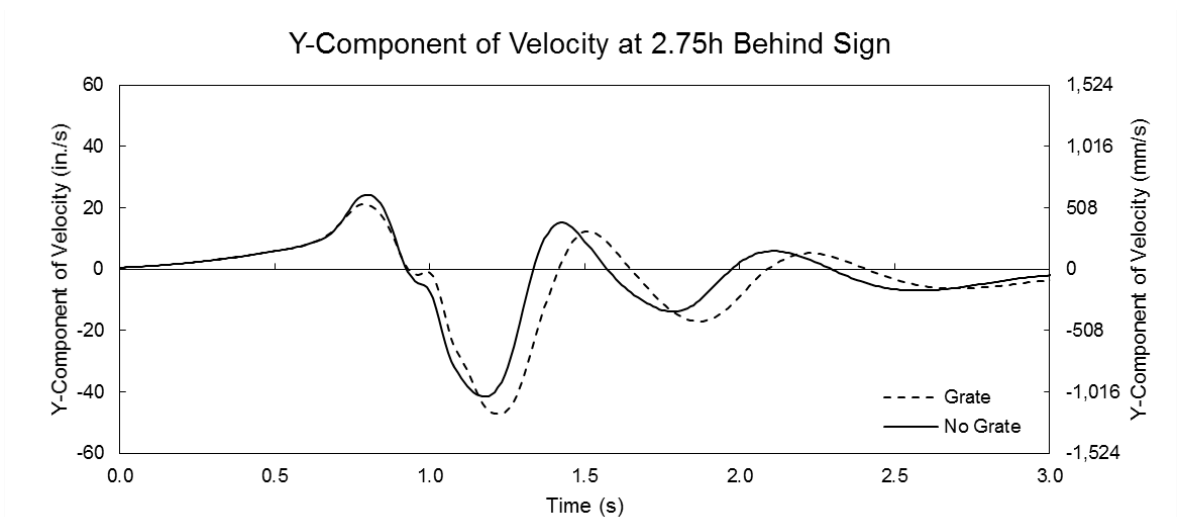


Figure A1.21: Y-component of velocity for the large sign at V=61.2 mph (27.4 m/s) at a distance = 2.75h behind the sign

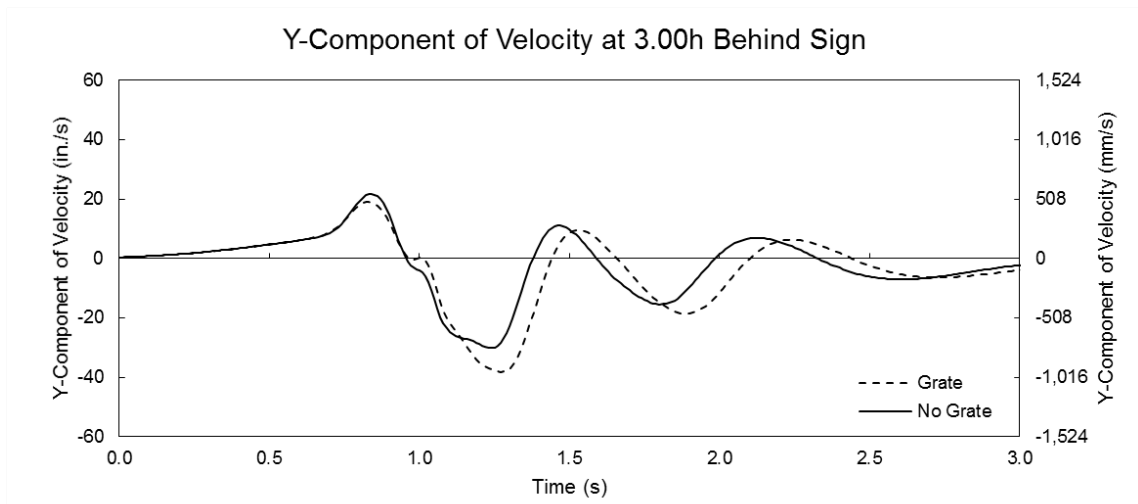


Figure A1.22: Y-component of velocity for the large sign at $V=61.2$ mph (27.4 m/s) at a distance = $3.0h$ behind the sign

A1.3: Y-Component of Velocity Behind Large Sign at V=105mph (46.9 m/s)

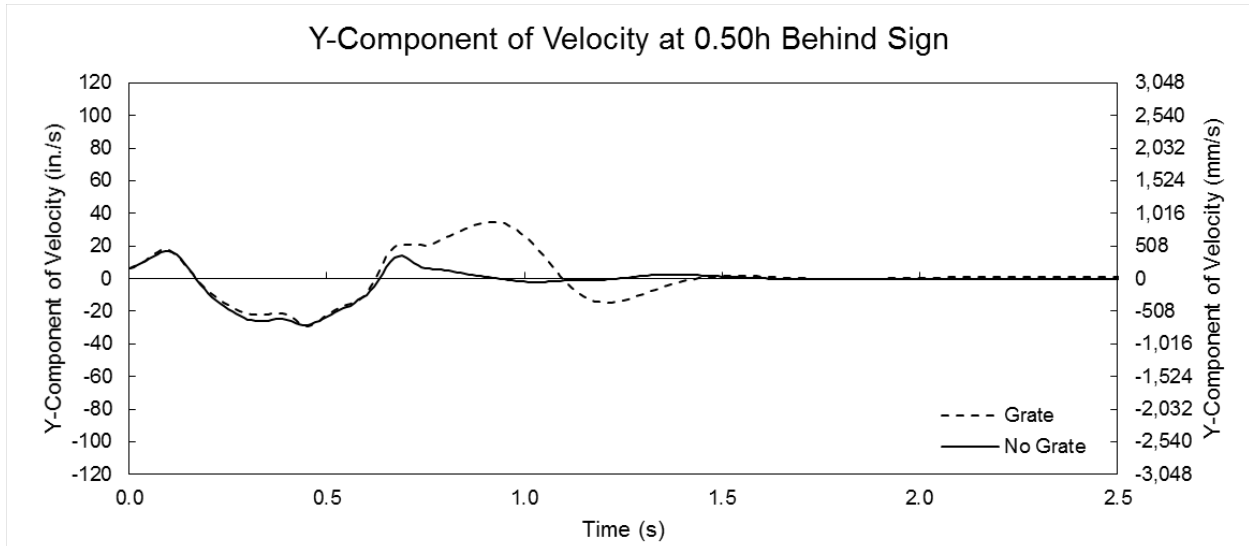


Figure A1.23: Y-component of velocity for the large sign at V=105 mph (46.9 m/s) at a distance = 0.5h behind the sign

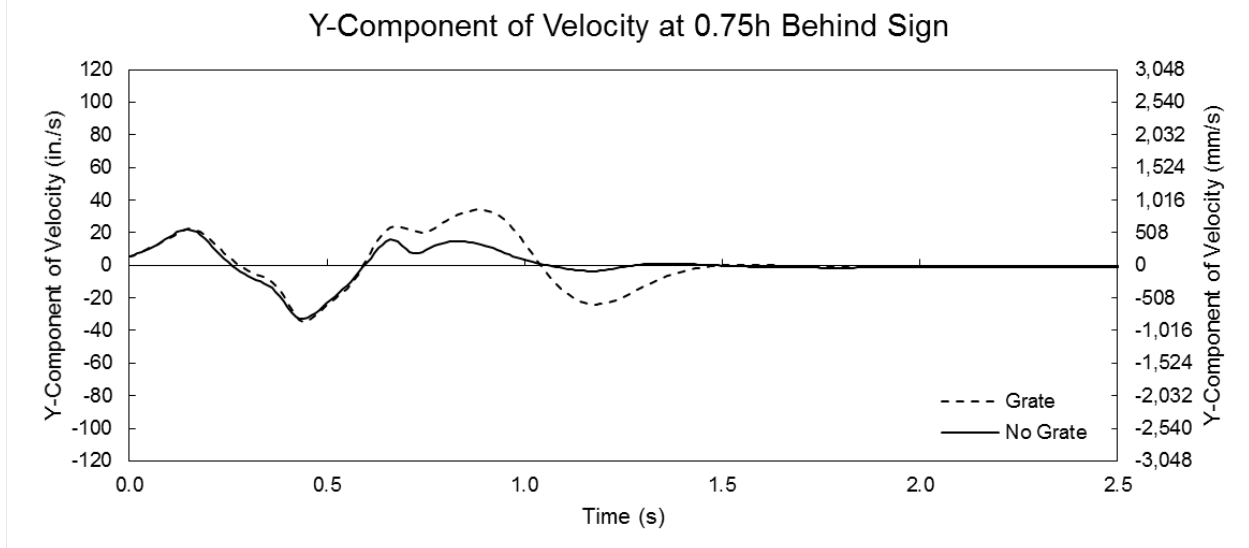


Figure A1.24: Y-component of velocity for the large sign at V=105 mph (46.9 m/s) at a distance = 0.75h behind the sign

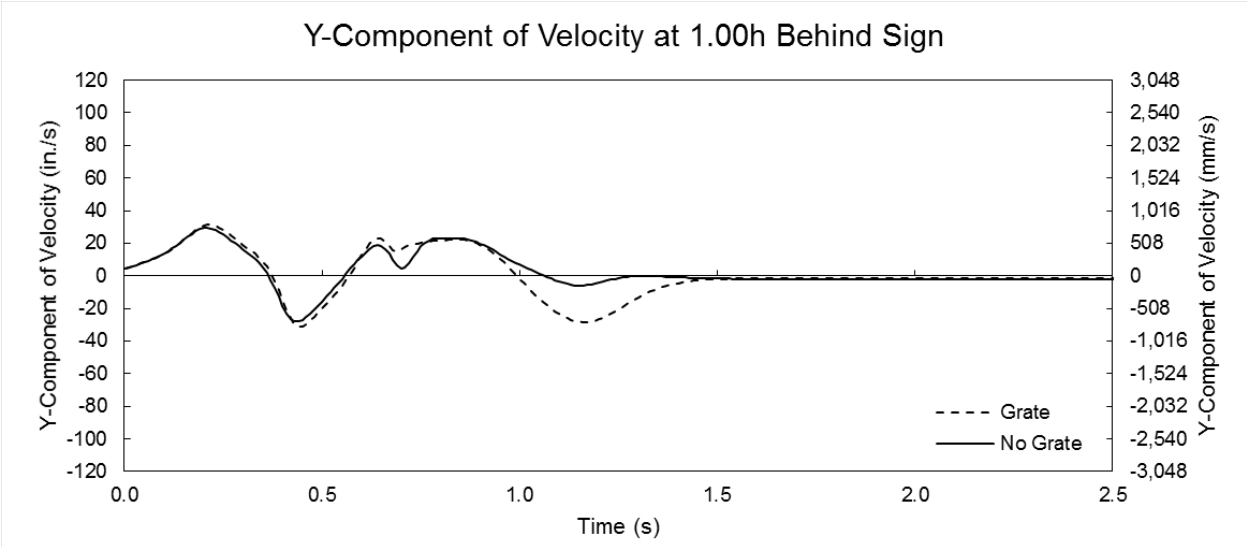


Figure A1.25: Y-component of velocity for the large sign at V=105 mph (46.9 m/s) at a distance = 1.0h behind the sign

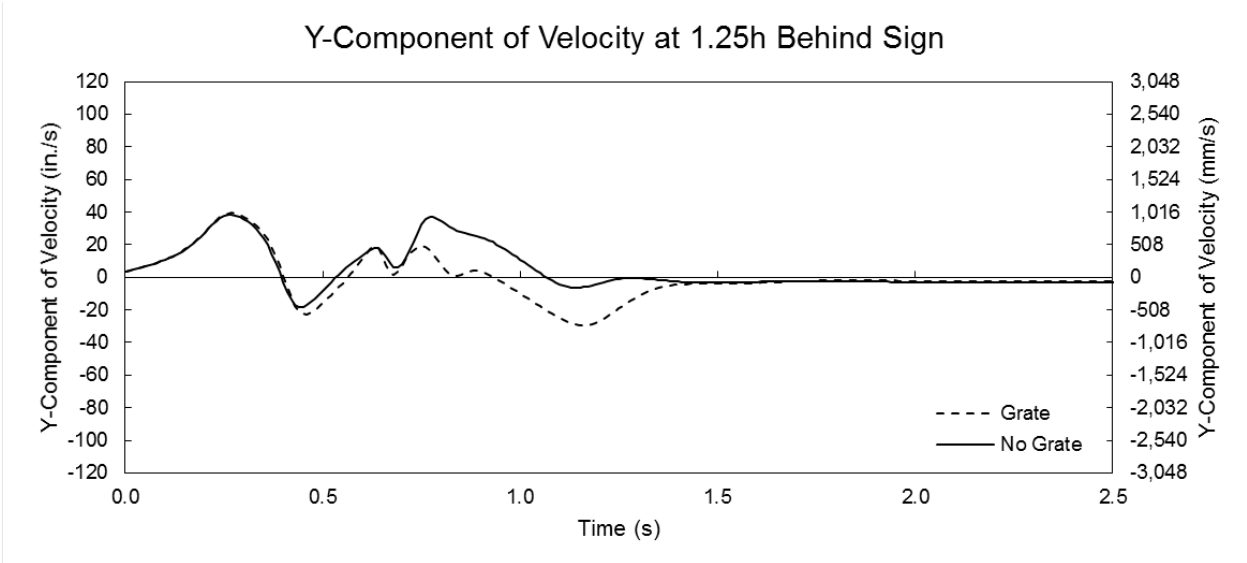


Figure A1.26: Y-component of velocity for the large sign at V=105 mph (46.9 m/s) at a distance = 1.25h behind the sign

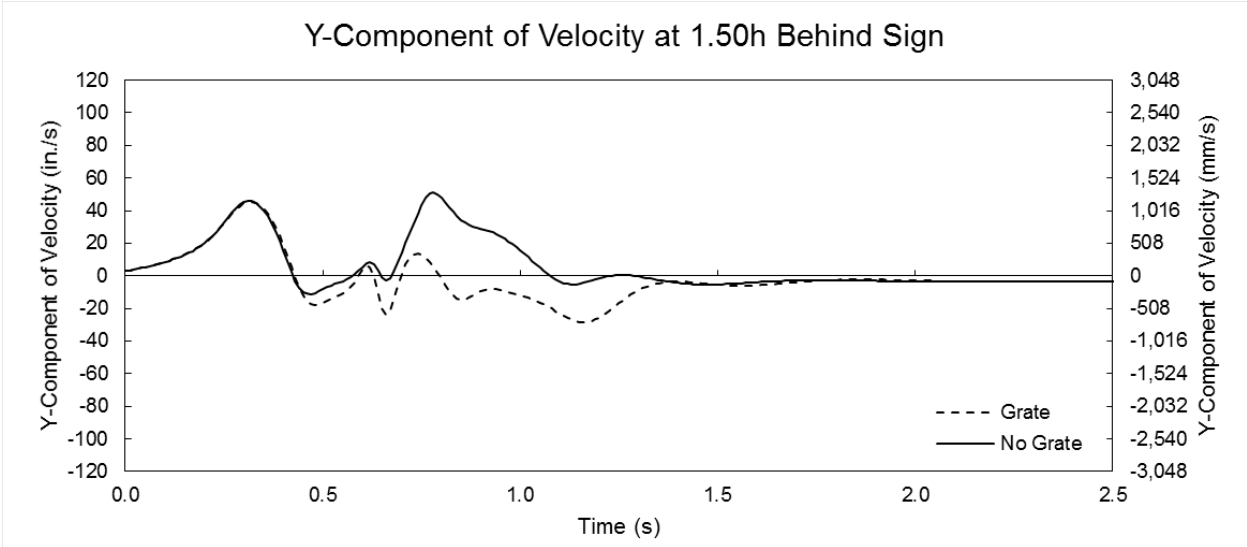


Figure A1.27: Y-component of velocity for the large sign at V=105 mph (46.9 m/s) at a distance = 1.5h behind the sign

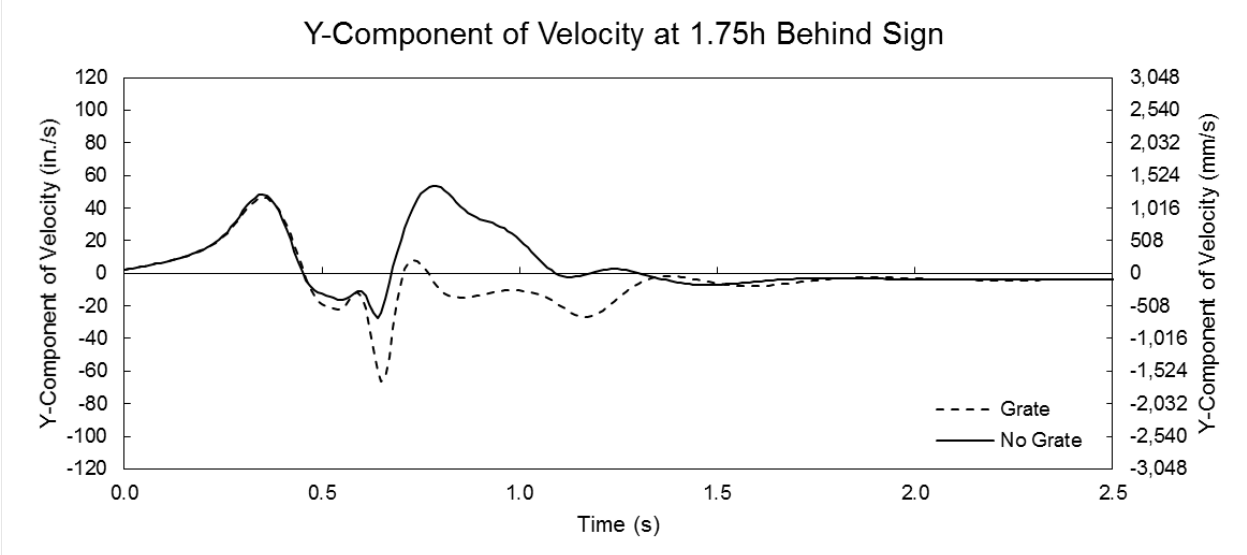


Figure A1.28: Y-component of velocity for the large sign at V=105 mph (46.9 m/s) at a distance = 1.75h behind the sign

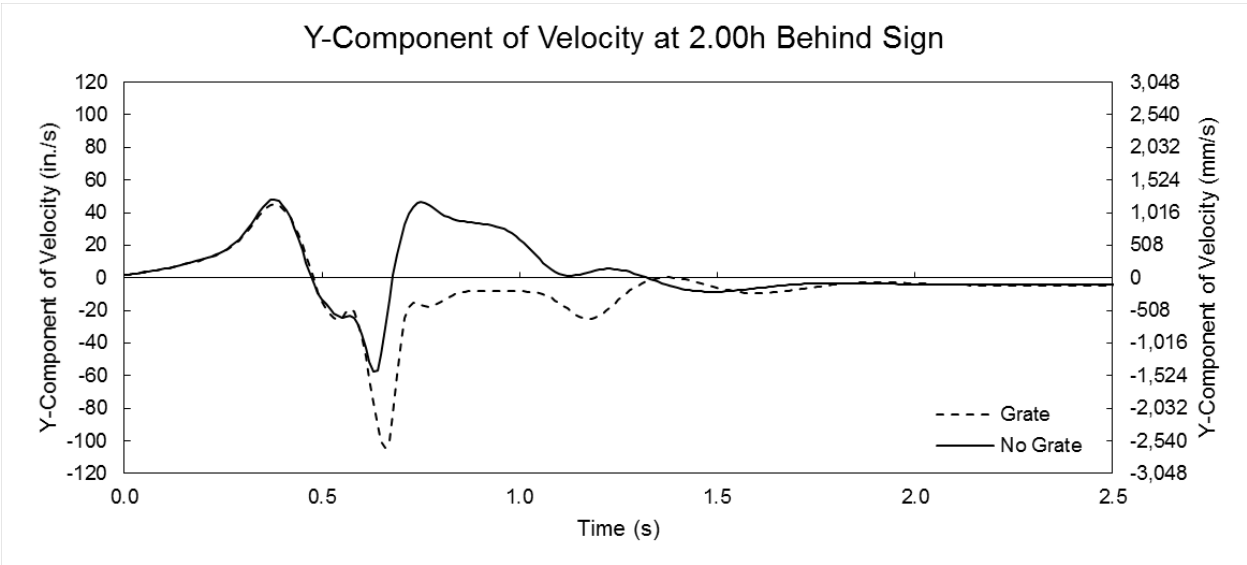


Figure A1.29: Y-component of velocity for the large sign at V=105 mph (46.9 m/s) at a distance = 2.0h behind the sign

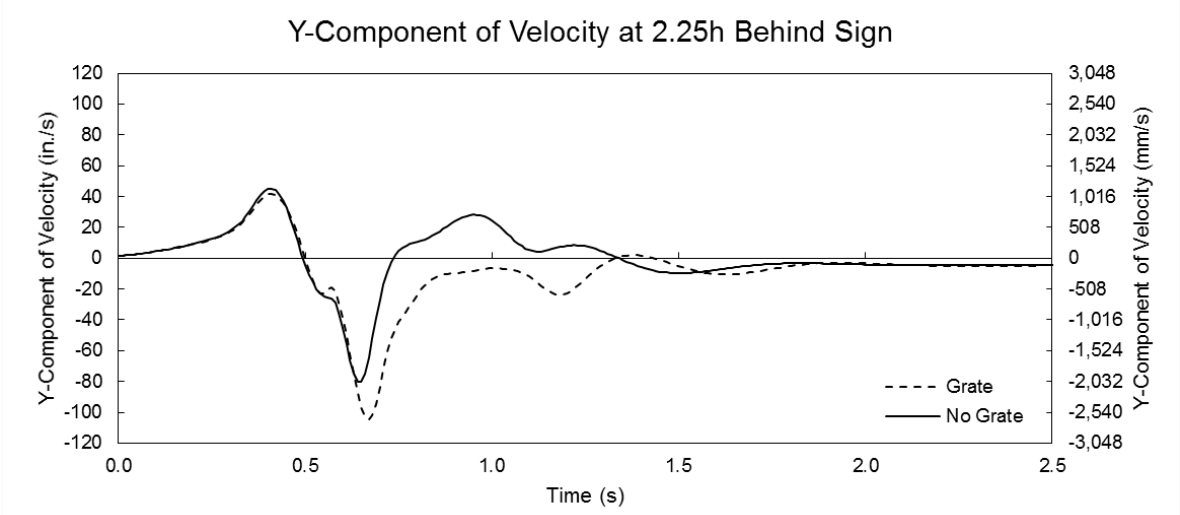


Figure A1.30: Y-component of velocity for the large sign at V=105 mph (46.9 m/s) at a distance = 2.25h behind the sign

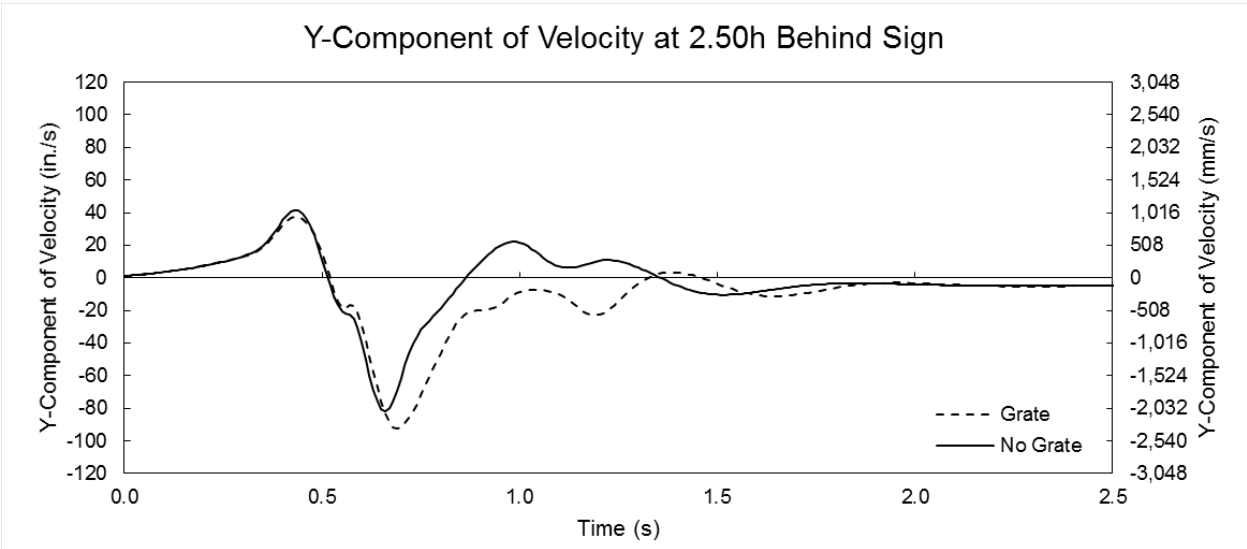


Figure A1.31: Y-component of velocity for the large sign at V=105 mph (46.9 m/s) at a distance = 2.5h behind the sign

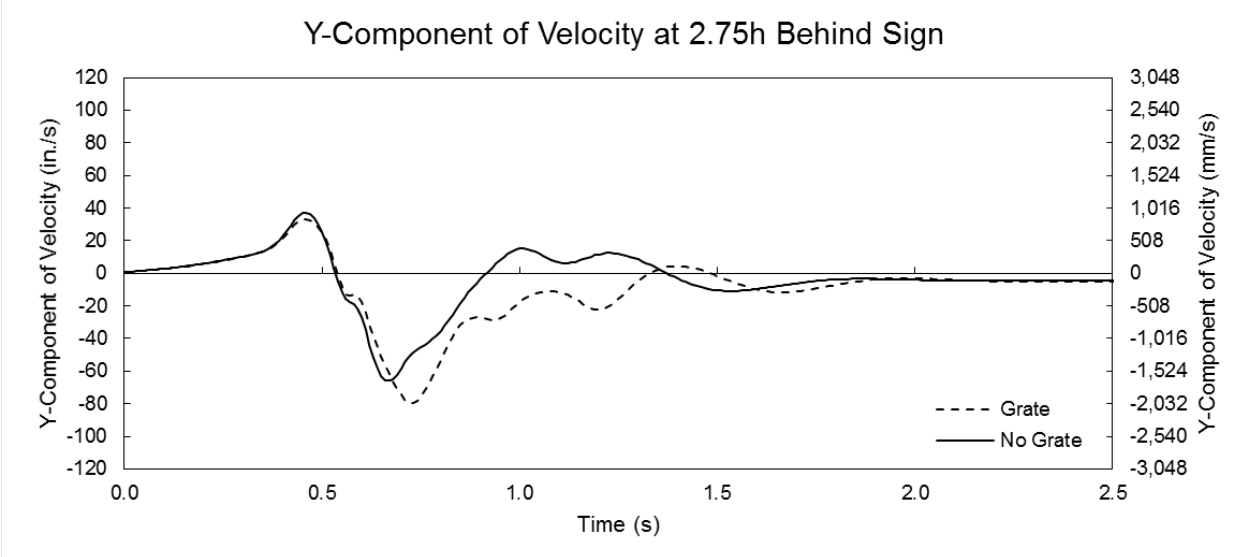


Figure A1.32: Y-component of velocity for the large sign at V=105 mph (46.9 m/s) at a distance = 2.75h behind the sign

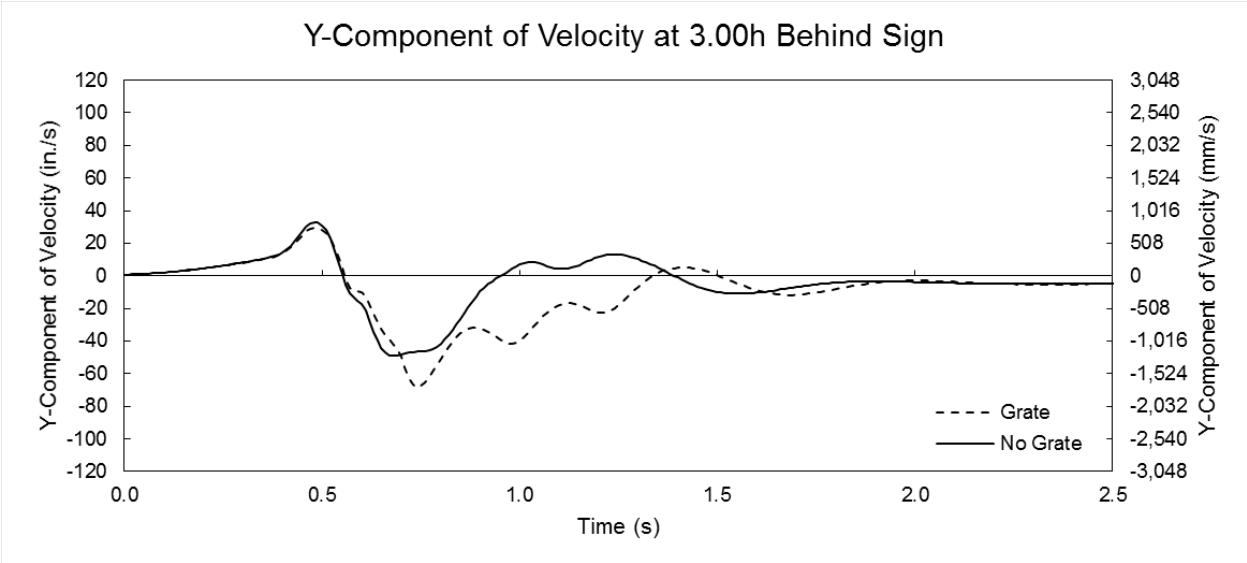


Figure A1.33: Y-component of velocity for the large sign at V=105 mph (46.9 m/s) at a distance = 3.0h behind the sign

A1.4: Y-Component of Velocity Behind Medium Sign at V=30 mph (13.4 m/s)

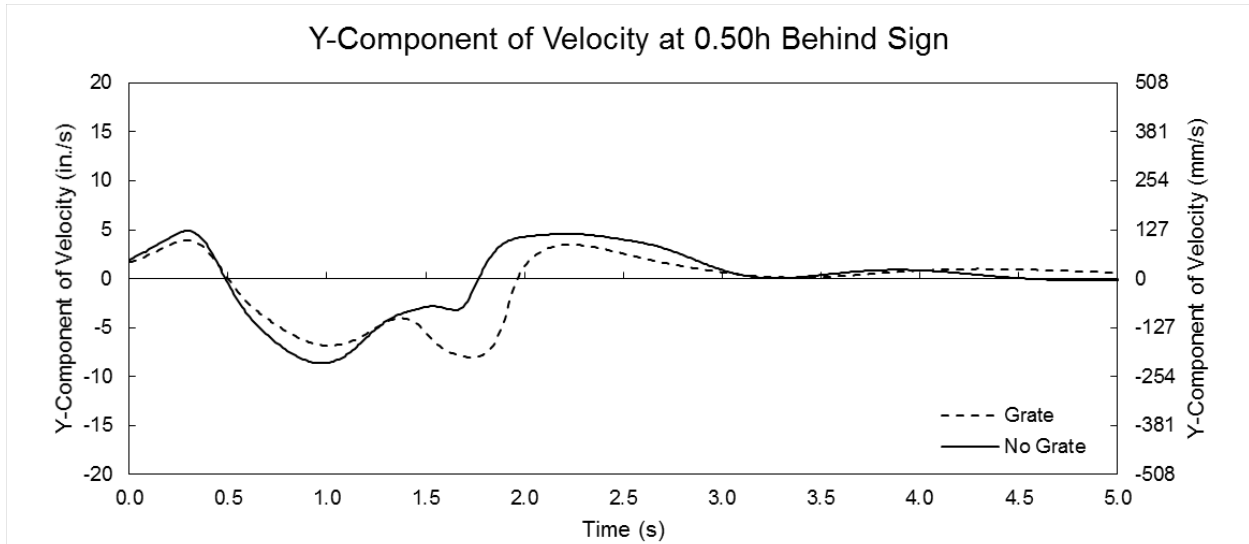


Figure A1.34: Y-component of velocity for the medium sign at V=30 mph (13.4 m/s) at a distance = 0.5h behind the sign

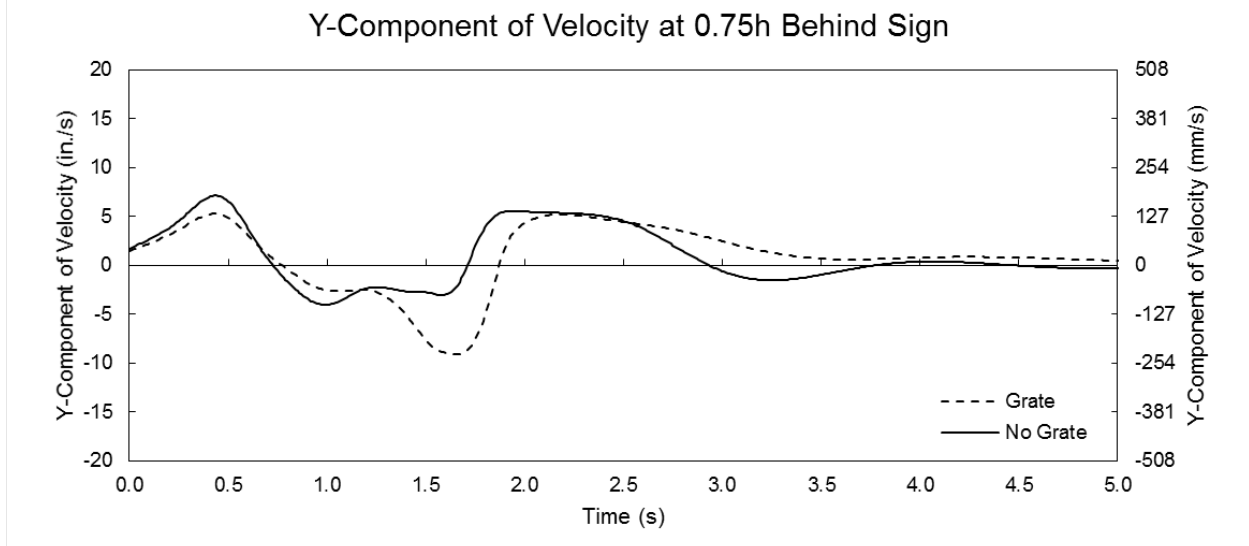


Figure A1.35: Y-component of velocity for the medium sign at V=30 mph (13.4 m/s) at a distance = 0.75h behind the sign

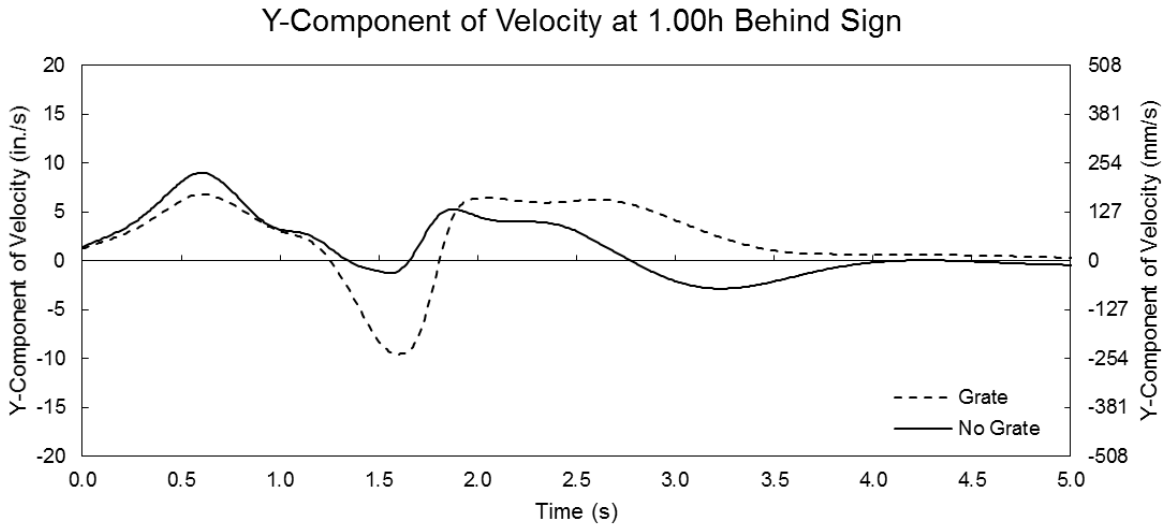


Figure A1.36: Y-component of velocity for the medium sign at V=30 mph (13.4 m/s) at a distance = 1.0h behind the sign

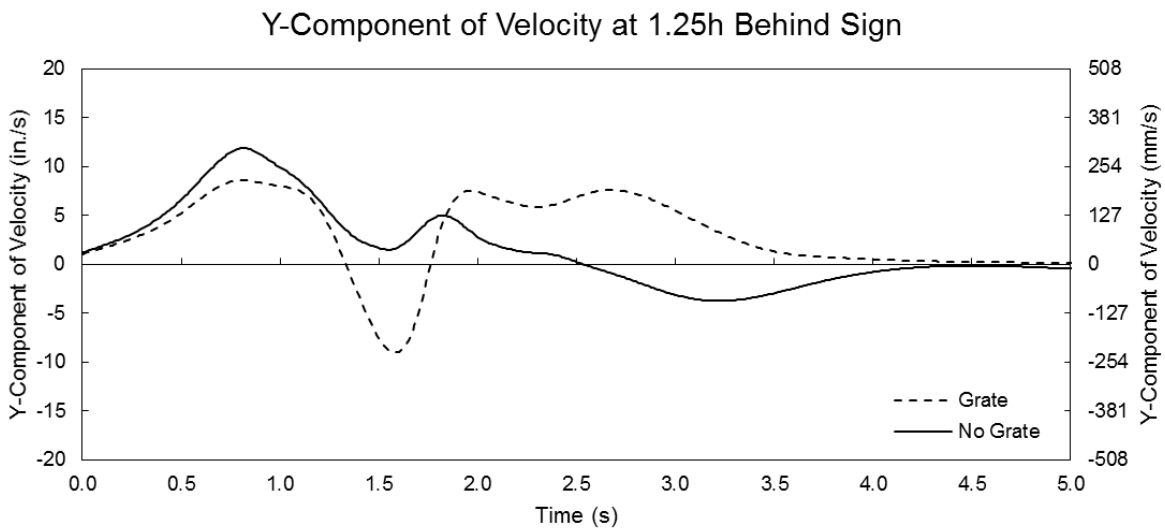


Figure A1.37: Y-component of velocity for the medium sign at V=30 mph (13.4 m/s) at a distance = 1.25h behind the sign

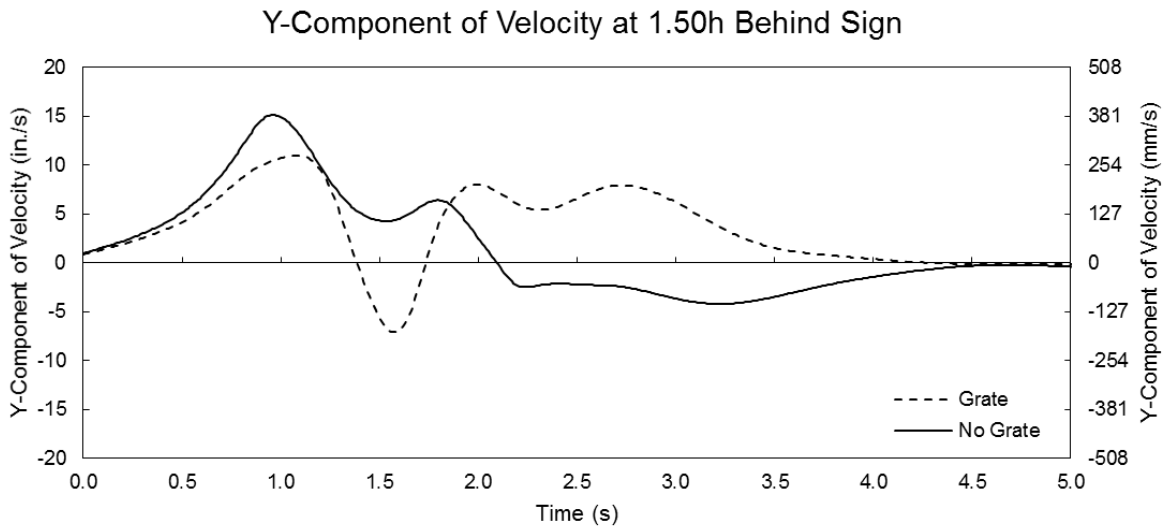


Figure A1.38: Y-component of velocity for the medium sign at V=30 mph (13.4 m/s) at a distance = 1.5h behind the sign

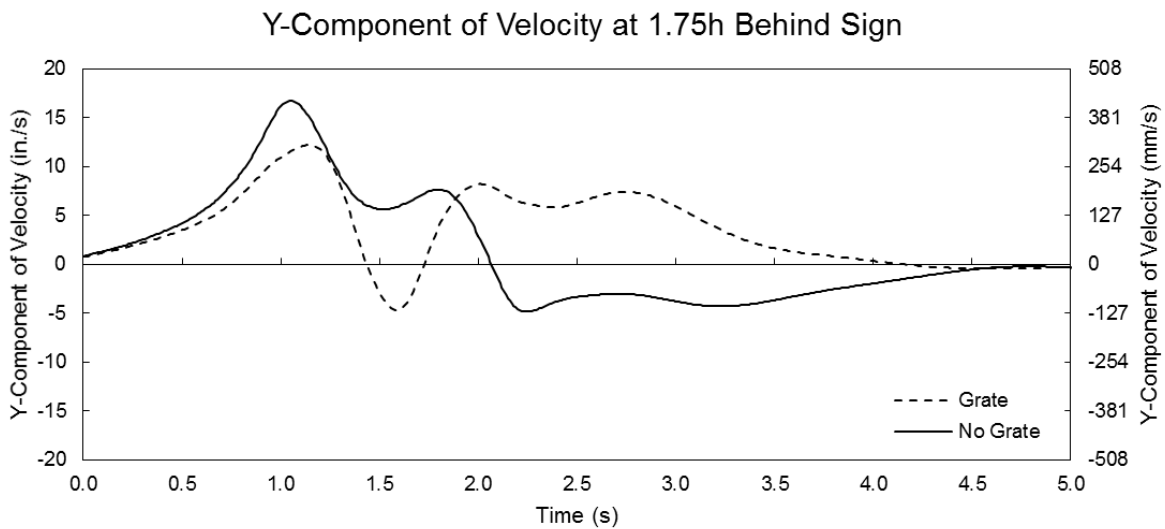


Figure A1.39: Y-component of velocity for the medium sign at V=30 mph (13.4 m/s) at a distance = 1.75h behind the sign

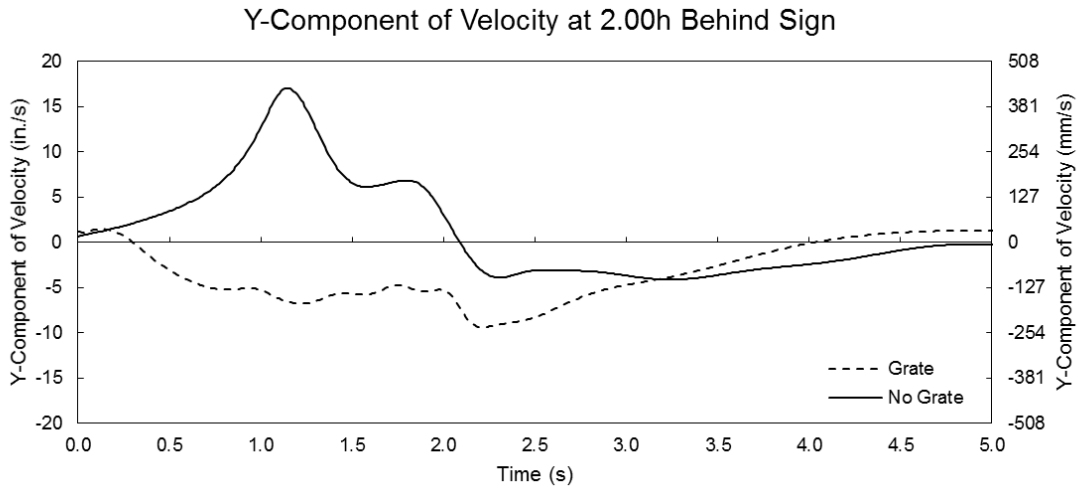


Figure A1.40: Y-component of velocity for the medium sign at V=30 mph (13.4 m/s) at a distance = 2.0h behind the sign

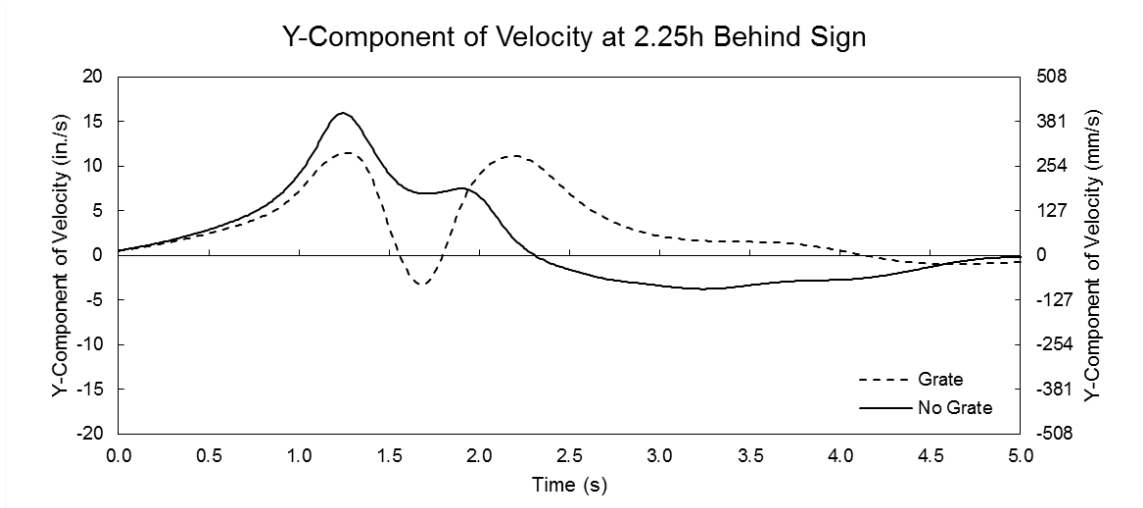


Figure A1.41: Y-component of velocity for the medium sign at V=30 mph (13.4 m/s) at a distance = 2.25h behind the sign

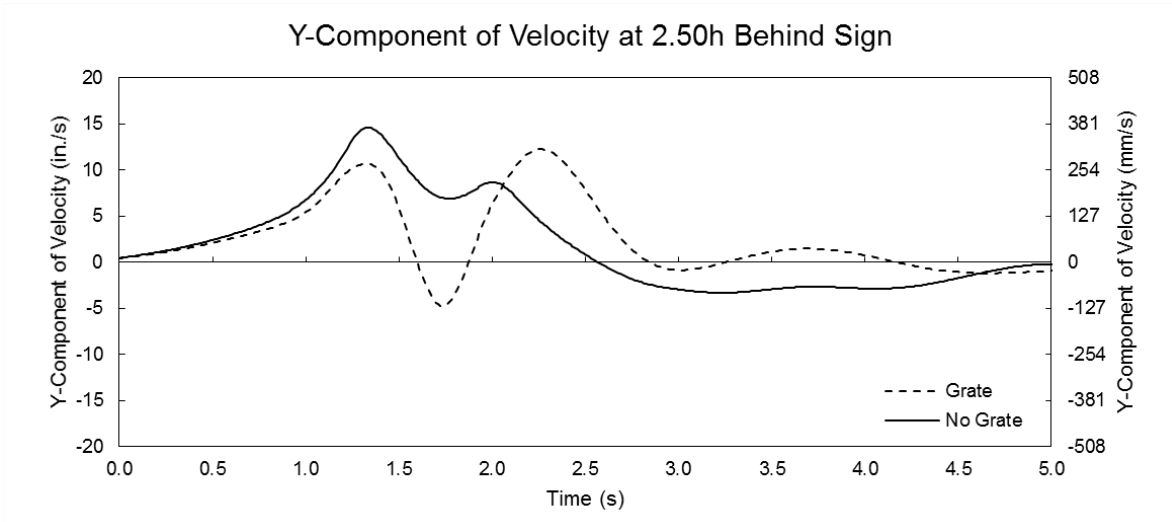


Figure A1.42: Y-component of velocity for the medium sign at V=30 mph (13.4 m/s) at a distance = 2.5h behind the sign

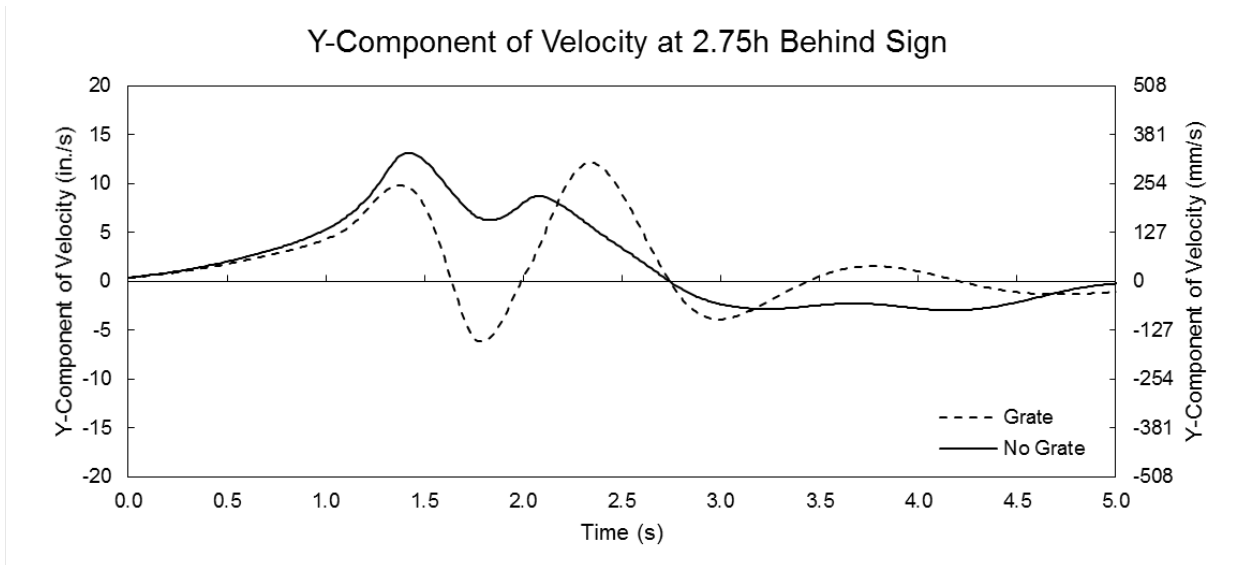


Figure A1.43: Y-component of velocity for the medium sign at V=30 mph (13.4 m/s) at a distance = 2.75h behind the sign

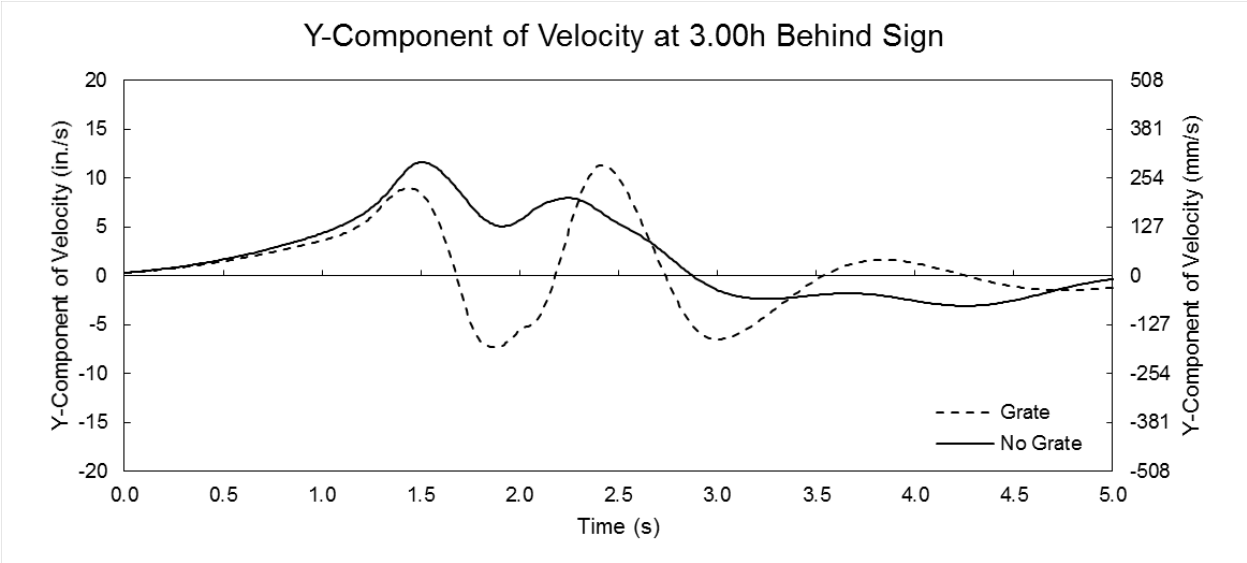


Figure A1.44: Y-component of velocity for the medium sign at V=30 mph (13.4 m/s) at a distance = 3.0h behind the sign

A1.5: Y-Component of Velocity Behind Medium Sign at V=61.2 mph (27.4 m/s)

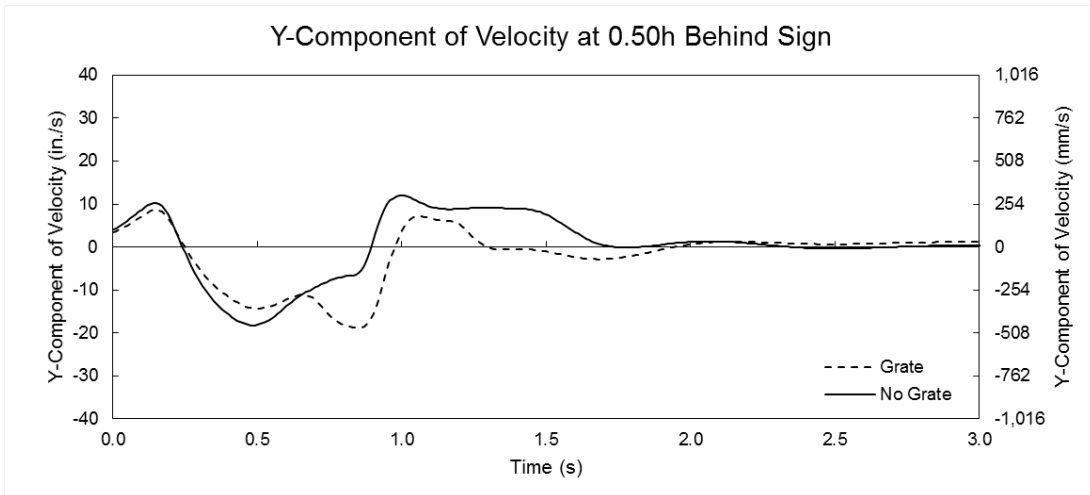


Figure A1.45: Y-component of velocity for the medium sign at V=61.2 mph (27.4 m/s) at a distance = 0.5h behind the sign

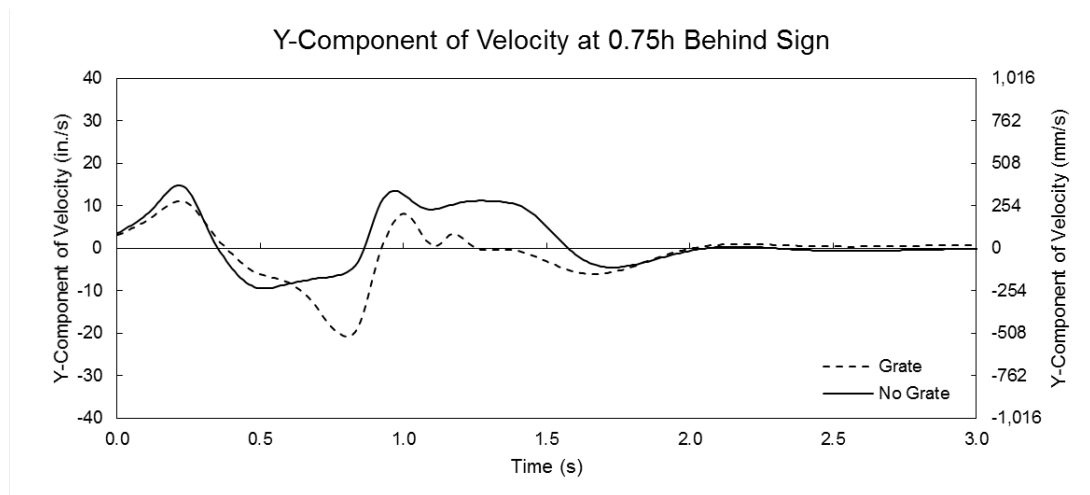


Figure A1.46: Y-component of velocity for the medium sign at V=61.2 mph (27.4 m/s) at a distance = 0.75h behind the sign

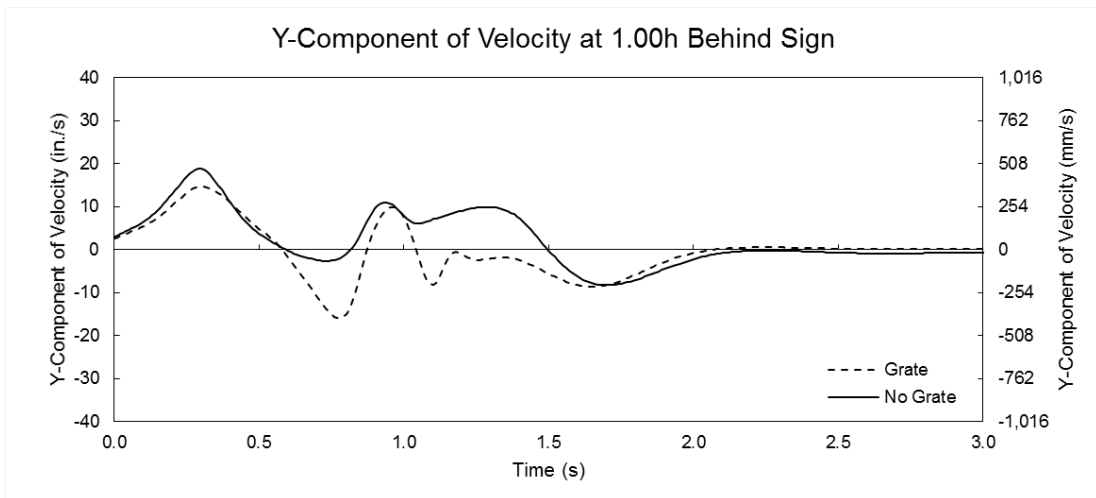


Figure A1.47: Y-component of velocity for the medium sign at V=61.2 mph (27.4 m/s) at a distance = 1.0h behind the sign

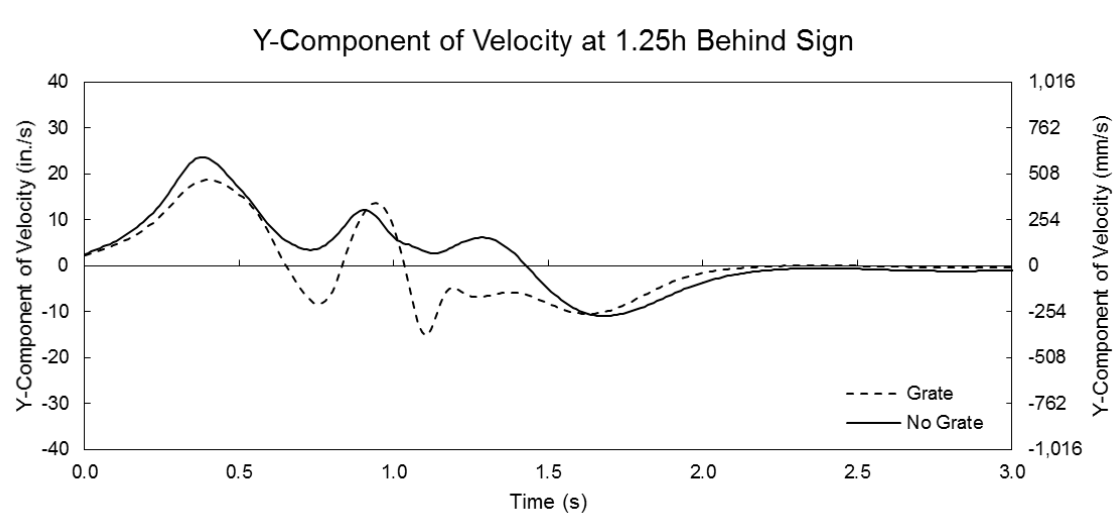


Figure A1.48: Y-component of velocity for the medium sign at V=61.2 mph (27.4 m/s) at a distance = 1.25h behind the sign

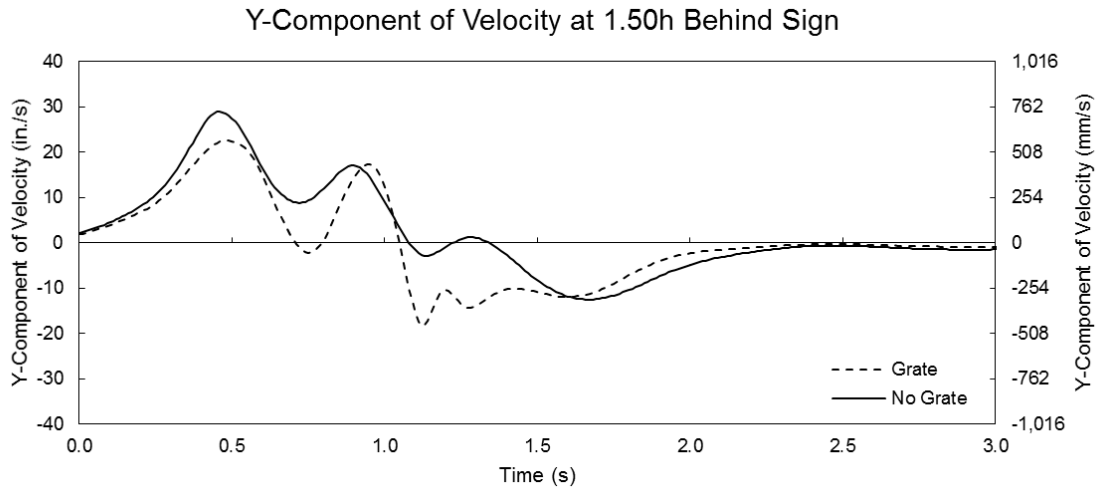


Figure A1.49: Y-component of velocity for the medium sign at V=61.2 mph (27.4 m/s) at a distance = 1.5h behind the sign

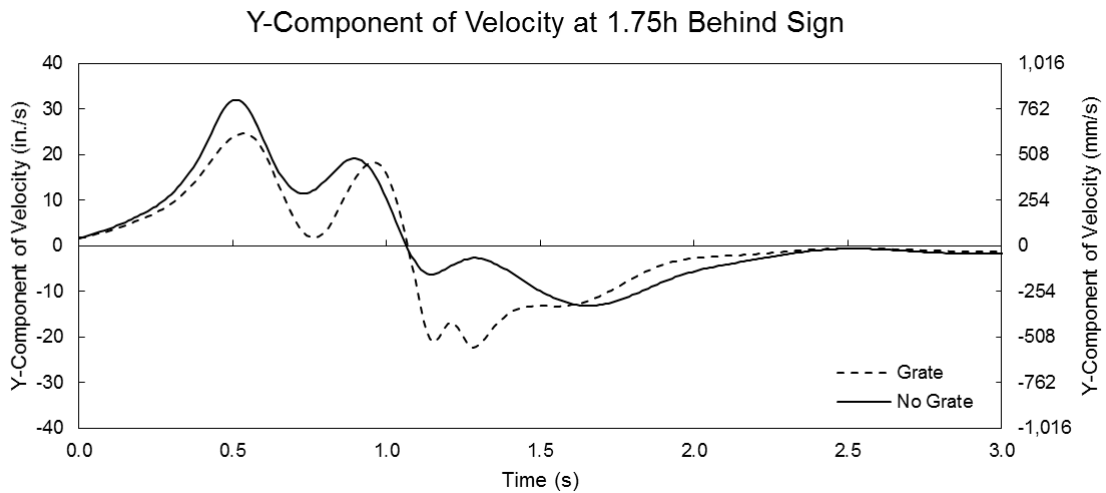


Figure A1.50: Y-component of velocity for the medium sign at V=61.2 mph (27.4 m/s) at a distance = 1.75h behind the sign

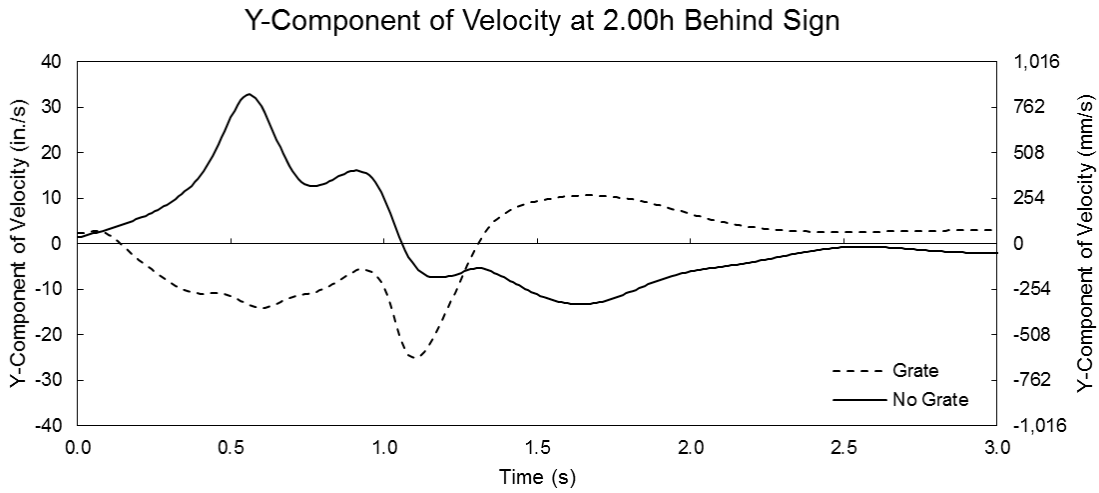


Figure A1.51: Y-component of velocity for the medium sign at V=61.2 mph (27.4 m/s) at a distance = 2.0h behind the sign

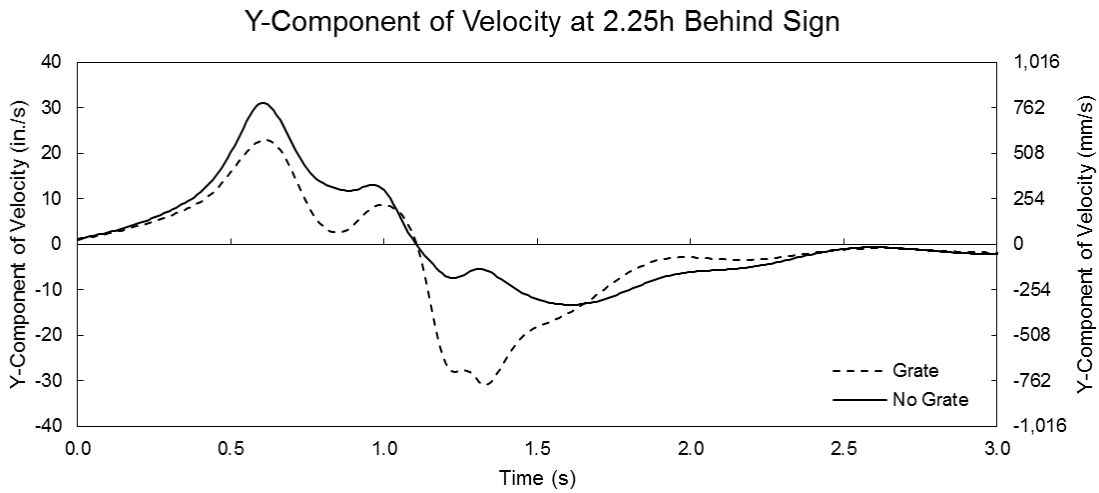


Figure A1.52: Y-component of velocity for the medium sign at V=61.2 mph (27.4 m/s) at a distance = 2.25h behind the sign

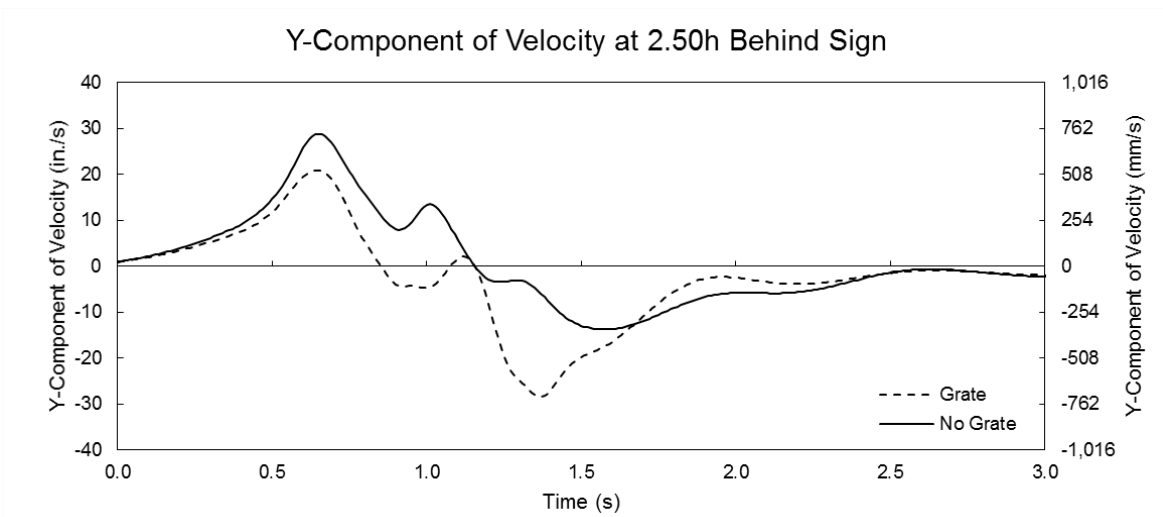


Figure A1.53: Y-component of velocity for the medium sign at V=61.2 mph (27.4 m/s) at a distance = 2.5h behind the sign

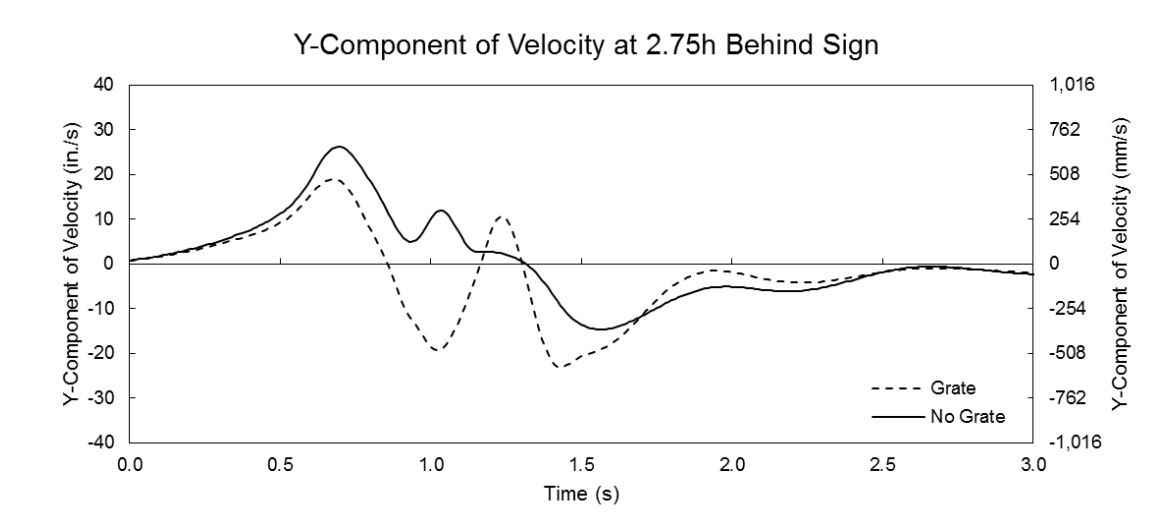


Figure A1.54: Y-component of velocity for the medium sign at V=61.2 mph (27.4 m/s) at a distance = 2.75h behind the sign

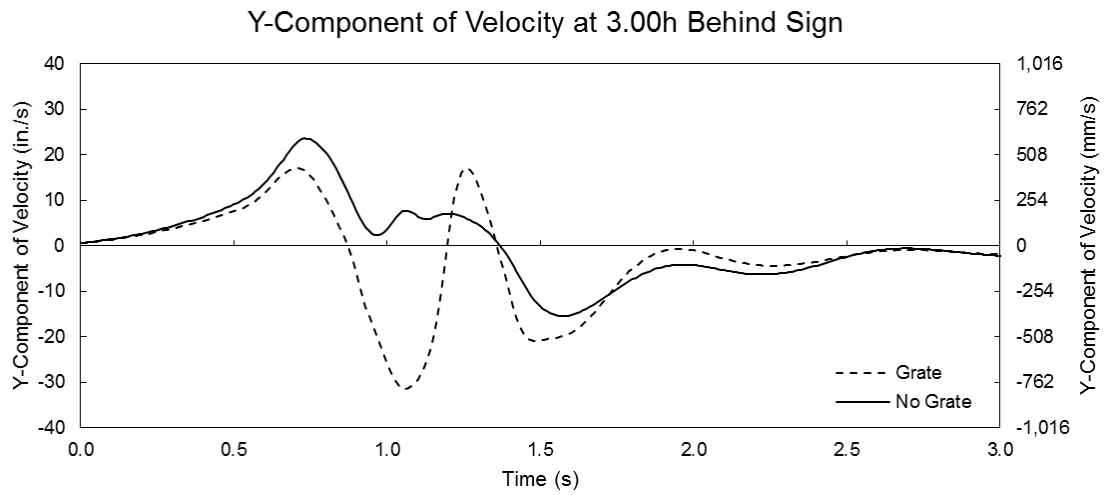


Figure A1.55: Y-component of velocity for the medium sign at V=61.2 mph (27.4 m/s) at a distance = 3.0h behind the sign

A1.6: Y-Component of Velocity Behind Medium Sign at V=105mph (46.9 m/s)

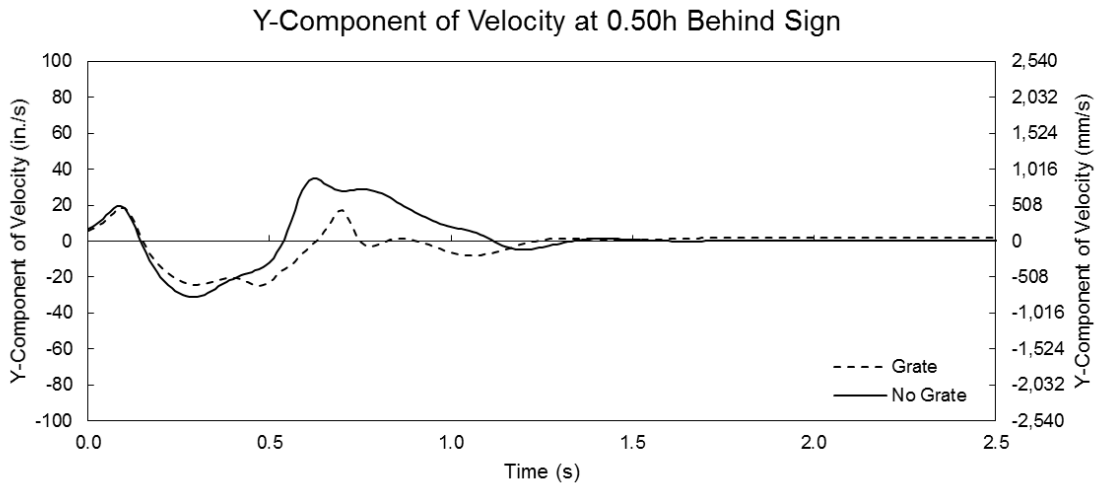


Figure A1.56: Y-component of velocity for the medium sign at V=105 mph (46.9 m/s) at a distance = 0.5h behind the sign

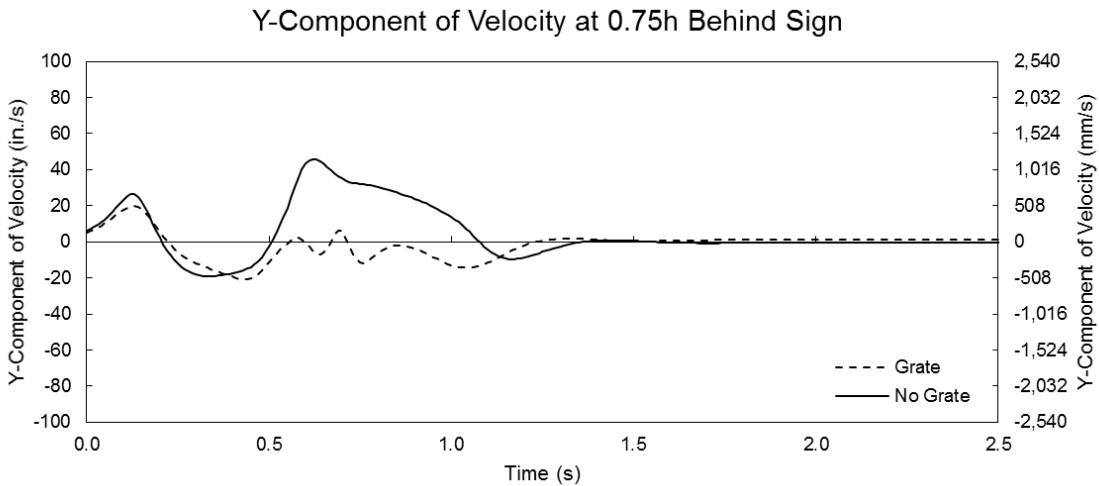


Figure A1.57: Y-component of velocity for the medium sign at V=105 mph (46.9 m/s) at a distance = 0.75h behind the sign

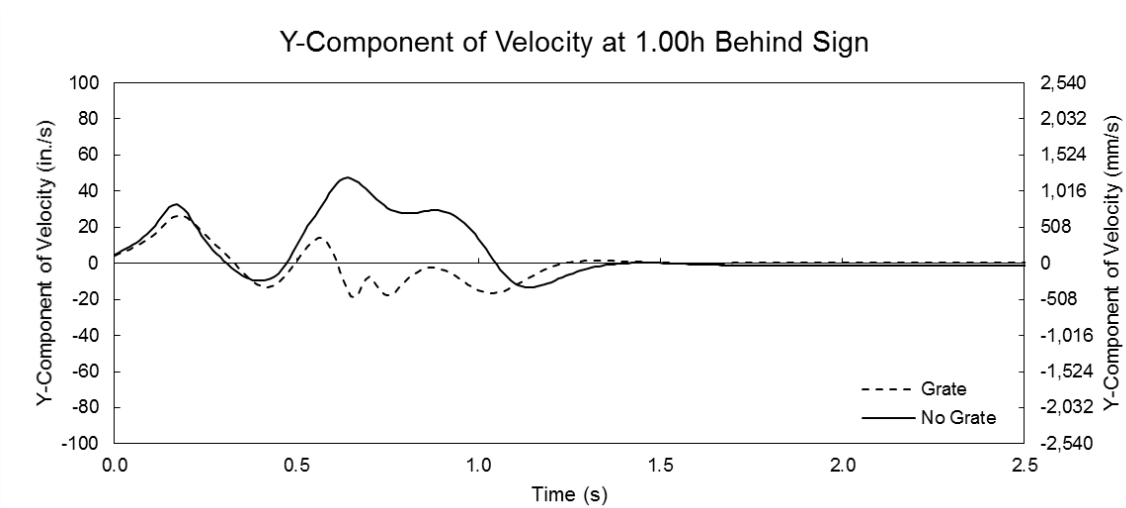


Figure A1.58: Y-component of velocity for the medium sign at V=105 mph (46.9 m/s) at a distance = 1.0h behind the sign

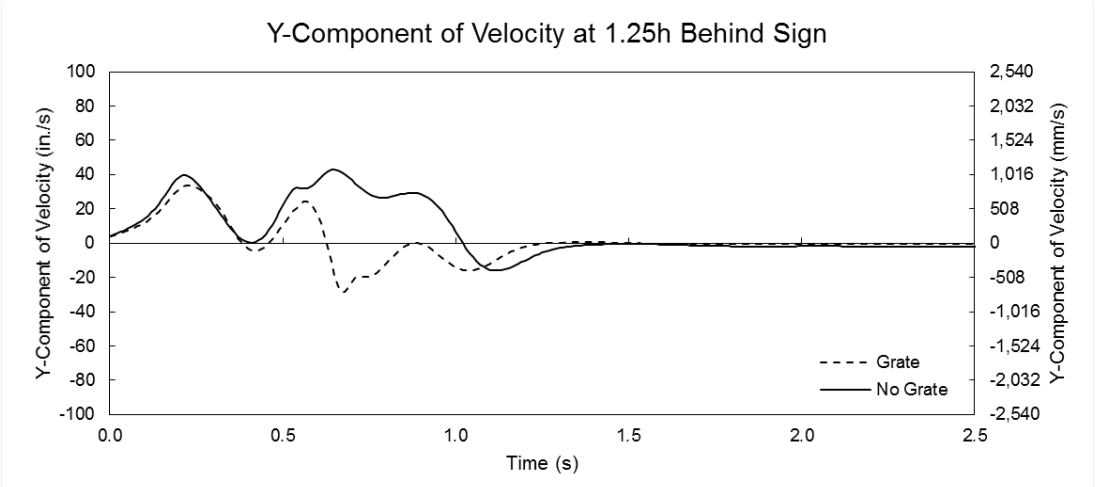


Figure A1.59: Y-component of velocity for the medium sign at V=105 mph (46.9 m/s) at a distance = 1.25h behind the sign

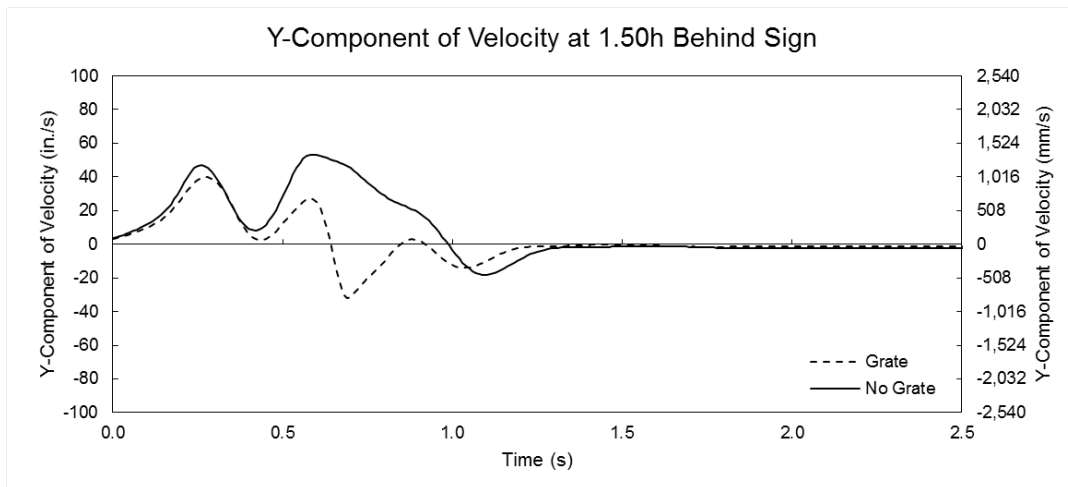


Figure A1.60: Y-component of velocity for the medium sign at V=105 mph (46.9 m/s) at a distance = 1.5h behind the sign

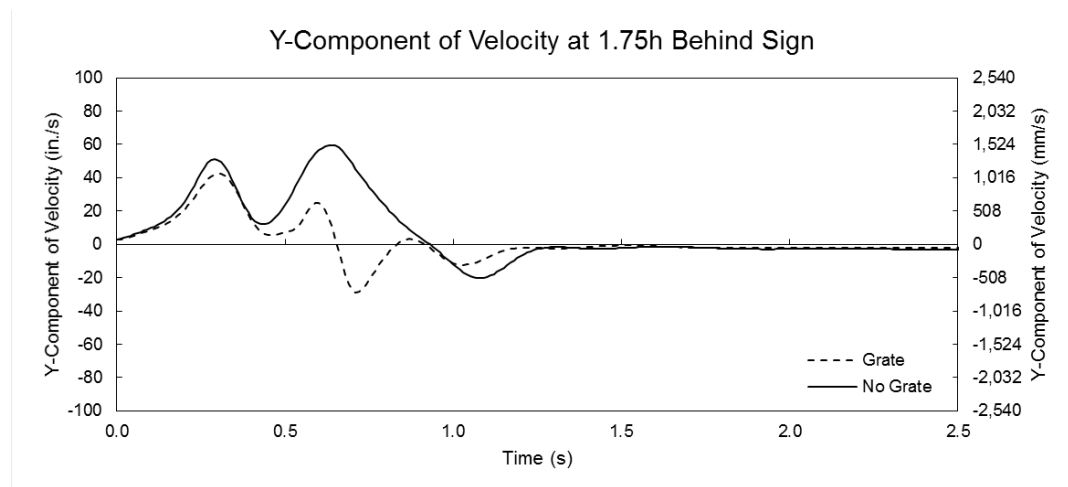


Figure A1.61: Y-component of velocity for the medium sign at V=105 mph (46.9 m/s) at a distance = 1.75h behind the sign

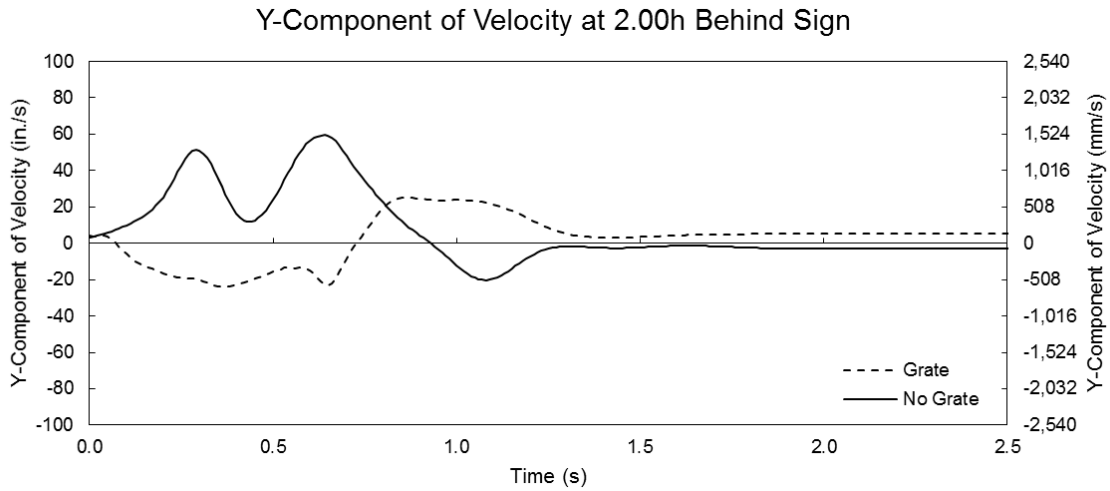


Figure A1.62: Y-component of velocity for the medium sign at V=105 mph (46.9 m/s) at a distance = 2.0h behind the sign

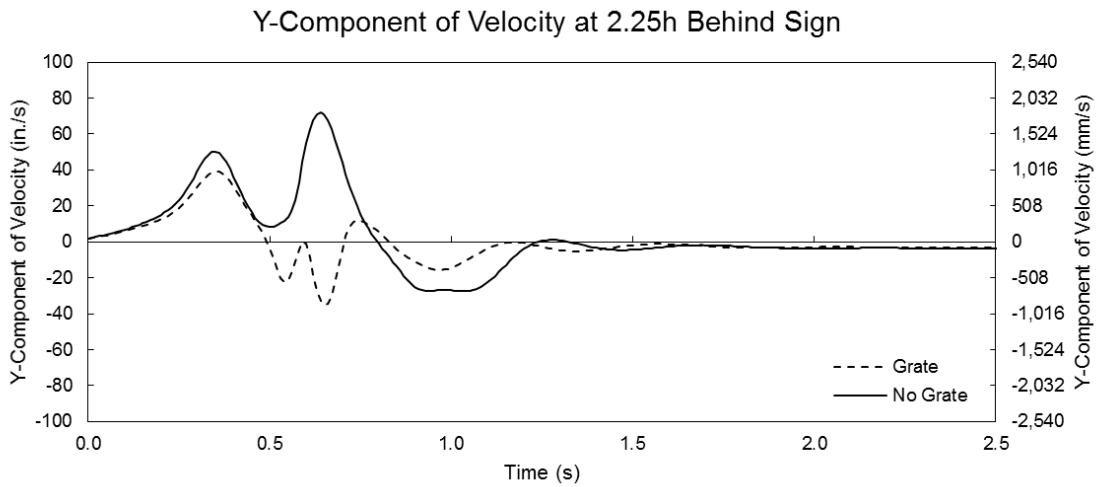


Figure A1.63: Y-component of velocity for the medium sign at V=105 mph (46.9 m/s) at a distance = 2.25h behind the sign

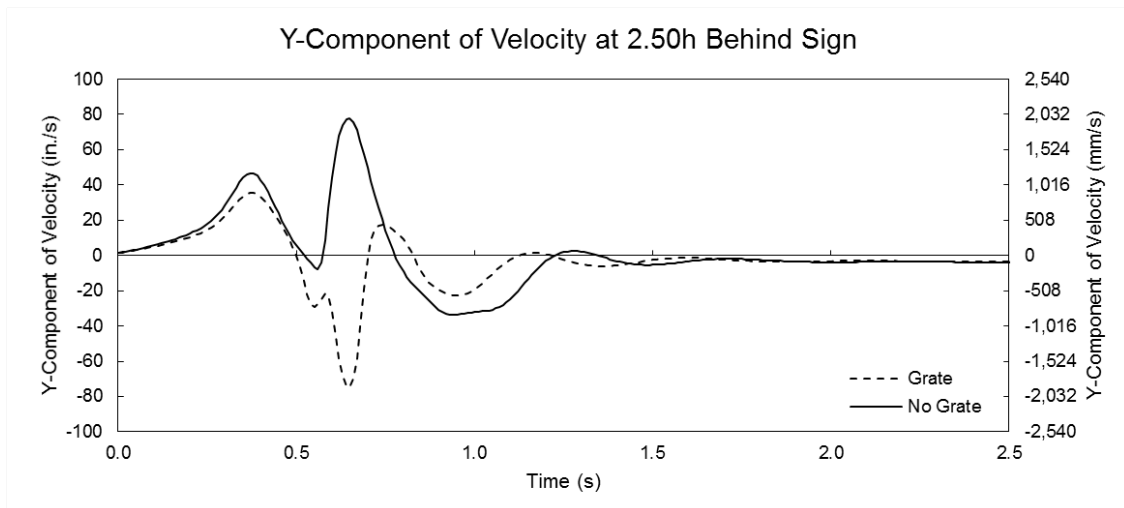


Figure A1.64: Y-component of velocity for the medium sign at V=105 mph (46.9 m/s) at a distance = 2.5h behind the sign

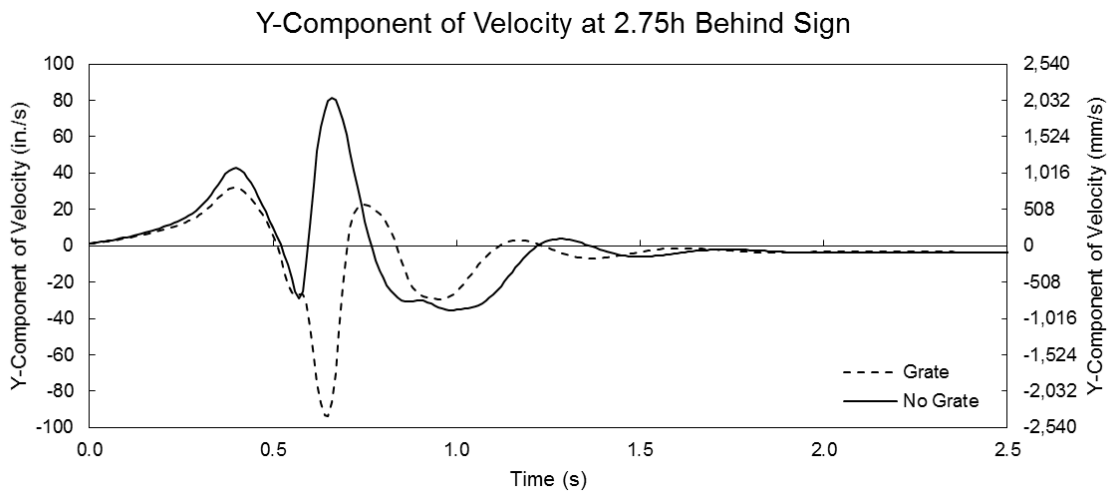


Figure A1.65: Y-component of velocity for the medium sign at V=105 mph (46.9 m/s) at a distance = 2.75h behind the sign

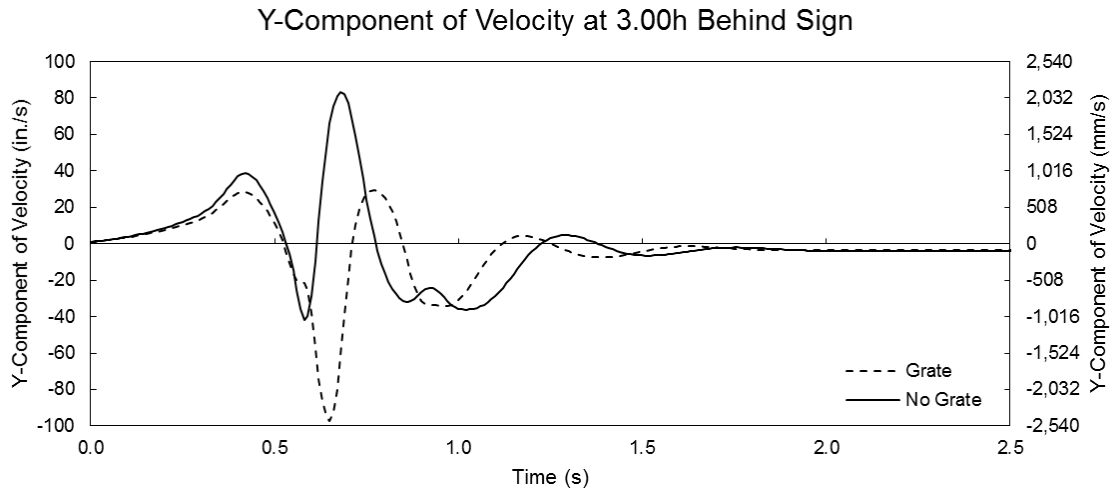


Figure A1.66: Y-component of velocity for the medium sign at V=105 mph (46.9 m/s) at a distance = 3.0h behind the sign

A1.7: Y-Component of Velocity Behind Small Sign at V=30 mph (13.4 m/s)

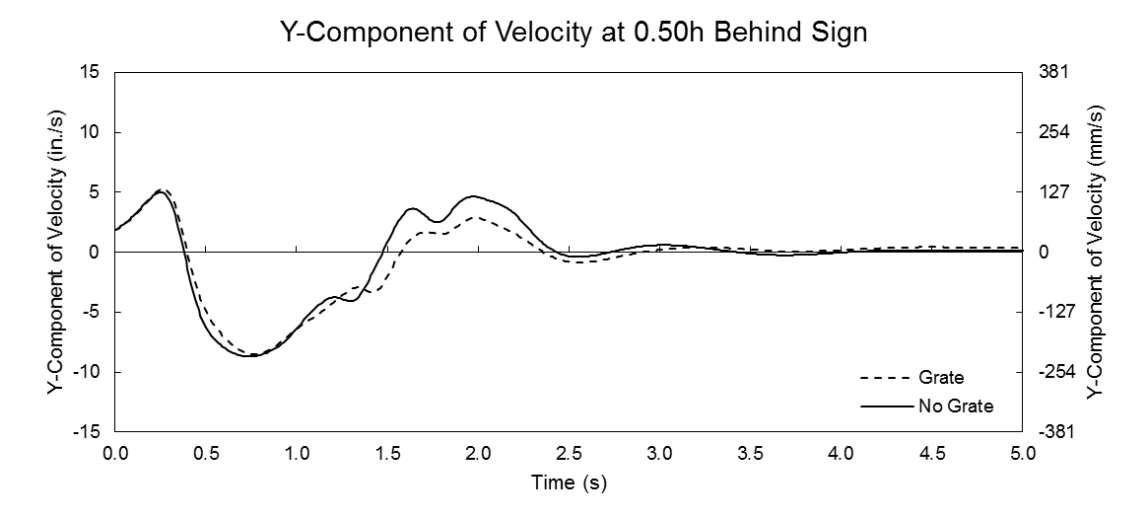


Figure A1.67: Y-component of velocity for the small sign at V=30 mph (13.4 m/s) at a distance = 0.5h behind the sign

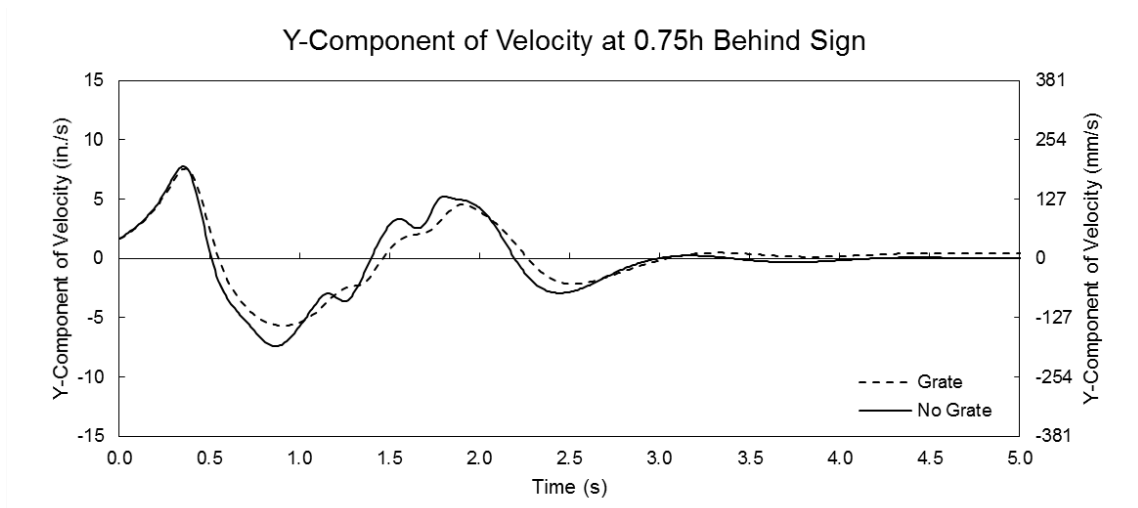


Figure A1.68: Y-component of velocity for the small sign at V=30 mph (13.4 m/s) at a distance = 0.75h behind the sign

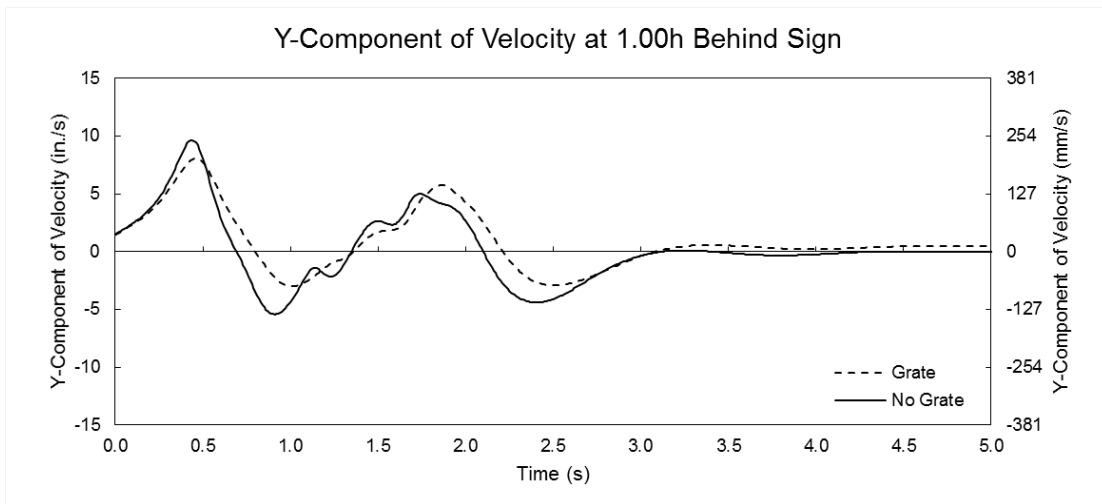


Figure A1.69: Y-component of velocity for the small sign at V=30 mph (13.4 m/s) at a distance = 1.0h behind the sign

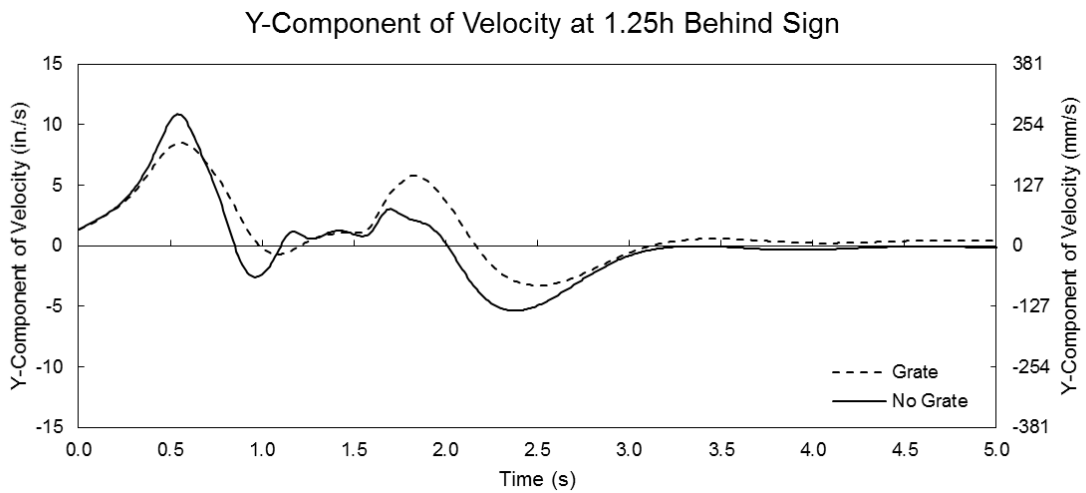


Figure A1.70: Y-component of velocity for the small sign at V=30 mph (13.4 m/s) at a distance = 1.25h behind the sign

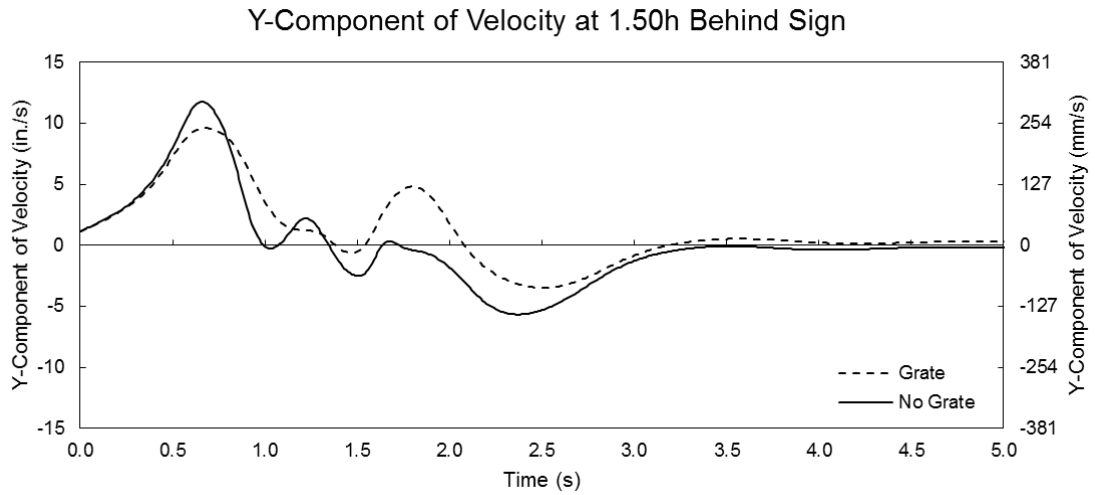


Figure A1.71: Y-component of velocity for the small sign at V=30 mph (13.4 m/s) at a distance = 1.5h behind the sign

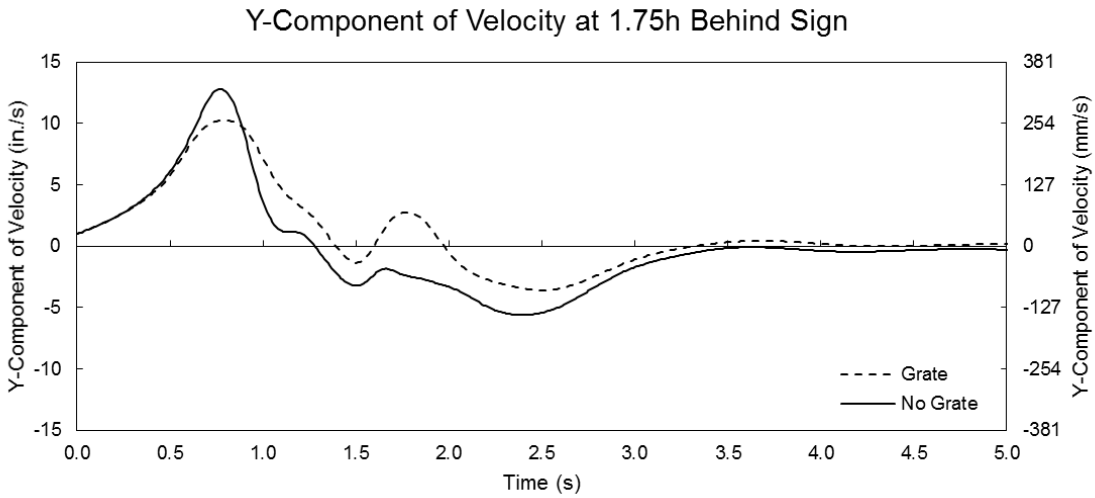


Figure A1.72: Y-component of velocity for the small sign at V=30 mph (13.4 m/s) at a distance = 1.75h behind the sign

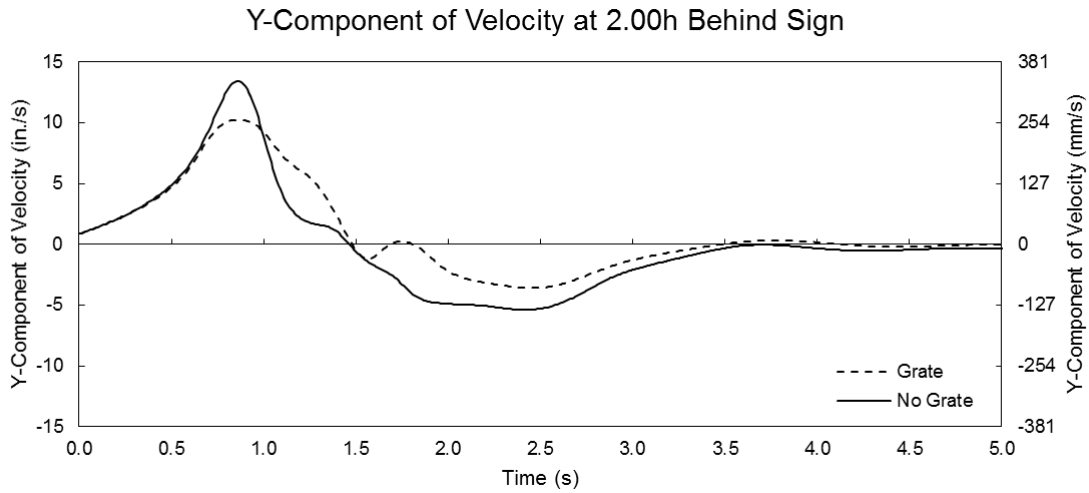


Figure A1.73: Y-component of velocity for the small sign at V=30 mph (13.4 m/s) at a distance = 2.0h behind the sign

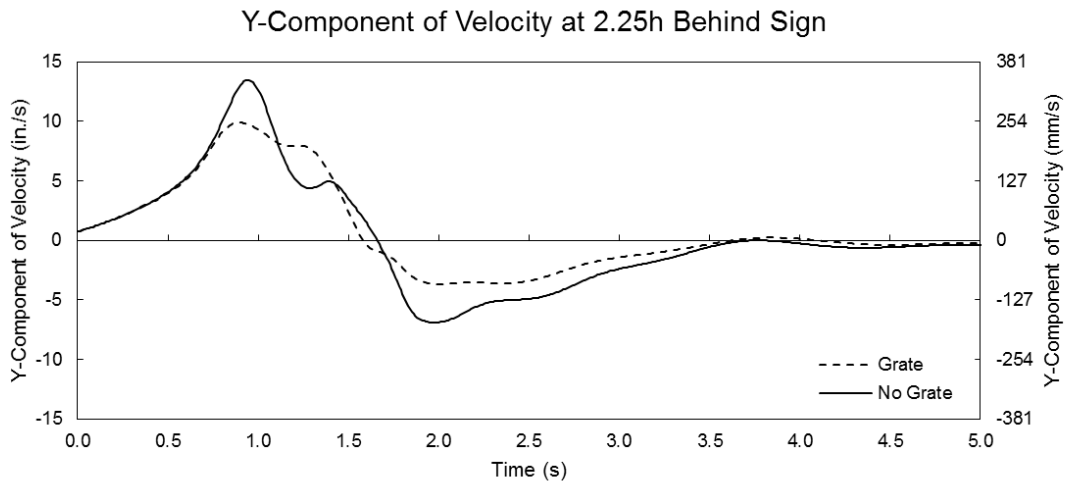


Figure A1.74: Y-component of velocity for the small sign at V=30 mph (13.4 m/s) at a distance = 2.25h behind the sign

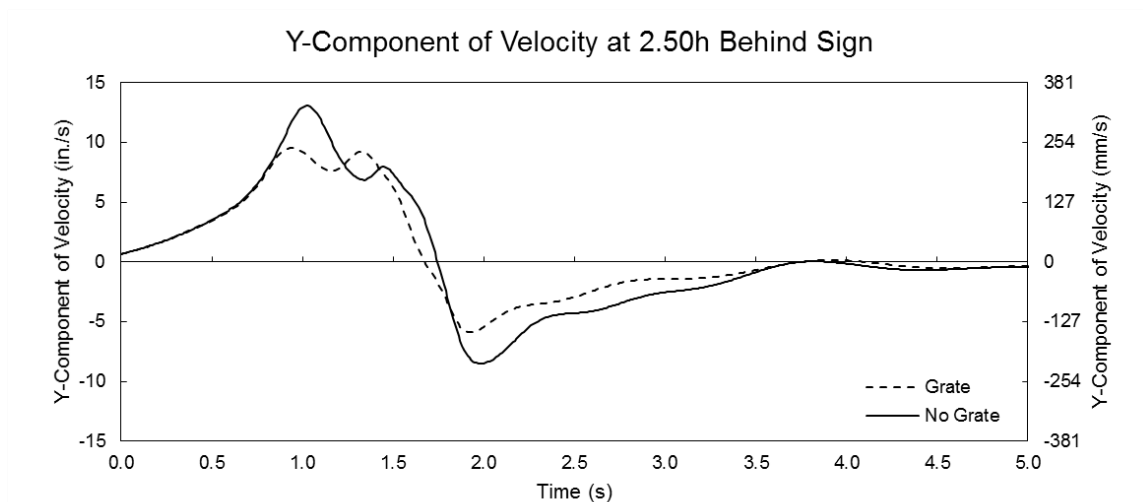


Figure A1.75: Y-component of velocity for the small sign at V=30 mph (13.4 m/s) at a distance = 2.5h behind the sign

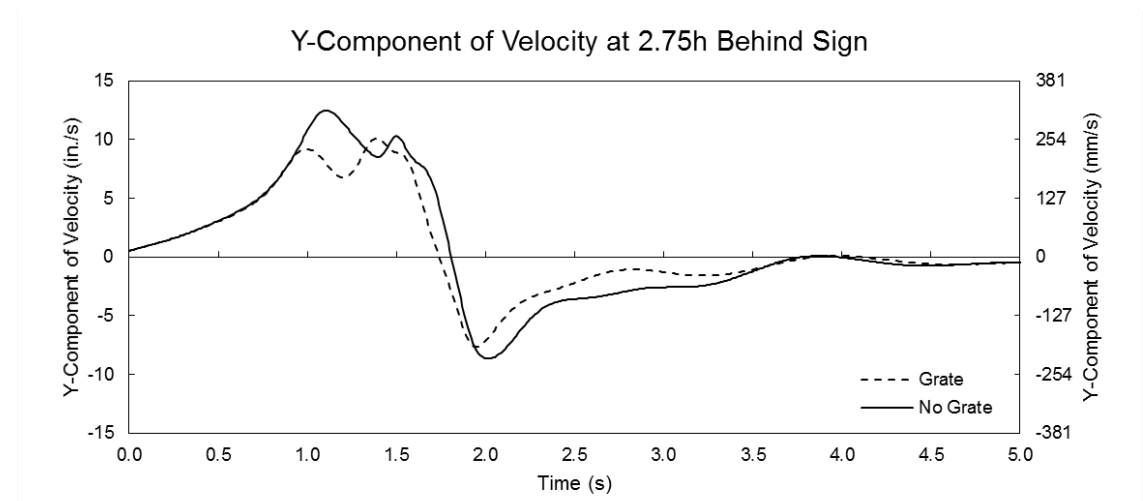


Figure A1.76: Y-component of velocity for the small sign at V=30 mph (13.4 m/s) at a distance = 2.75h behind the sign

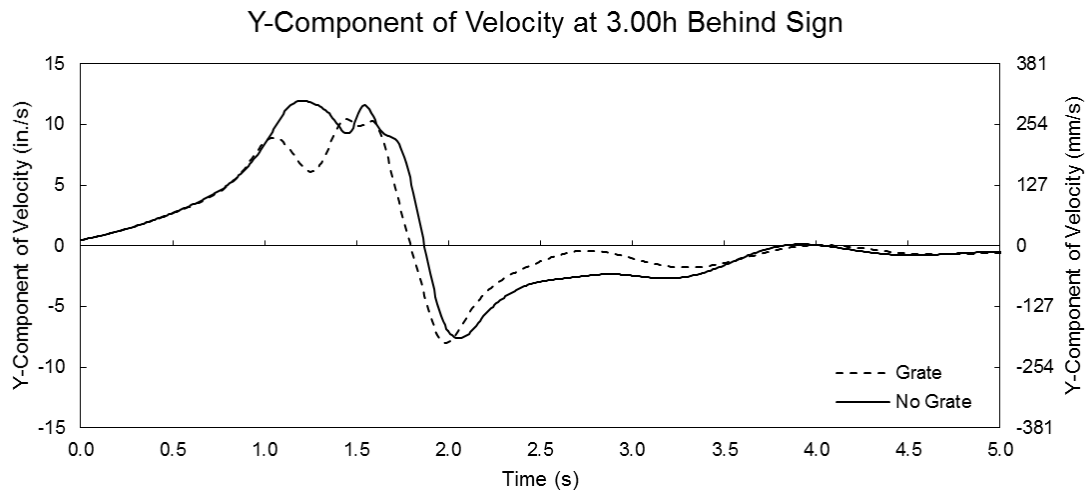


Figure A1.77: Y-component of velocity for the small sign at V=30 mph (13.4 m/s) at a distance = 3.0h behind the sign

A1.8: Y-Component of Velocity Behind Small Sign at V=61.2 mph (27.4 m/s)

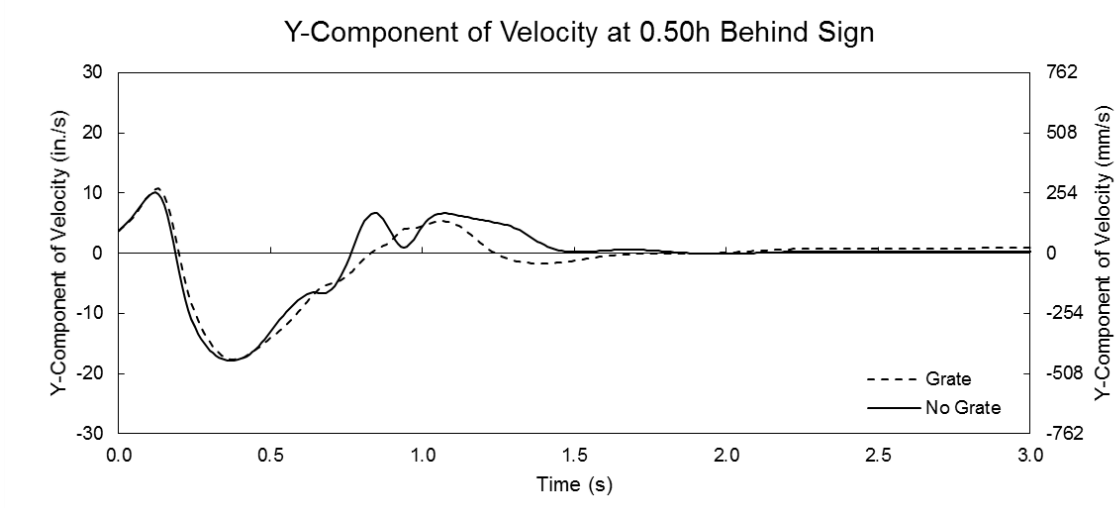


Figure A1.78: Y-component of velocity for the small sign at V=61.2 mph (27.4 m/s) at a distance = 0.5h behind the sign

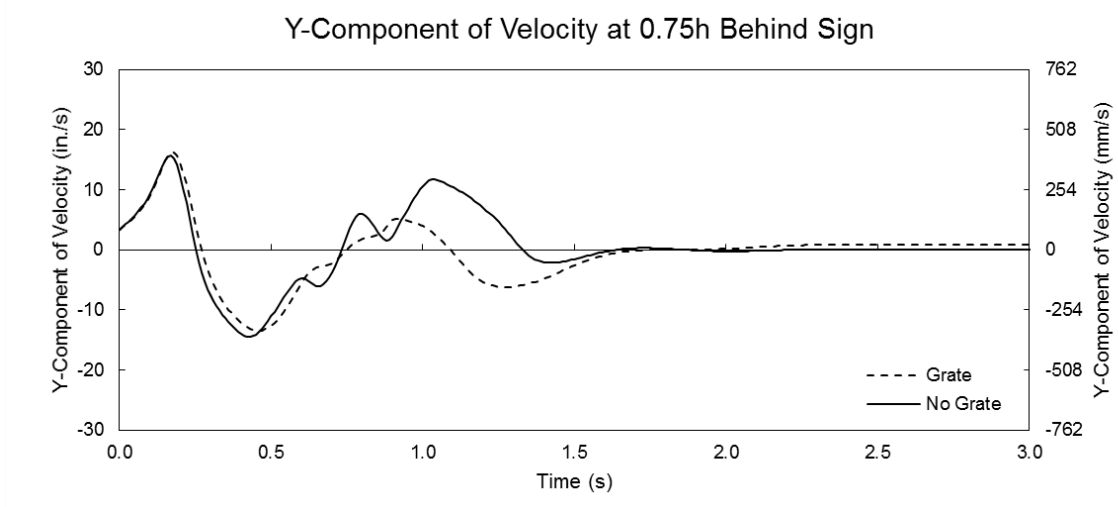


Figure A1.79: Y-component of velocity for the small sign at V=61.2 mph (27.4 m/s) at a distance = 0.75h behind the sign

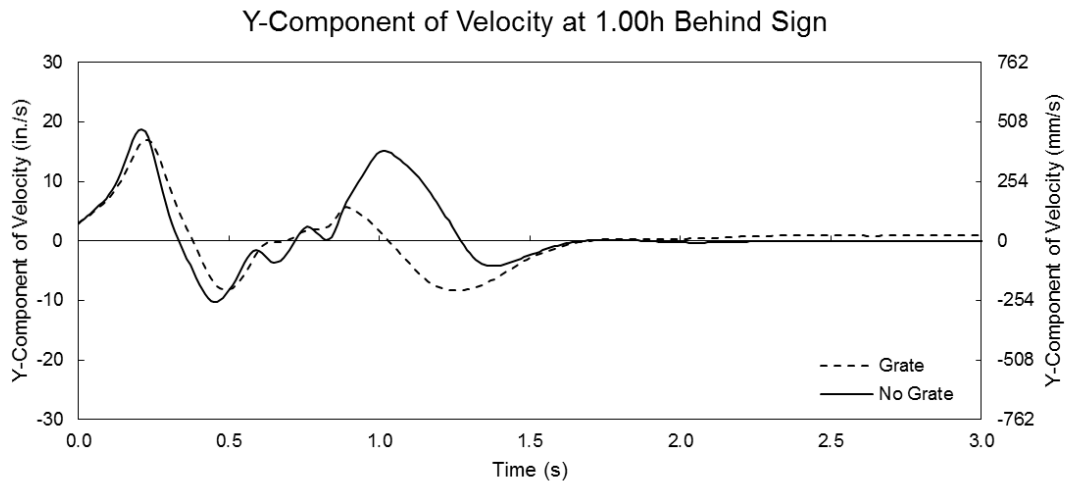


Figure A1.80: Y-component of velocity for the small sign at V=61.2 mph (27.4 m/s) at a distance = 1.0h behind the sign

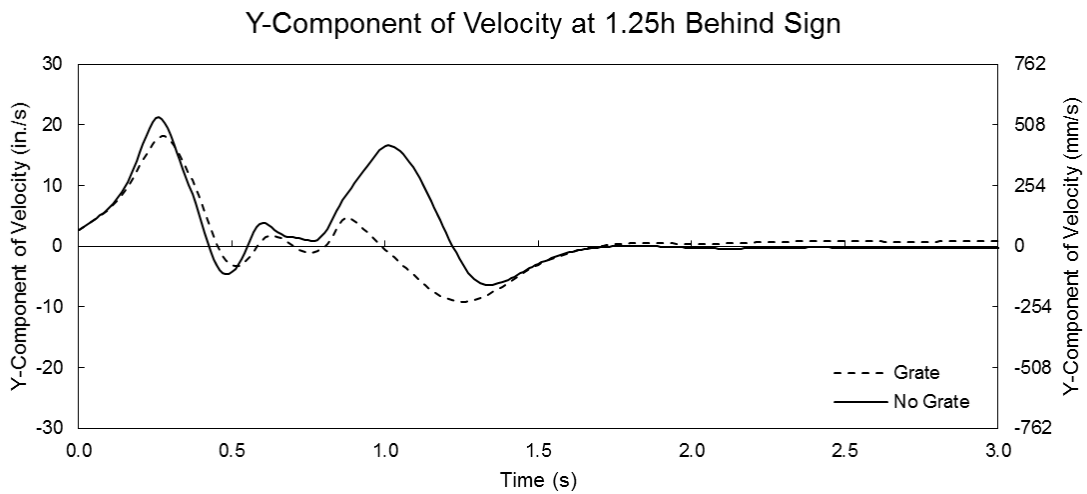


Figure A1.81: Y-component of velocity for the small sign at V=61.2 mph (27.4 m/s) at a distance = 1.25h behind the sign

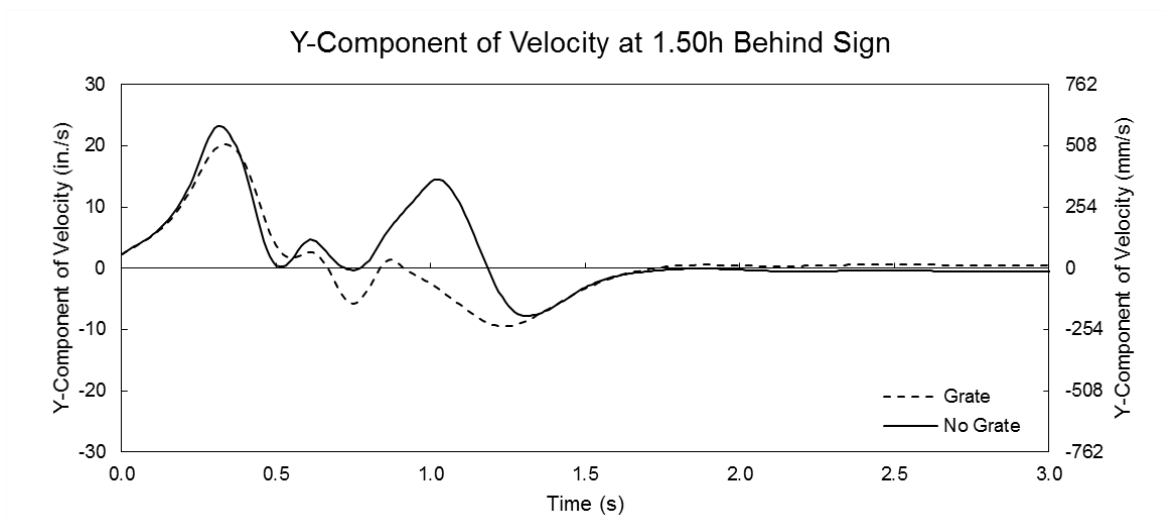


Figure A1.82: Y-component of velocity for the small sign at V=61.2 mph (27.4 m/s) at a distance = 1.5h behind the sign

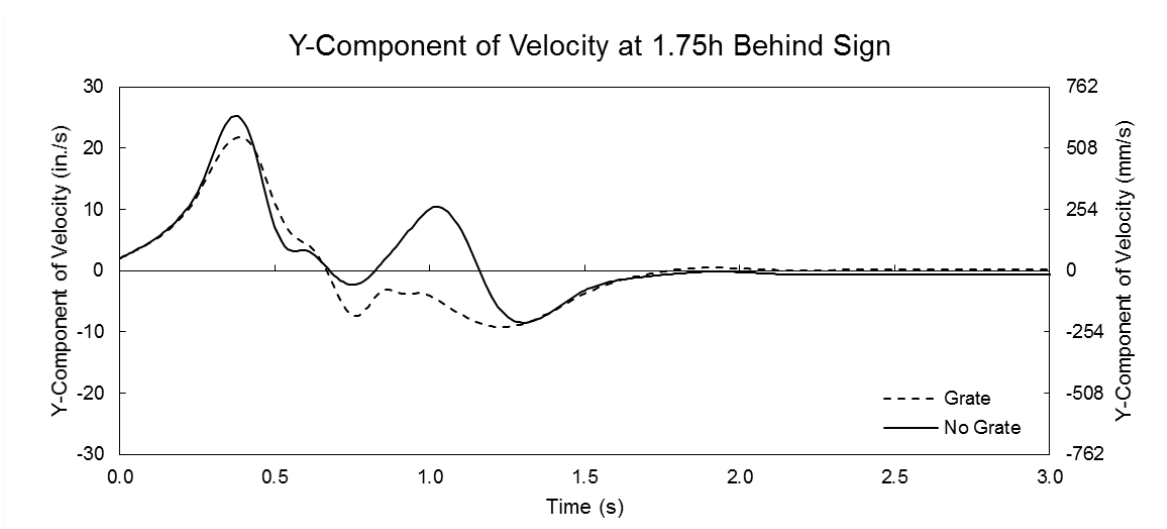


Figure A1.83: Y-component of velocity for the small sign at V=61.2 mph (27.4 m/s) at a distance = 1.75h behind the sign

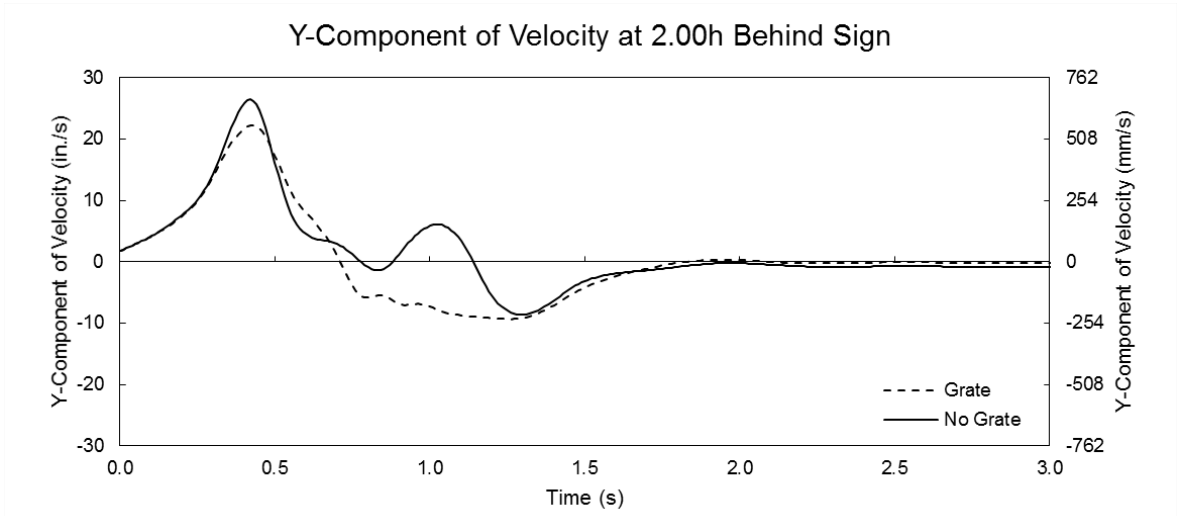


Figure A1.84: Y-component of velocity for the small sign at V=61.2 mph (27.4 m/s) at a distance = 2.0h behind the sign

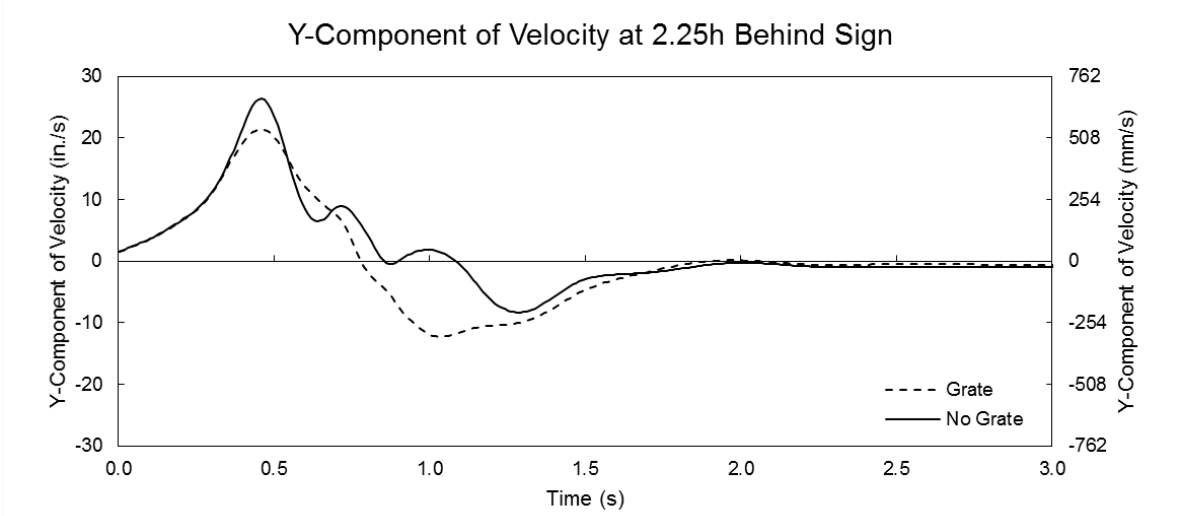


Figure A1.85: Y-component of velocity for the small sign at V=61.2 mph (27.4 m/s) at a distance = 2.25h behind the sign

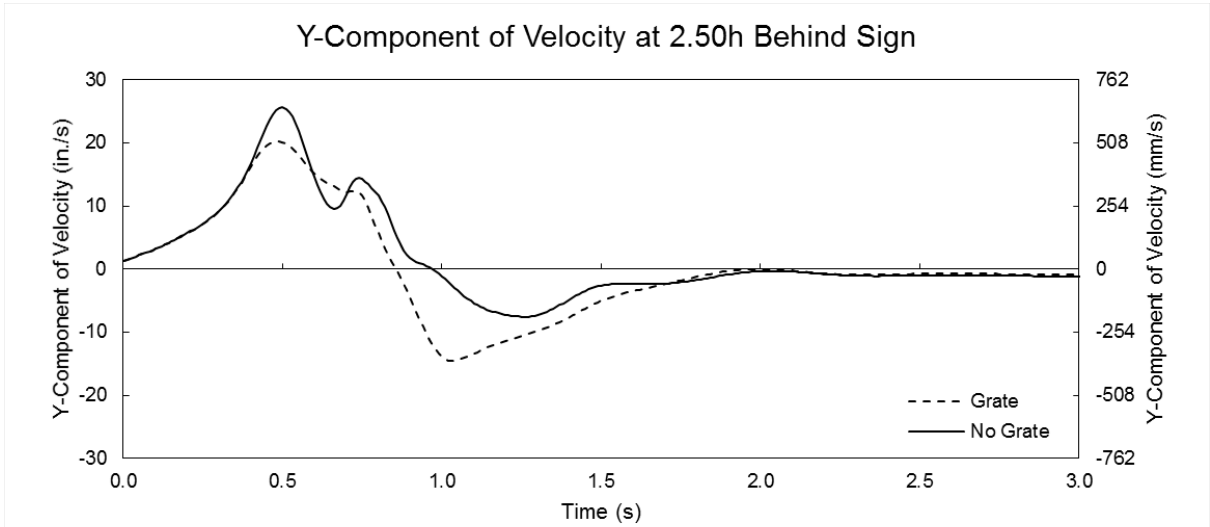


Figure A1.86: Y-component of velocity for the small sign at V=61.2 mph (27.4 m/s) at a distance = 2.5h behind the sign

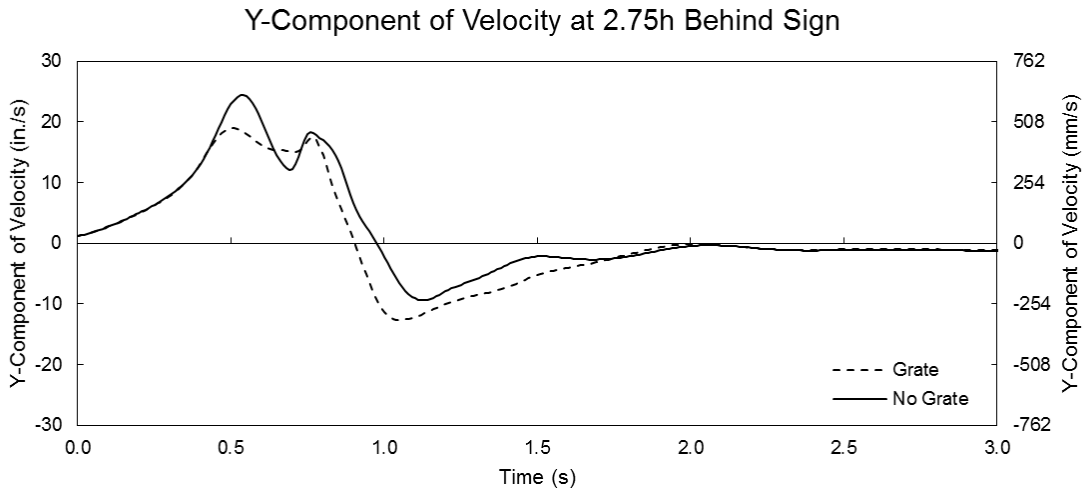


Figure A1.87: Y-component of velocity for the small sign at V=61.2 mph (27.4 m/s) at a distance = 2.75h behind the sign

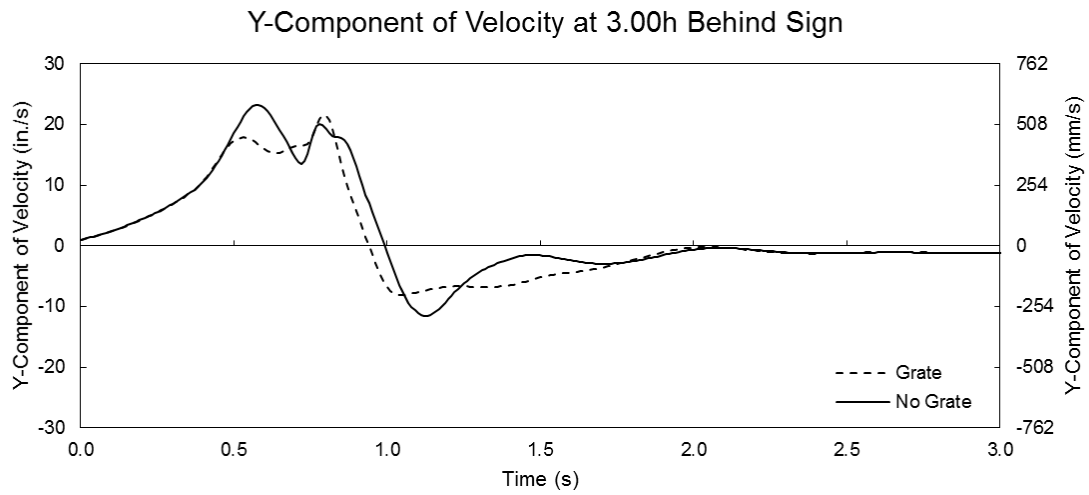


Figure A1.88: Y-component of velocity for the small sign at V=61.2 mph (27.4 m/s) at a distance = 3.0h behind the sign

A1.9: Y-Component of Velocity Behind Small Sign at V=105mph (46.9 m/s)

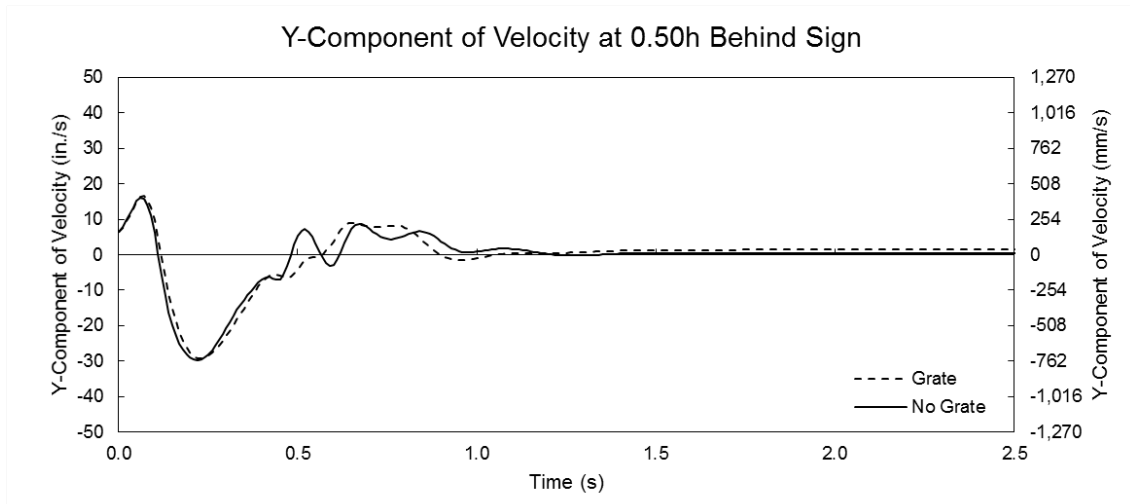


Figure A1.89: Y-component of velocity for the small sign at V=105 mph (46.9 m/s) at a distance = 0.5h behind the sign

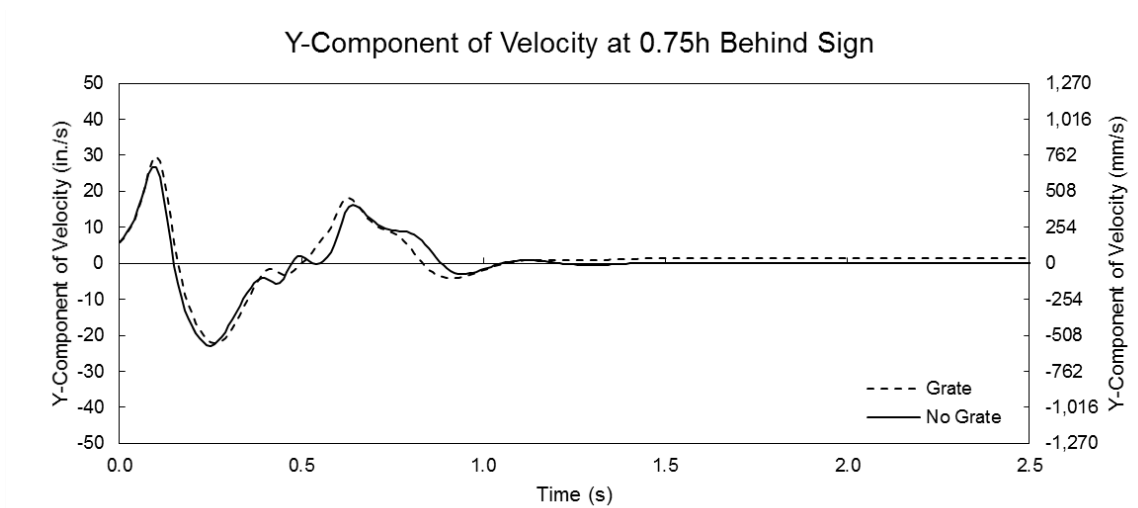


Figure A1.90: Y-component of velocity for the small sign at V=105 mph (46.9 m/s) at a distance = 0.75h behind the sign

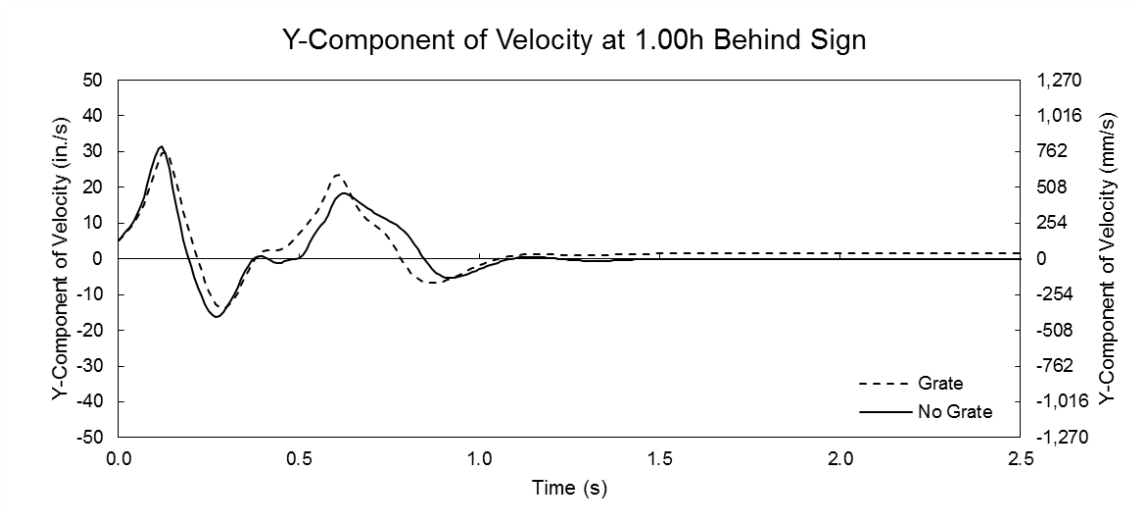


Figure A1.91: Y-component of velocity for the small sign at V=105 mph (46.9 m/s) at a distance = 1.0h behind the sign

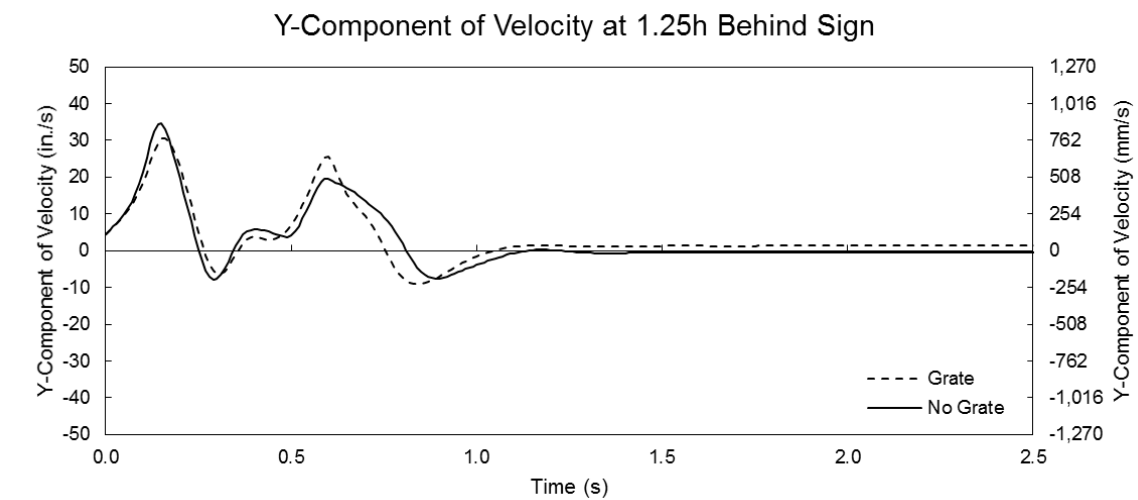


Figure A1.92: Y-component of velocity for the small sign at V=105 mph (46.9 m/s) at a distance = 1.25h behind the sign

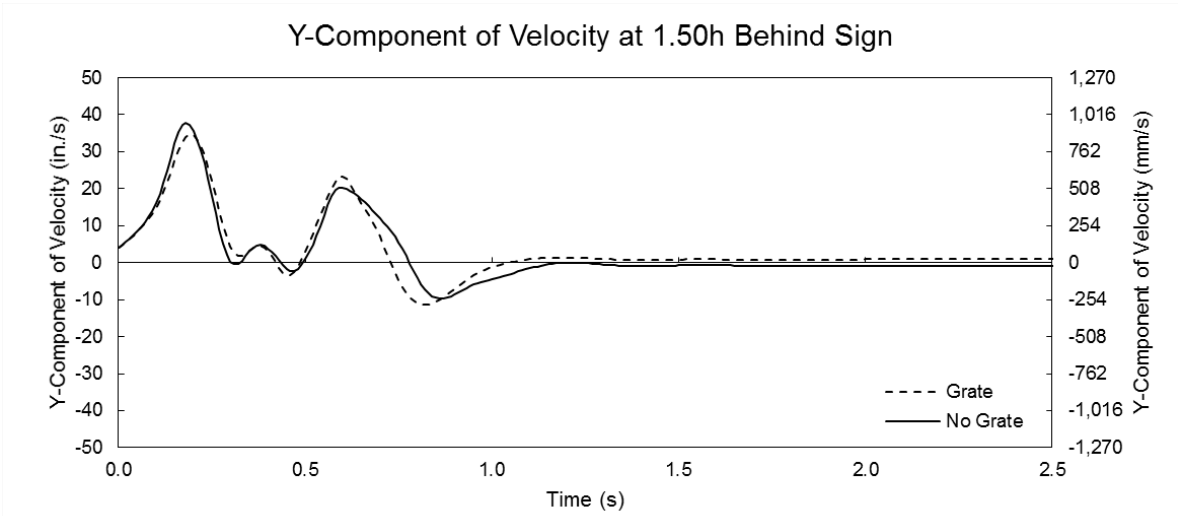


Figure A1.93: Y-component of velocity for the small sign at V=105 mph (46.9 m/s) at a distance = 1.5h behind the sign

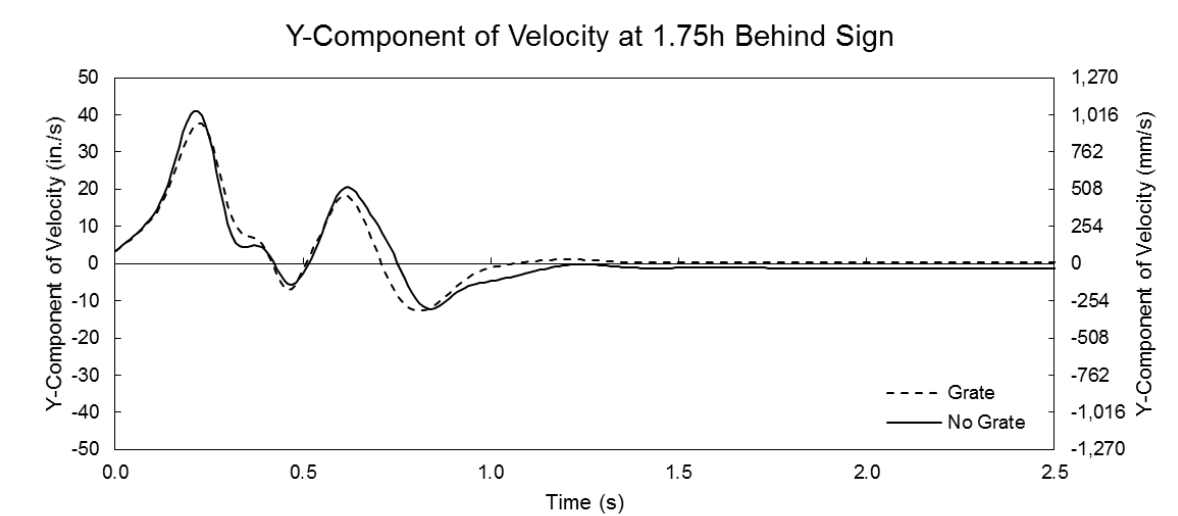


Figure A1.94: Y-component of velocity for the small sign at V=105 mph (46.9 m/s) at a distance = 1.75h behind the sign

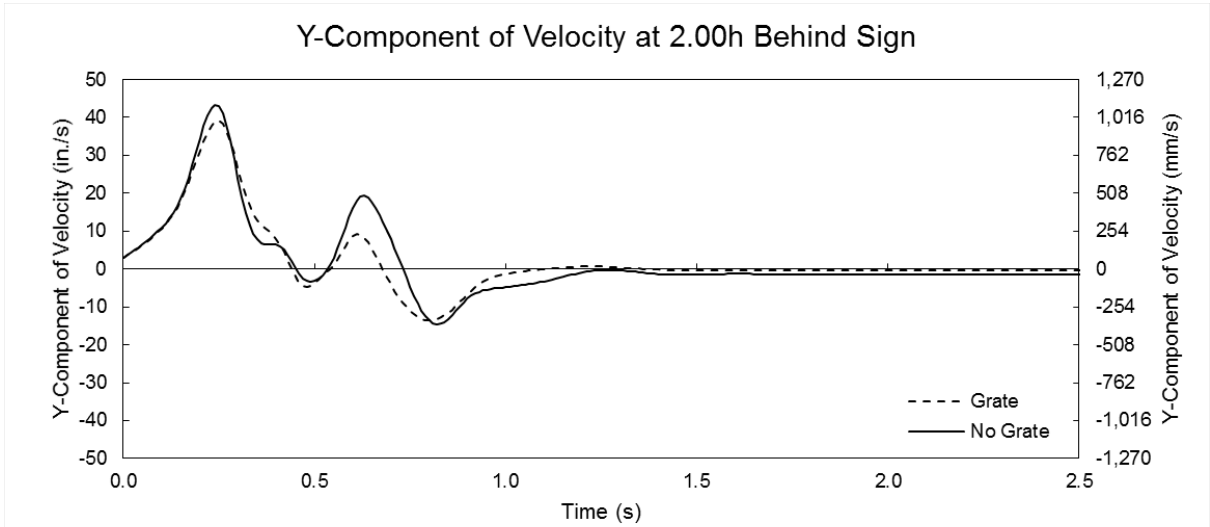


Figure A1.95: Y-component of velocity for the small sign at V=105 mph (46.9 m/s) at a distance = 2.0h behind the sign

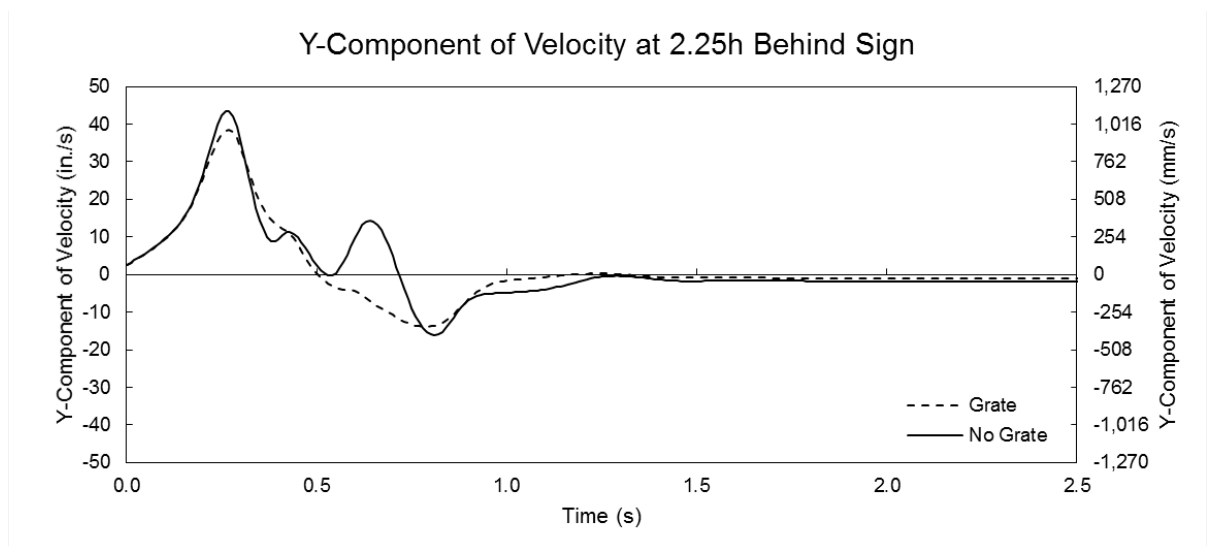


Figure A1.96: Y-component of velocity for the small sign at V=105 mph (46.9 m/s) at a distance = 2.25h behind the sign

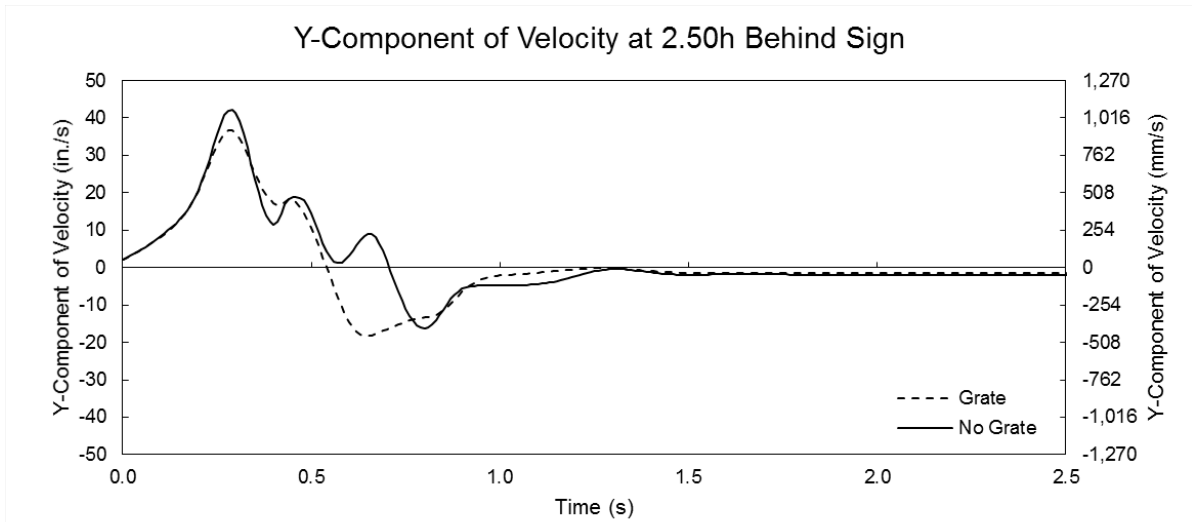


Figure A1.97: Y-component of velocity for the small sign at V=105 mph (46.9 m/s) at a distance = 2.5h behind the sign

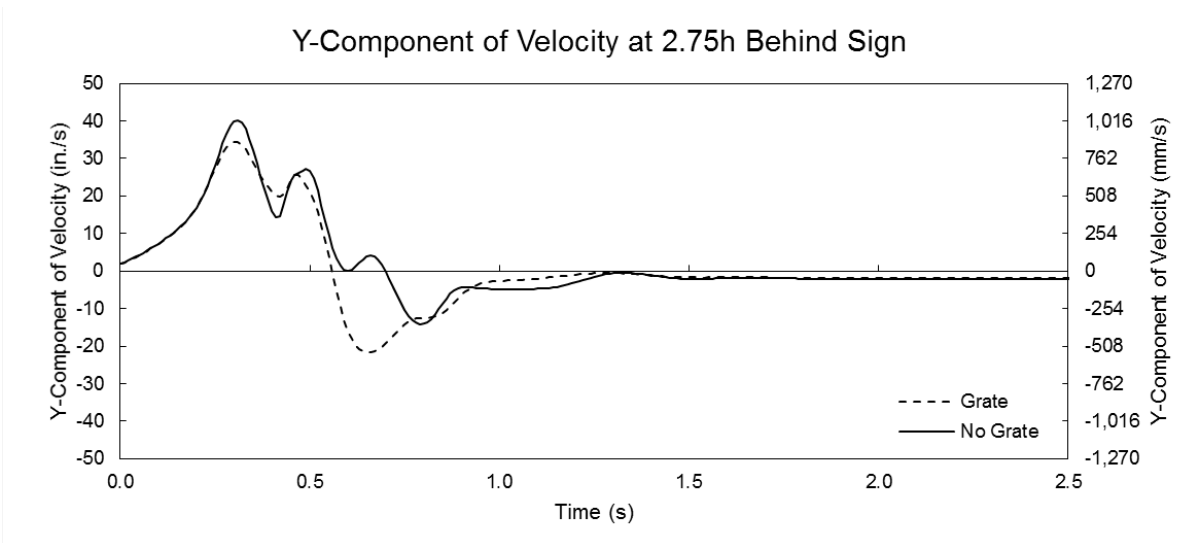


Figure A1.98: Y-component of velocity for the small sign at V=105 mph (46.9 m/s) at a distance = 2.75h behind the sign

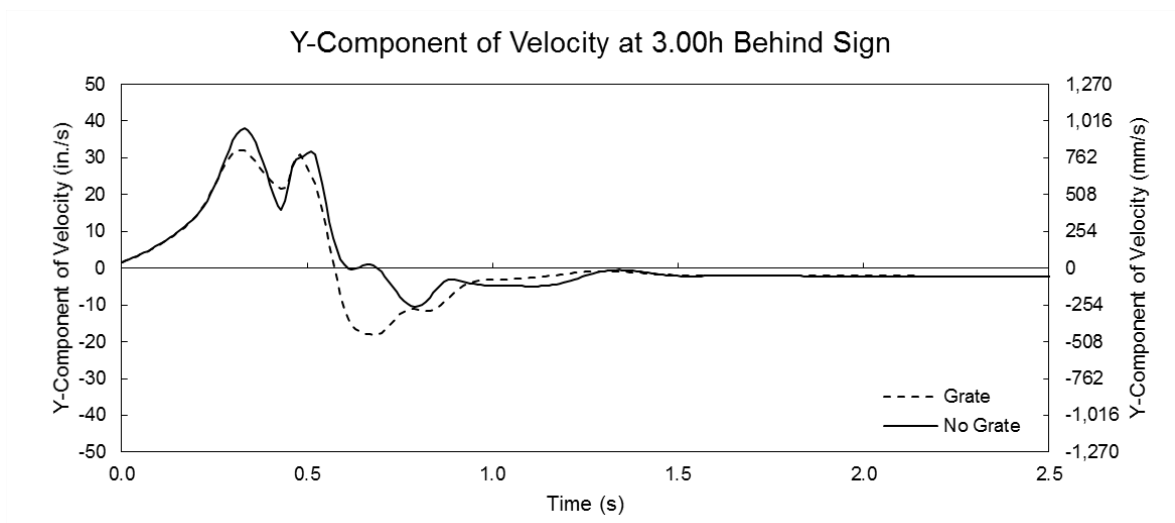
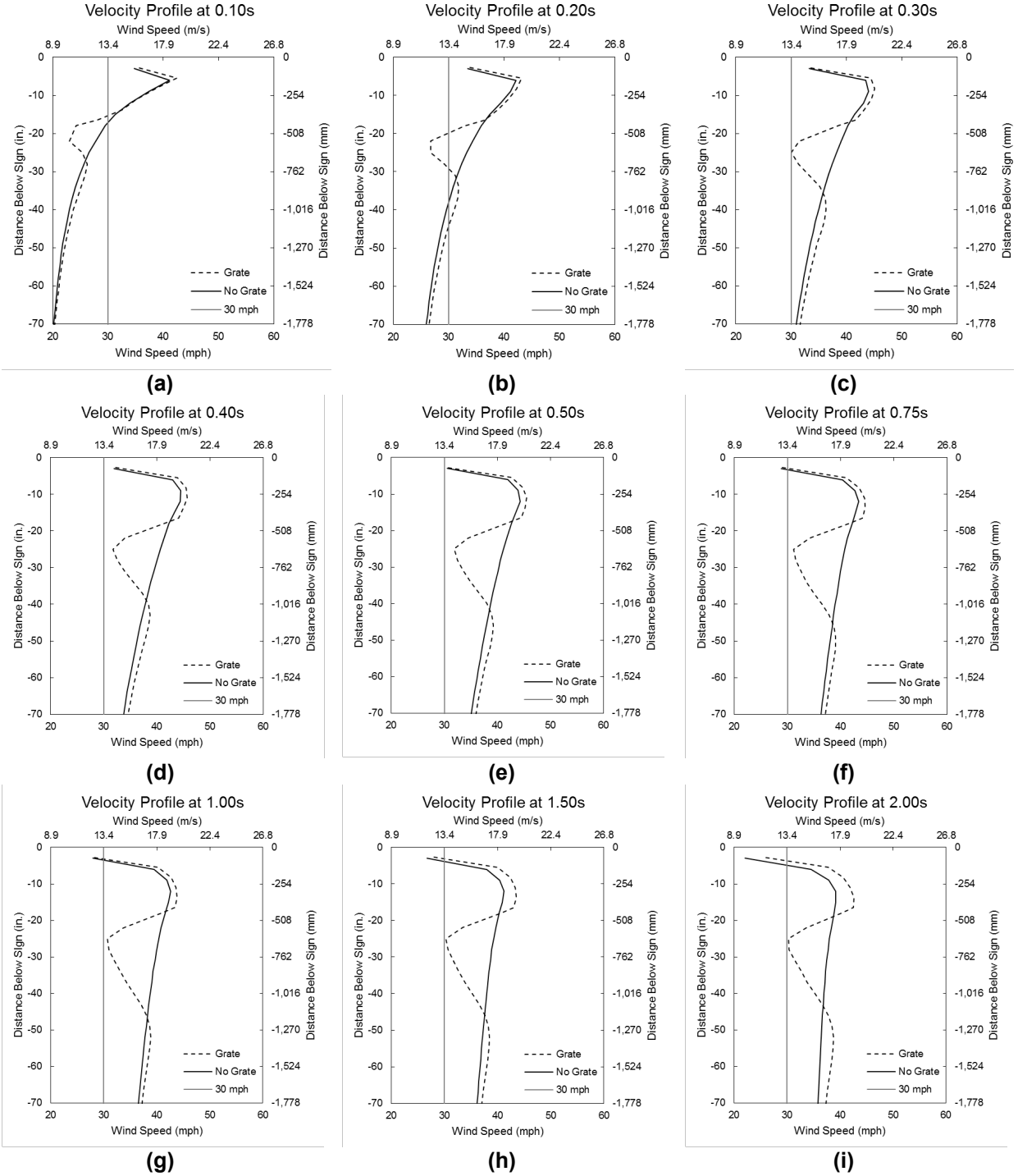


Figure A1.99: Y-component of velocity for the small sign at V=105 mph (46.9 m/s) at a distance = 3.0h behind the sign

Appendix A2

A2.1: Large Sign Velocity Profile at V=30 mph (13.4 m/s)



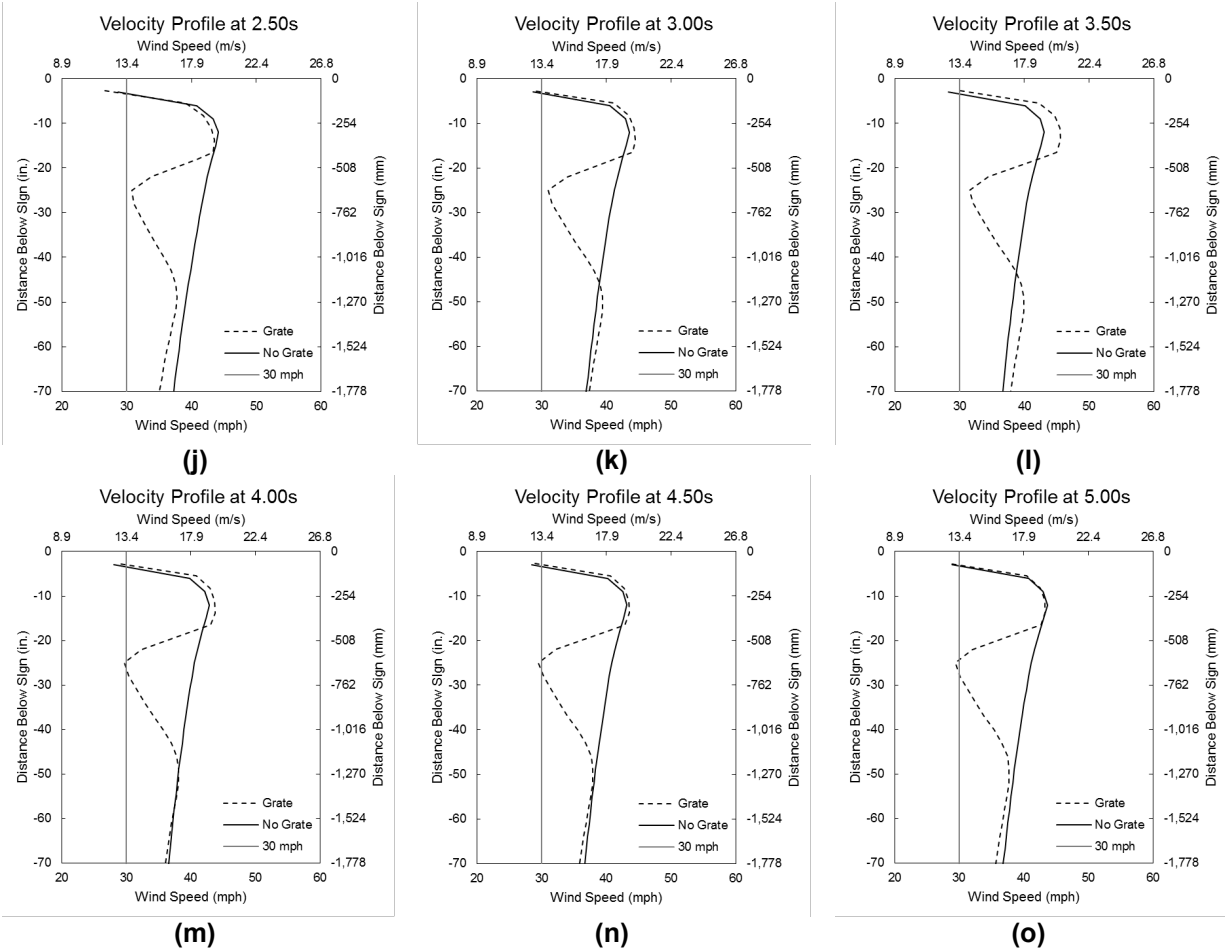
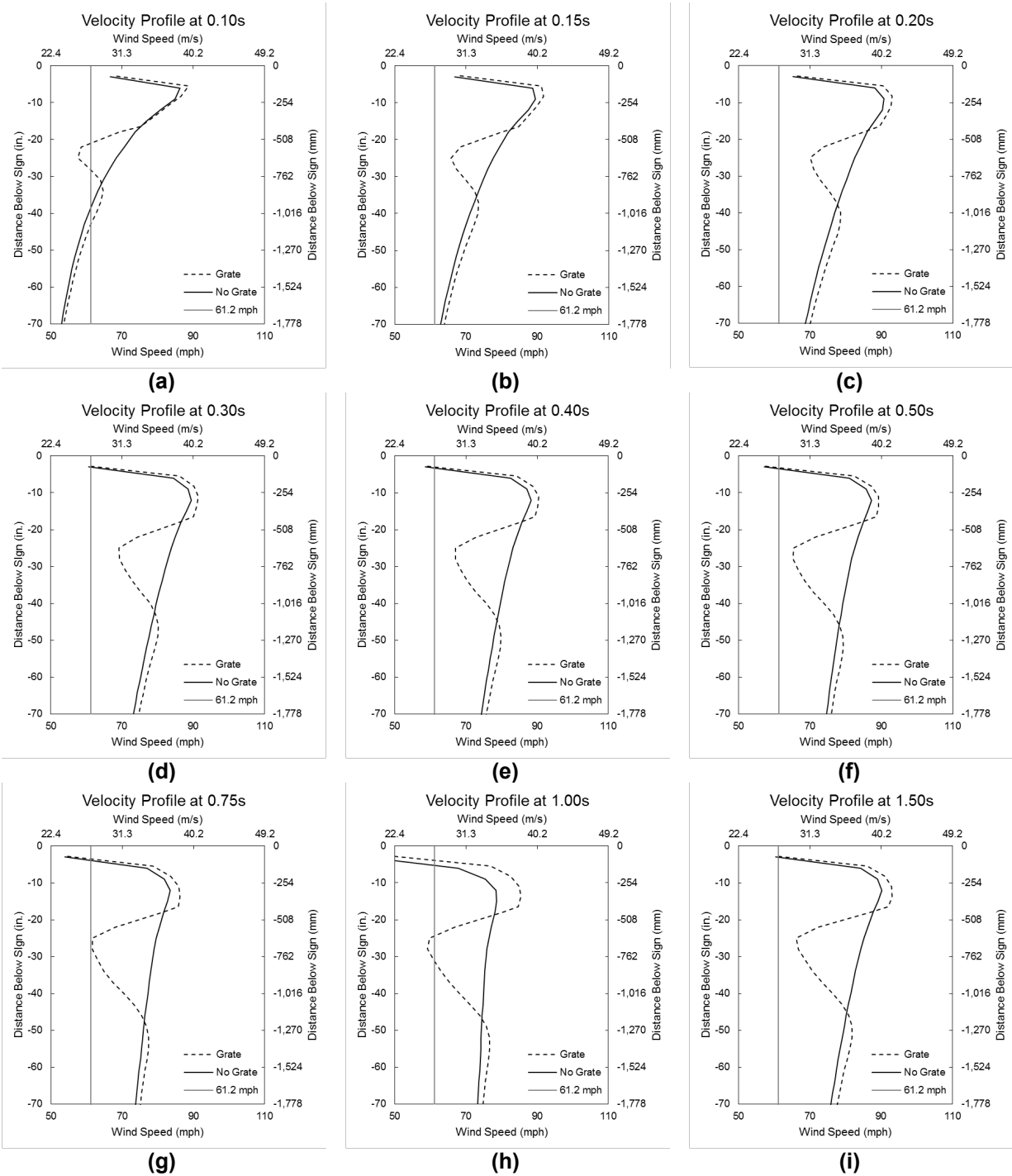


Figure A2.1: Velocity profile below the sign, for the large sign and a wind speed of $V=30$ mph (13.4 m/s)

A2.2: Large Sign Velocity Profile at V=61.2 mph (27.4 m/s)



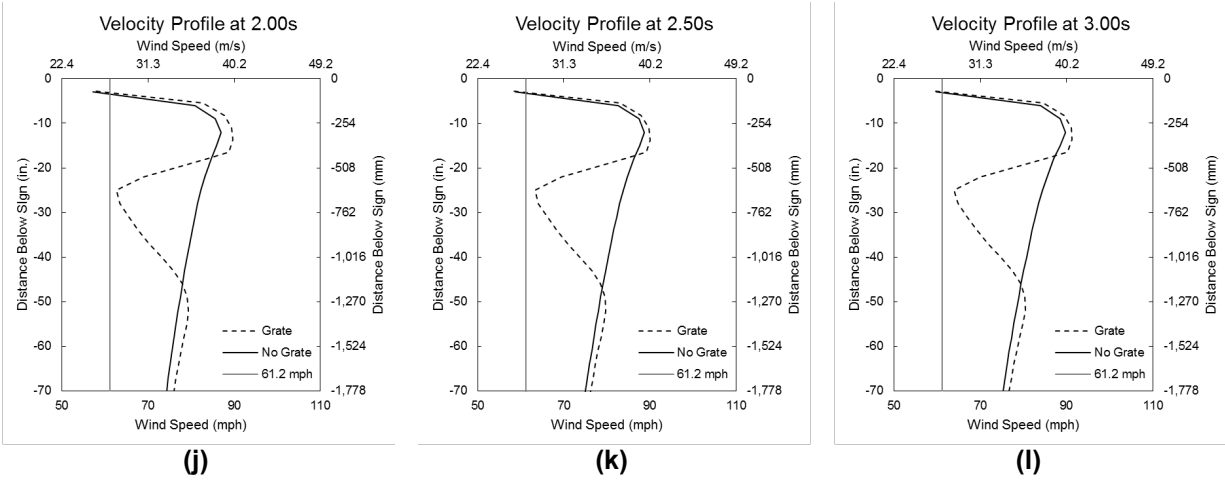
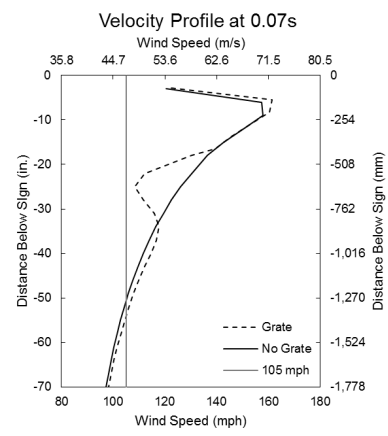
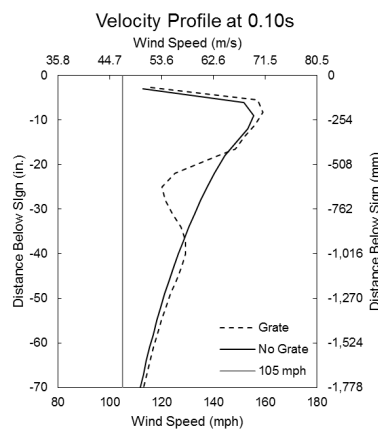


Figure A2.2: Velocity profile below the sign, for the large sign and a wind speed of $V=61.2$ mph (27.4 m/s)

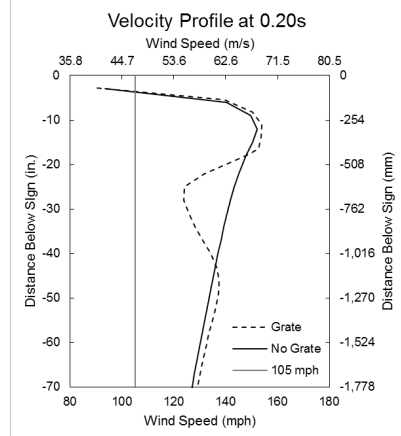
A2.3: Large Sign Velocity Profile at V=105mph (46.9 m/s)



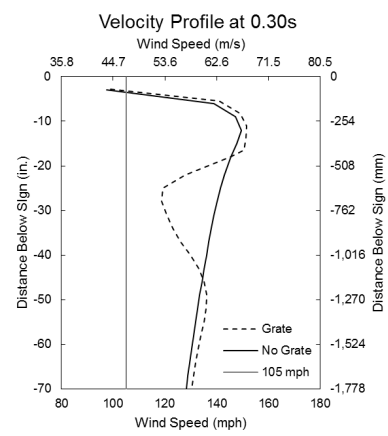
(a)



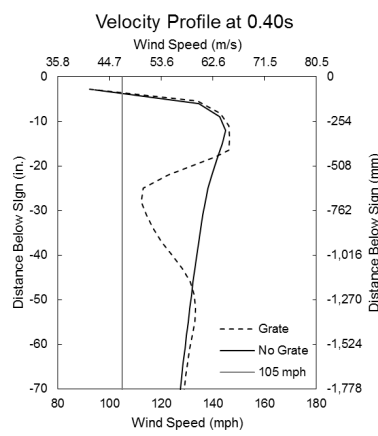
(b)



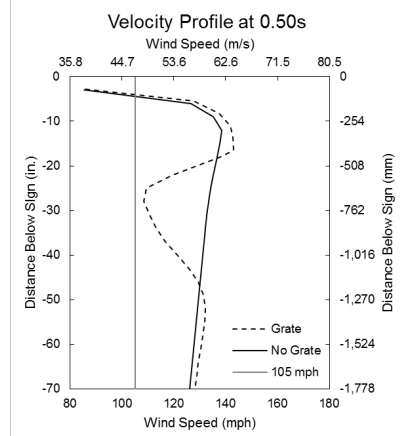
(c)



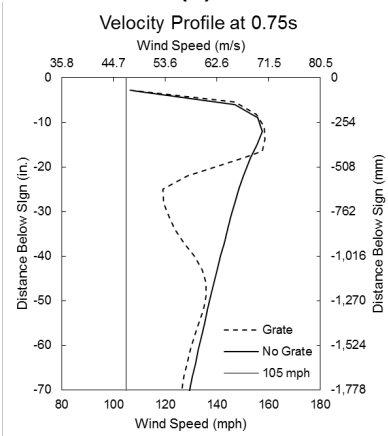
(d)



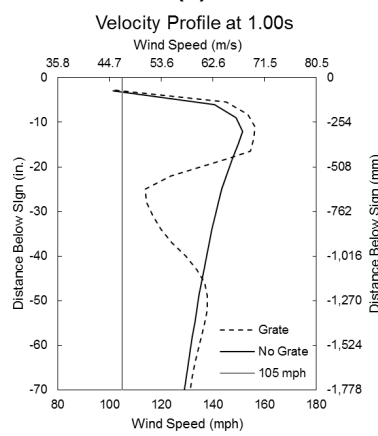
(e)



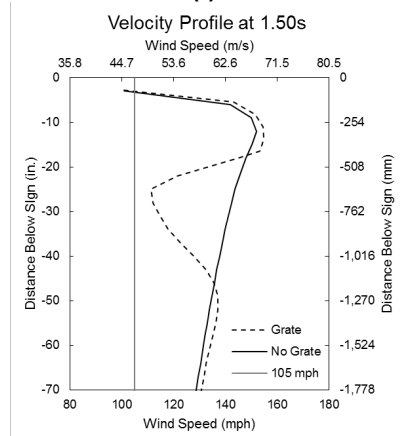
(f)



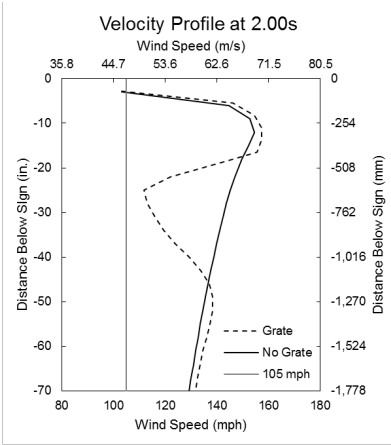
(g)



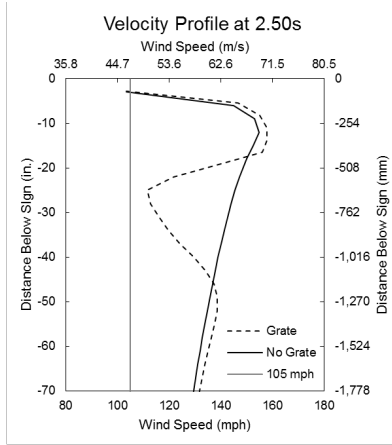
(h)



(i)



(j)



(k)

Figure A2.3: Velocity profile below the sign, for the large sign and a wind speed of V=105 mph (46.9 m/s)

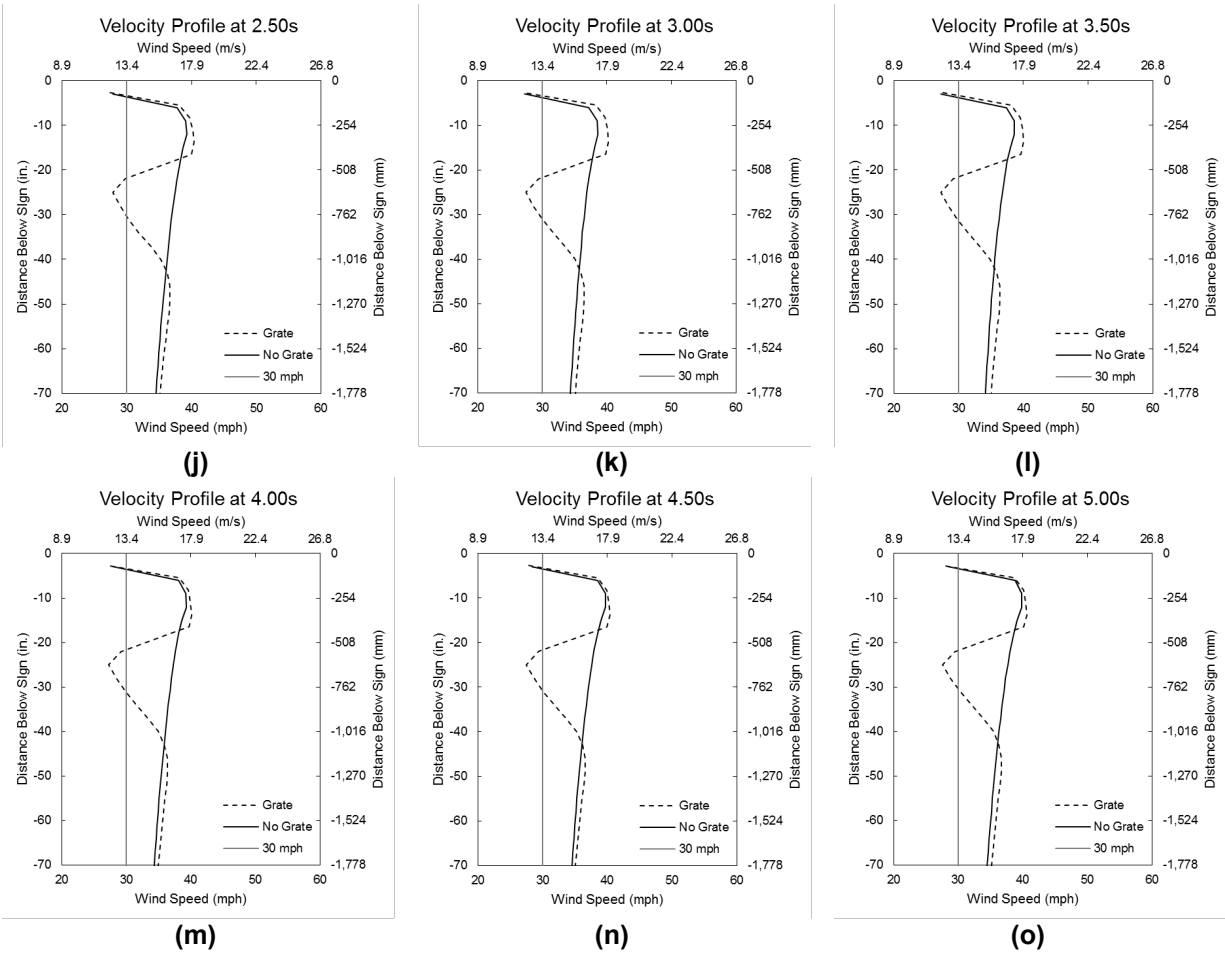
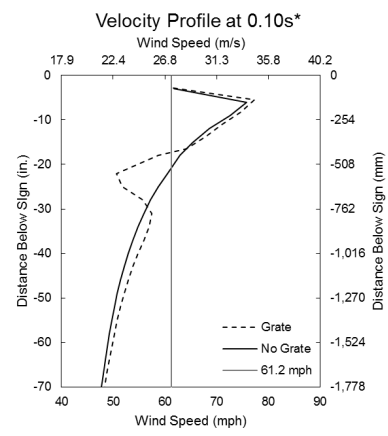
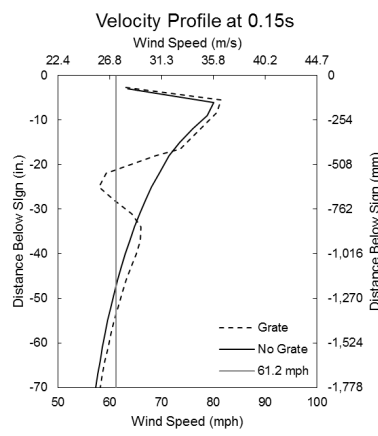


Figure A2.4: Velocity profile below the sign, for the medium sign and a wind speed of $V=30$ mph (13.4 m/s)

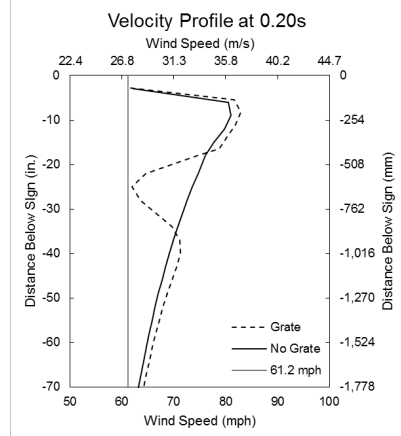
A2.5: Medium Sign Velocity Profile at V=61.2 mph (27.4 m/s)



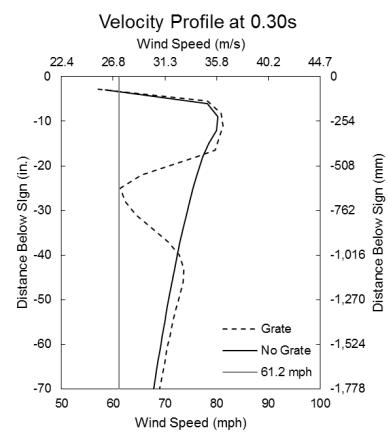
(a)



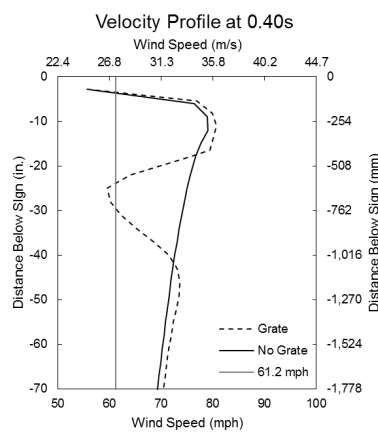
(b)



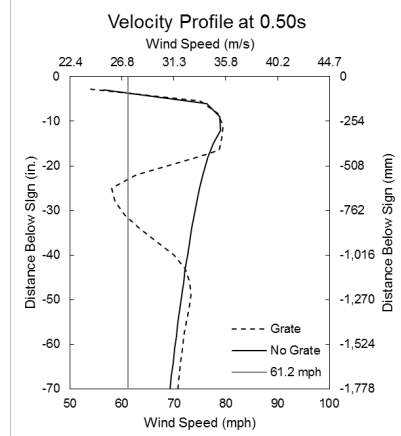
(c)



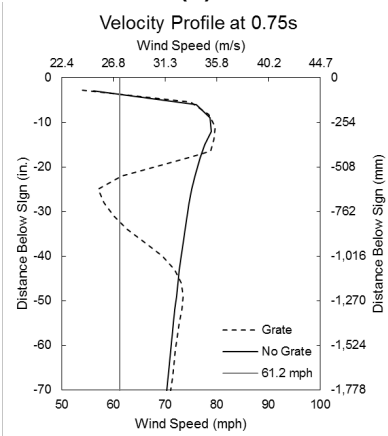
(d)



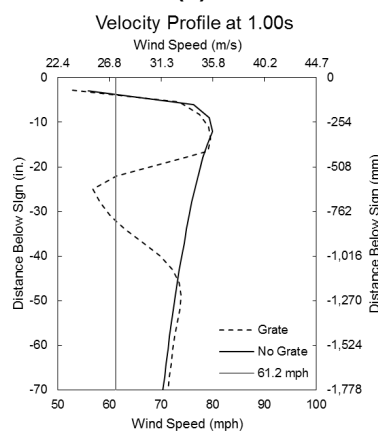
(e)



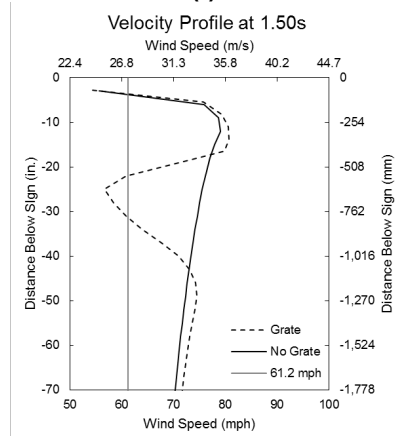
(f)



(g)



(h)



(i)

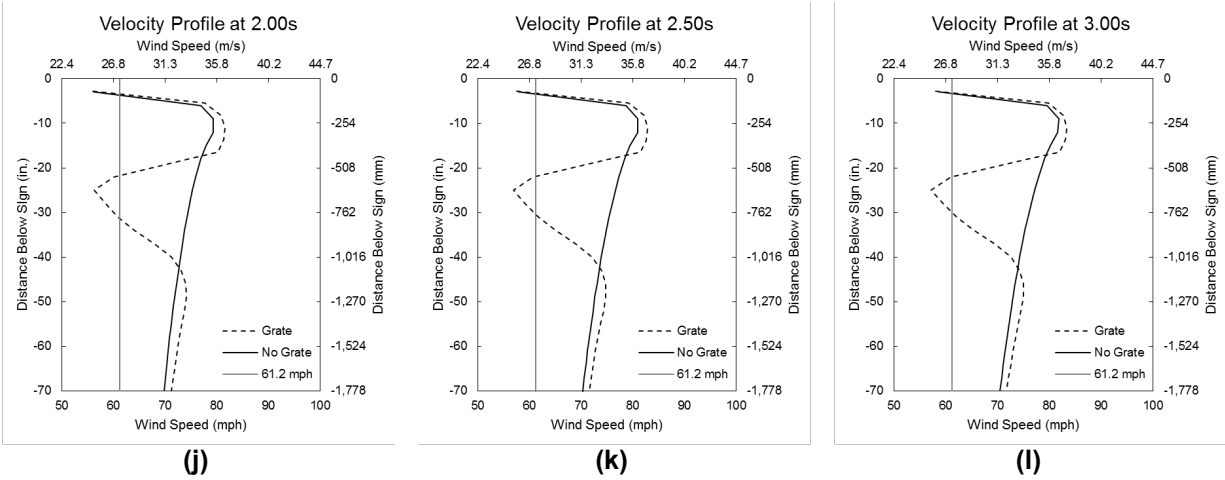
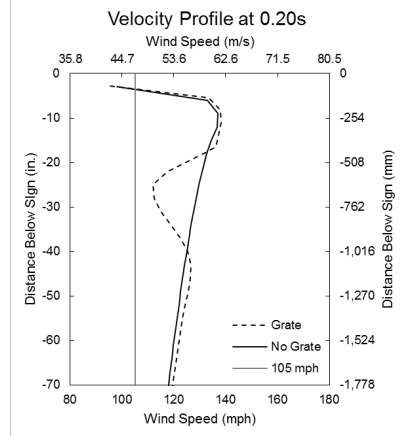
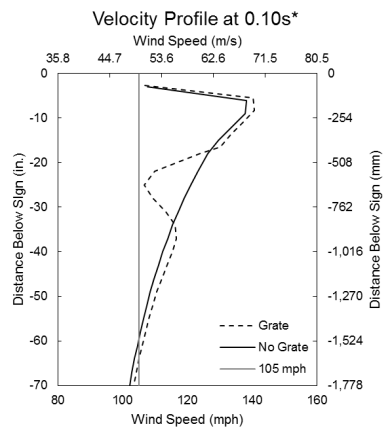
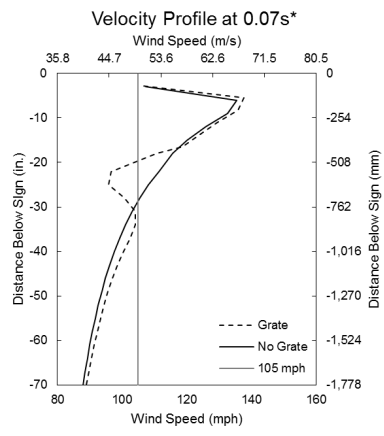
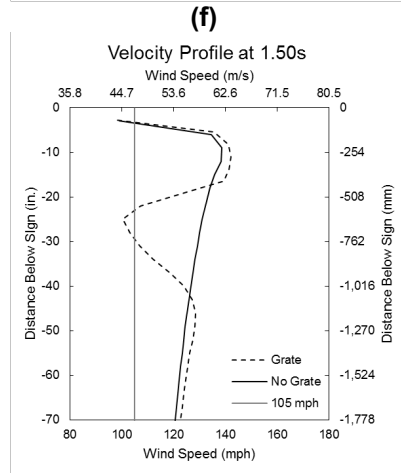
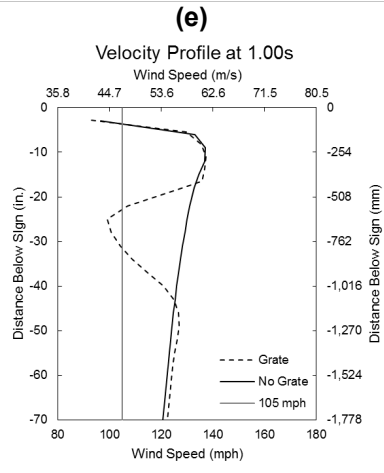
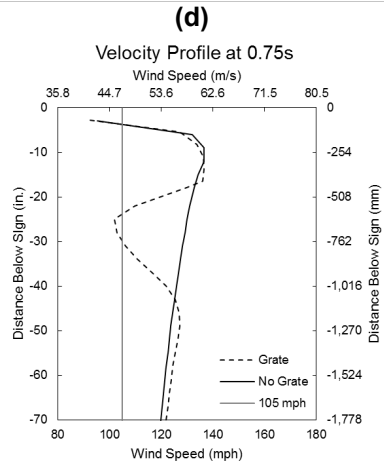
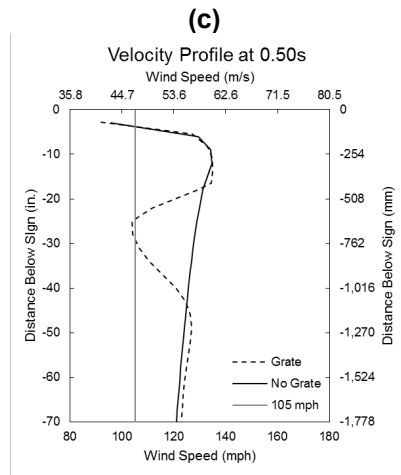
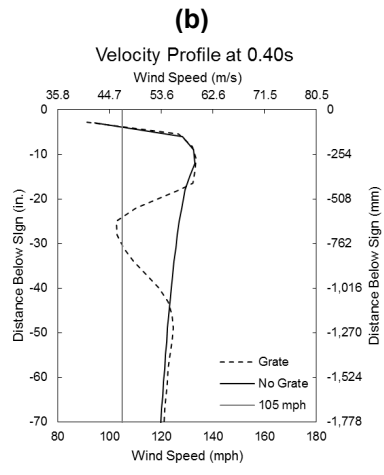
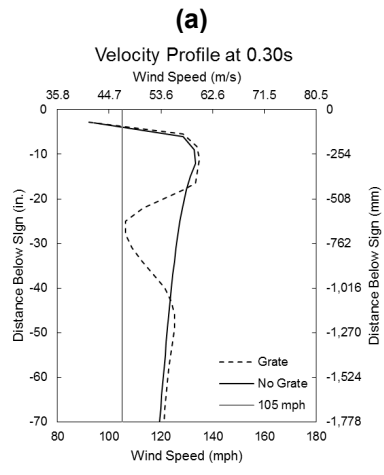


Figure A2.5: Velocity profile below the sign, for the medium sign and a wind speed of $V=61.2$ mph (27.4 m/s)

A2.6: Medium Sign Velocity Profile at V=105mph (46.9 m/s)



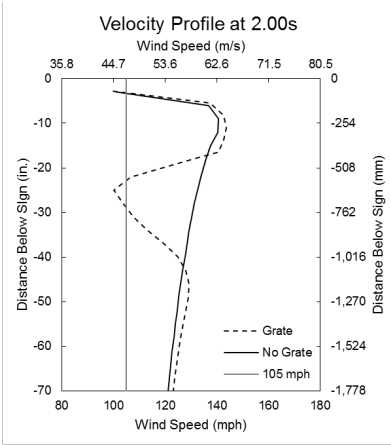
*Wind speed scales are different from the rest of the batch.



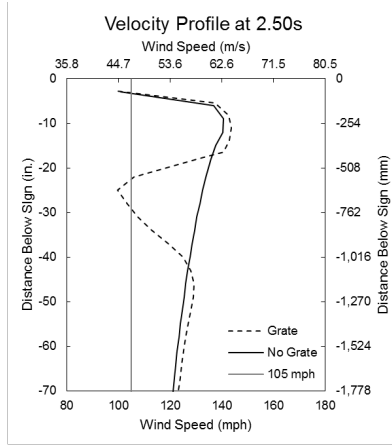
(g)

(h)

(i)



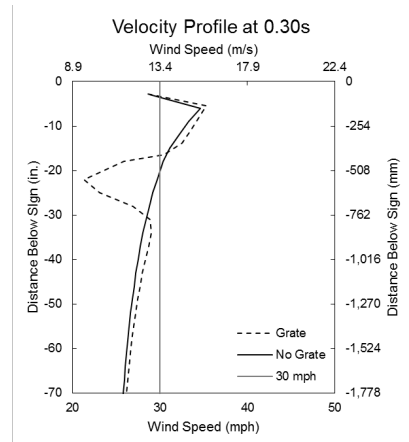
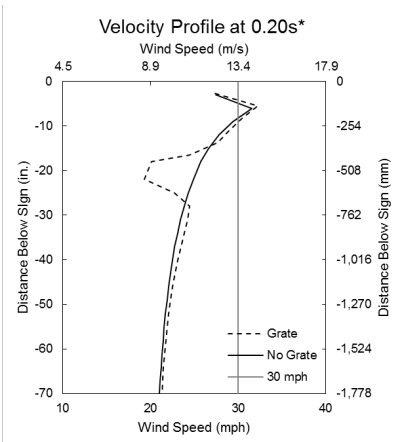
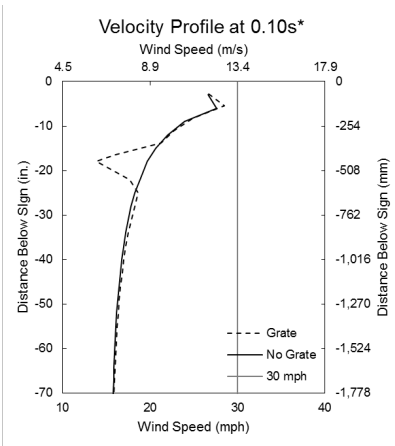
(j)



(k)

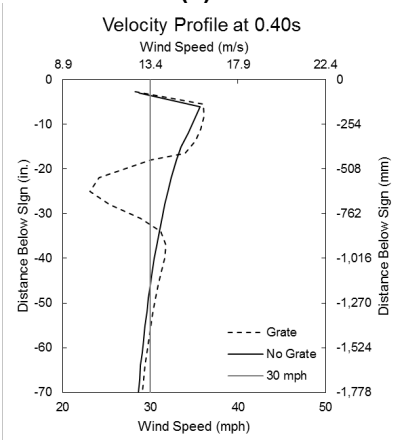
Figure A2.6: Velocity profile below the sign, for the medium sign and a wind speed of $V=105\text{mph}$ (46.9 m/s)

A2.7: Small Sign Velocity Profile at V=30 mph (13.4 m/s)

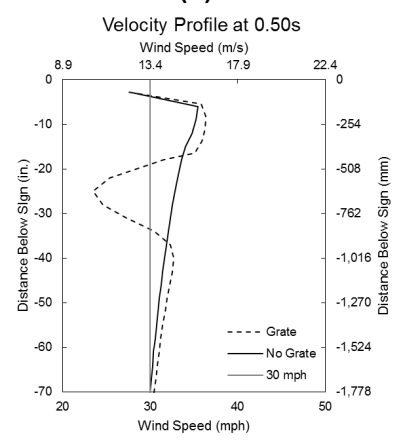


*Wind speed scales are different from the rest of the batch.

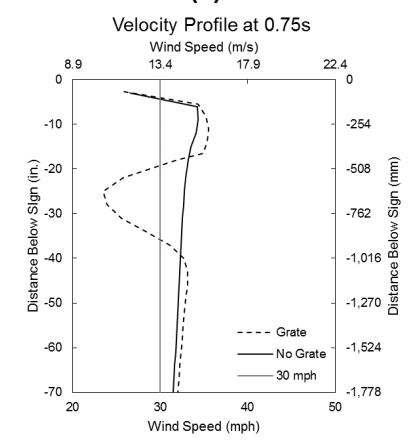
(a)



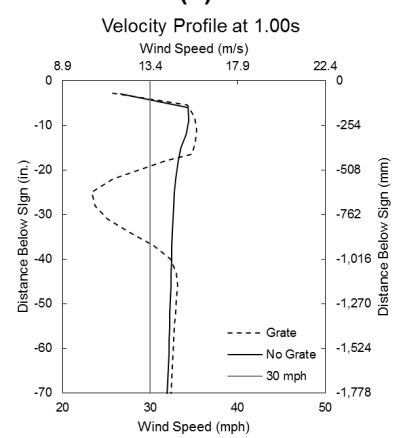
(b)



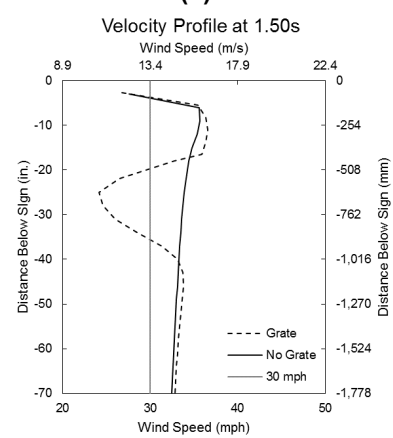
(c)



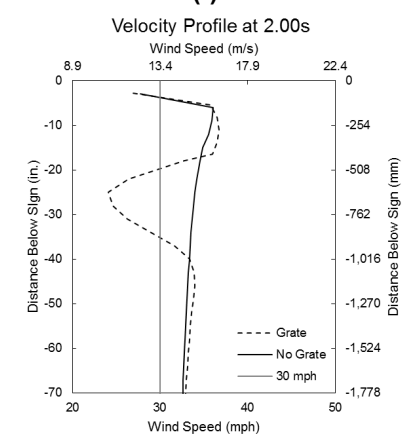
(d)



(e)



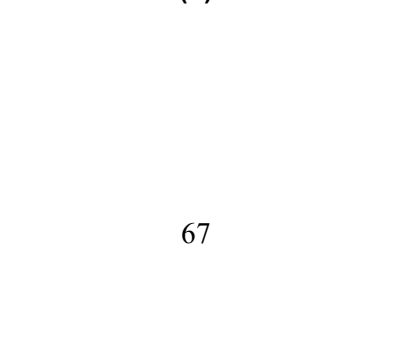
(f)



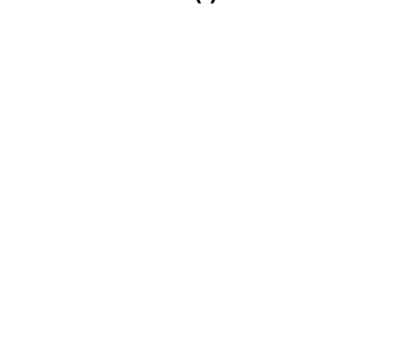
(g)



(h)



(i)



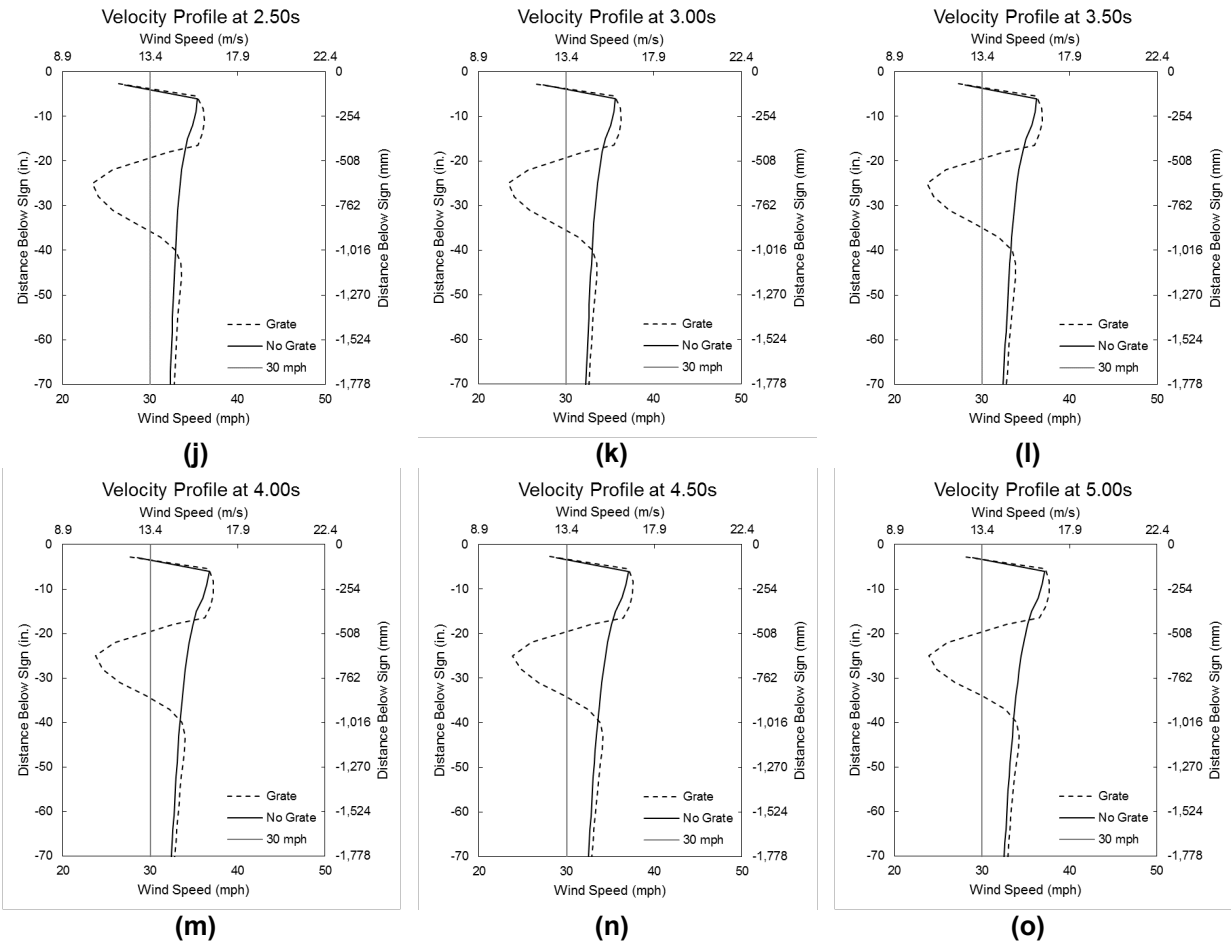
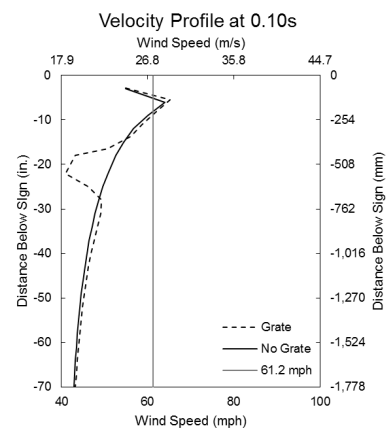
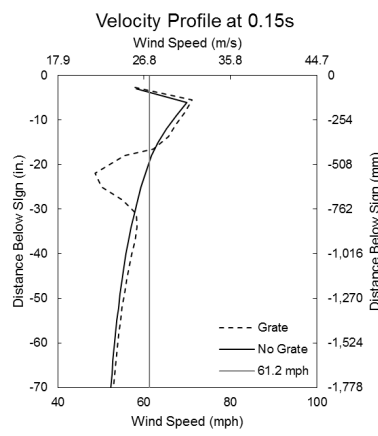


Figure A2.7: Velocity profile below the sign, for the small sign and a wind speed of 30 mph (13.4 m/s)

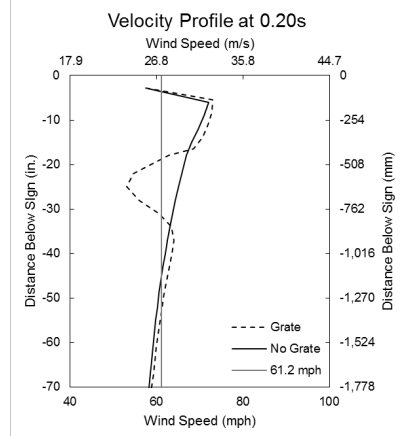
A2.8: Small Sign Velocity Profile at V=61.2 mph (27.4 m/s)



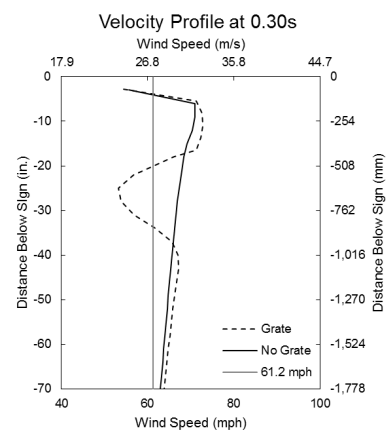
(a)



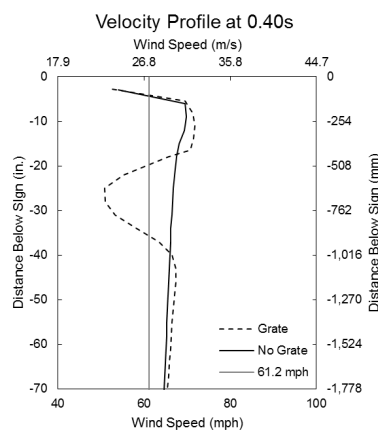
(b)



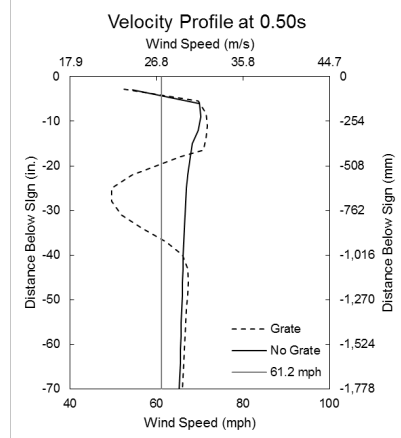
(c)



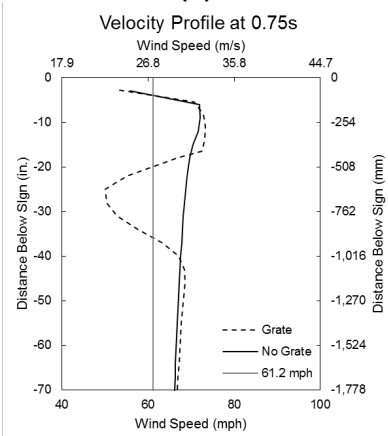
(d)



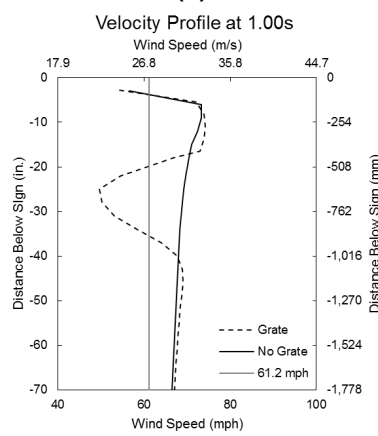
(e)



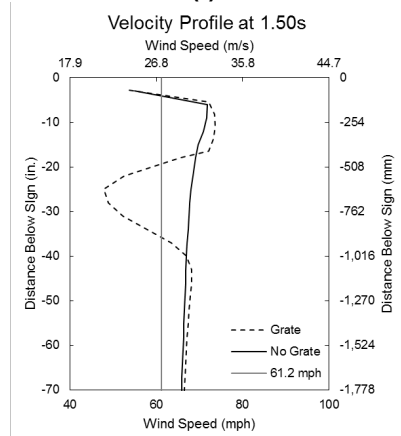
(f)



(g)



(h)



(i)

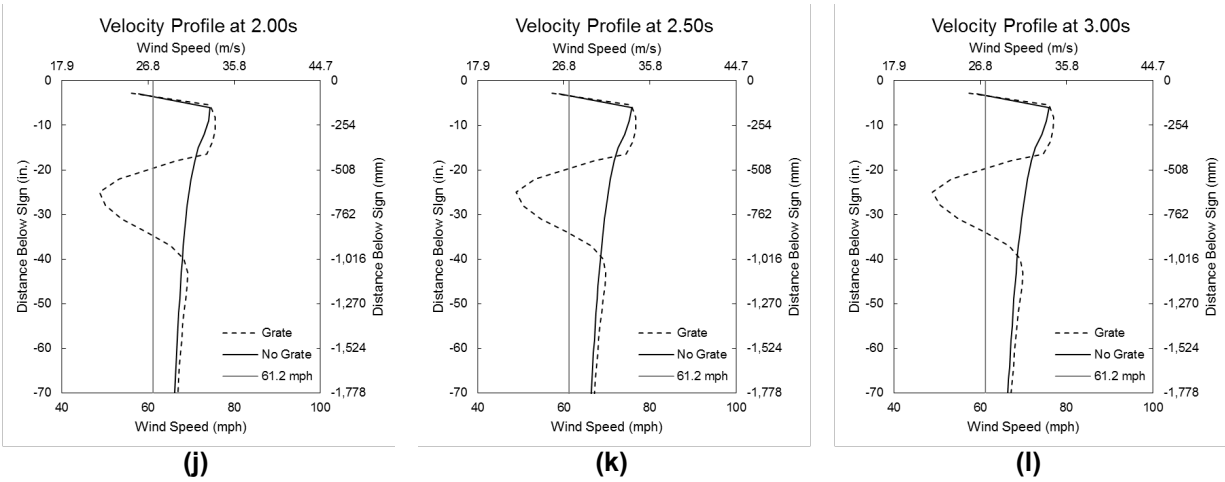
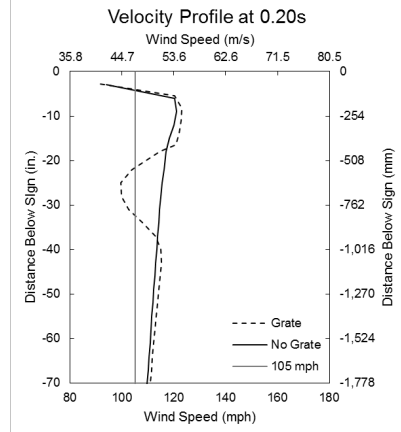
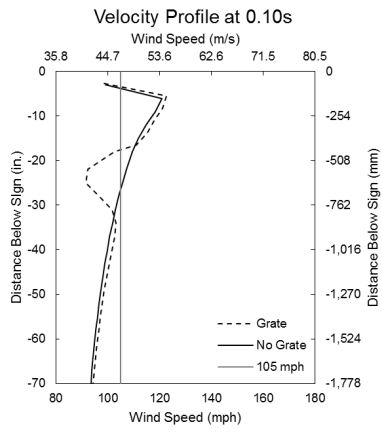
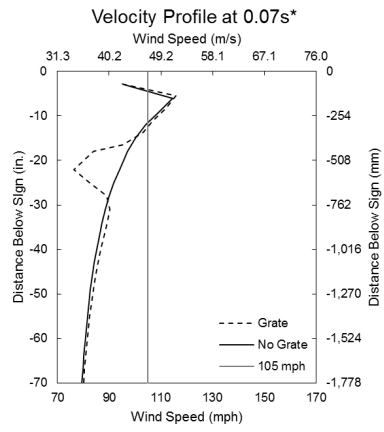


Figure A2.8: Velocity profile below the sign, for the small sign and a wind speed of 61.2 mph (27.4 m/s)

A2.9: Small Sign Velocity Profile at V=105mph (46.9 m/s)

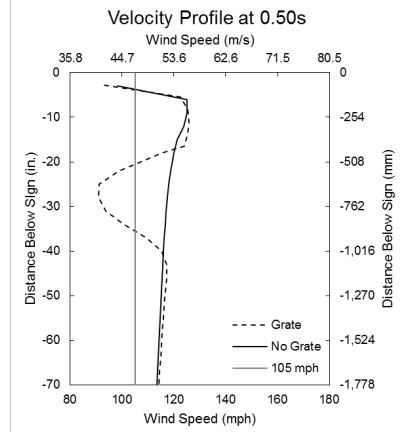
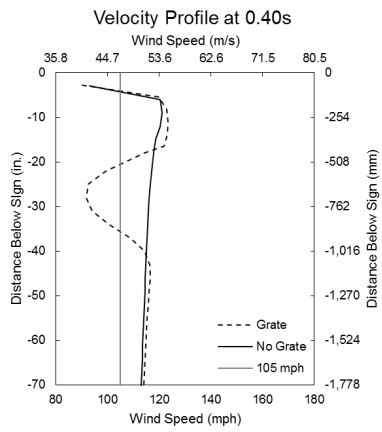
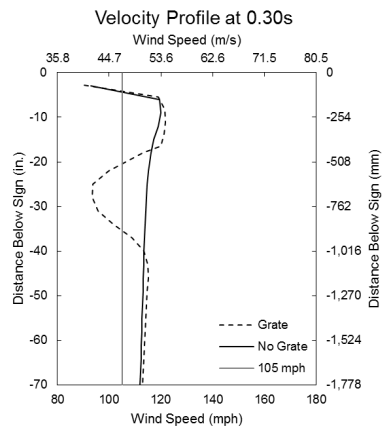


*Wind speed scales are different from the rest of the batch.

(a)

(b)

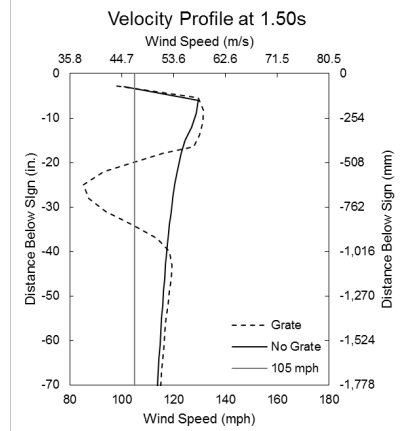
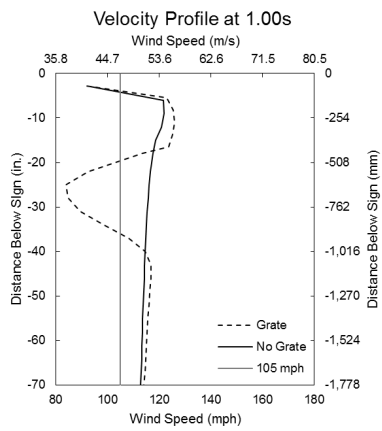
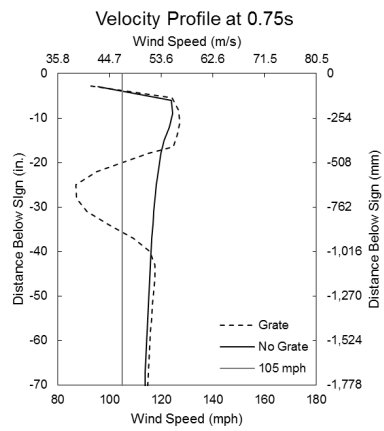
(c)



(d)

(e)

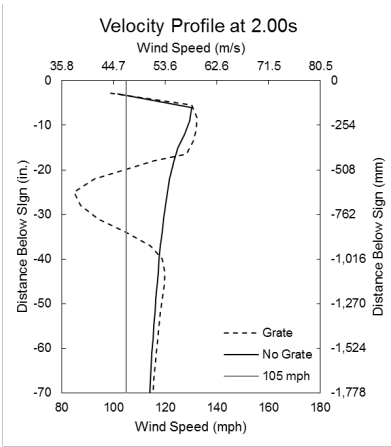
(f)



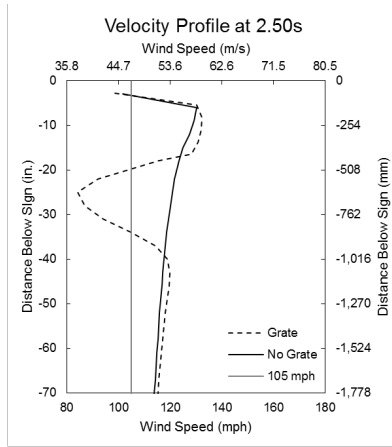
(g)

(h)

(i)



(j)



(k)

Figure A2.9: Velocity profile below the sign, for the small sign and a wind speed of $V=105\text{mph}$ (46.9 m/s)

Appendix A3

Table A3.1: Displacements at V=30 mph (13.4 m/s)

Model	ΔUZ				ΔUY			
	w/ Walkway		w/o Walkway		w/ Walkway		w/o Walkway	
	in.	mm	in.	mm	in.	mm	in.	mm
S20x12-L20-P25	5.13	130.38	4.96	125.91	0.13	3.26	0.04	0.90
S20x12-L20-P27	5.47	139.06	5.29	134.33	0.14	3.44	0.04	0.91
S20x12-L20-P29	5.88	149.40	5.64	143.31	0.14	3.65	0.04	1.04
S20x12-L16-P25	3.88	98.67	3.76	95.43	0.10	2.64	0.03	0.82
S20x12-L16-P27	4.15	105.51	4.05	102.90	0.11	2.81	0.03	0.84
S20x12-L16-P29	4.46	113.24	4.31	109.51	0.11	2.91	0.03	0.86
S20x12-L12-P25	2.88	73.23	2.72	69.18	0.07	1.77	0.02	0.52
S20x12-L12-P27	3.12	79.37	2.99	75.96	0.08	2.03	0.03	0.69
S20x12-L12-P29	3.40	86.24	3.23	82.09	0.09	2.41	0.03	0.83
S16x9-L20-P25	3.44	87.29	3.54	89.81	0.05	1.36	0.05	1.21
S16x9-L20-P27	3.65	92.68	3.72	94.52	0.05	1.39	0.05	1.20
S16x9-L20-P29	3.90	98.98	3.95	100.39	0.06	1.46	0.05	1.37
S16x9-L16-P25	2.52	63.95	2.53	64.37	0.04	1.08	0.03	0.83
S16x9-L16-P27	2.70	68.52	2.73	69.23	0.05	1.24	0.04	1.06
S16x9-L16-P29	2.89	73.48	2.91	73.96	0.05	1.38	0.05	1.24
S16x9-L12-P25	1.71	43.31	1.71	43.36	0.03	0.69	0.02	0.54
S16x9-L12-P27	1.87	47.39	1.87	47.57	0.03	0.89	0.03	0.72
S16x9-L12-P29	2.03	51.51	2.04	51.83	0.05	1.17	0.03	0.82
S12x6-L20-P25	2.08	52.88	2.13	54.22	0.04	0.92	0.03	0.67
S12x6-L20-P27	2.23	56.53	2.27	57.60	0.04	1.09	0.03	0.84
S12x6-L20-P29	2.38	60.35	2.42	61.42	0.05	1.24	0.04	0.91
S12x6-L16-P25	1.46	36.97	1.47	37.35	0.03	0.68	0.02	0.56
S12x6-L16-P27	1.58	40.22	1.60	40.75	0.03	0.79	0.02	0.61
S12x6-L16-P29	1.74	44.13	1.75	44.36	0.04	0.91	0.03	0.65
S12x6-L12-P25	0.97	24.54	0.97	24.74	0.02	0.58	0.02	0.42
S12x6-L12-P27	1.07	27.23	1.09	27.68	0.02	0.60	0.02	0.48
S12x6-L12-P29	1.20	30.41	1.19	30.33	0.03	0.66	0.02	0.52

Table A3.2: Top Box-Connection Stresses at V=30 mph (13.4 m/s)

Model	S33				S11			
	w/ Walkway		w/o Walkway		w/ Walkway		w/o Walkway	
	ksi	MPa	ksi	MPa	ksi	MPa	ksi	MPa
S20x12-L20-P25	3.91	26.98	3.89	26.82	0.09	0.65	0.03	0.23
S20x12-L20-P27	3.92	27.04	3.91	26.96	0.07	0.50	0.02	0.17
S20x12-L20-P29	3.91	26.95	3.93	27.11	0.06	0.43	0.02	0.14
S20x12-L16-P25	3.41	23.54	3.34	23.03	0.06	0.43	0.02	0.14
S20x12-L16-P27	3.41	23.53	3.37	23.23	0.05	0.35	0.02	0.11
S20x12-L16-P29	3.40	23.46	3.39	23.38	0.05	0.31	0.01	0.10
S20x12-L12-P25	2.89	19.93	2.83	19.54	0.04	0.26	0.01	0.10
S20x12-L12-P27	2.88	19.82	2.81	19.39	0.04	0.26	0.02	0.11
S20x12-L12-P29	2.88	19.88	2.85	19.64	0.04	0.25	0.01	0.10
S16x9-L20-P25	4.17	28.78	4.19	28.91	0.05	0.37	0.03	0.23
S16x9-L20-P27	4.19	28.87	4.18	28.84	0.04	0.25	0.02	0.16
S16x9-L20-P29	4.17	28.72	4.21	29.05	0.03	0.21	0.02	0.16
S16x9-L16-P25	3.58	24.71	3.60	24.81	0.03	0.23	0.02	0.14
S16x9-L16-P27	3.59	24.74	3.58	24.66	0.03	0.18	0.02	0.12
S16x9-L16-P29	3.57	24.65	3.55	24.48	0.03	0.18	0.02	0.14
S16x9-L12-P25	2.96	20.38	2.96	20.40	0.02	0.15	0.01	0.10
S16x9-L12-P27	2.96	20.42	2.95	20.35	0.02	0.15	0.02	0.11
S16x9-L12-P29	2.96	20.40	2.93	20.21	0.02	0.14	0.02	0.11
S12x6-L20-P25	2.02	13.93	2.02	13.95	0.01	0.08	0.01	0.06
S12x6-L20-P27	2.01	13.86	2.01	13.85	0.01	0.08	0.01	0.06
S12x6-L20-P29	2.00	13.80	1.99	13.73	0.01	0.07	0.01	0.06
S12x6-L16-P25	1.68	11.60	1.71	11.76	0.01	0.06	0.01	0.05
S12x6-L16-P27	1.69	11.67	1.72	11.83	0.01	0.06	0.01	0.05
S12x6-L16-P29	1.70	11.71	1.72	11.84	0.01	0.06	0.01	0.05
S12x6-L12-P25	1.34	9.25	1.37	9.45	0.01	0.05	0.01	0.04
S12x6-L12-P27	1.37	9.42	1.39	9.58	0.01	0.05	0.01	0.04
S12x6-L12-P29	1.38	9.53	1.39	9.60	0.01	0.04	0.01	0.04

Table A3.3: Bottom Box-Connection Stresses at V=30 mph (13.4 m/s)

Model	S33				S11			
	w/ Walkway		w/o Walkway		w/ Walkway		w/o Walkway	
	ksi	MPa	ksi	MPa	ksi	MPa	ksi	MPa
S20x12-L20-P25	5.67	39.11	5.56	38.37	0.16	1.10	0.06	0.40
S20x12-L20-P27	5.70	39.28	5.55	38.26	0.12	0.84	0.04	0.28
S20x12-L20-P29	5.70	39.31	5.52	38.05	0.10	0.71	0.04	0.24
S20x12-L16-P25	4.98	34.37	4.84	33.38	0.11	0.77	0.04	0.25
S20x12-L16-P27	5.02	34.61	4.83	33.33	0.09	0.62	0.03	0.21
S20x12-L16-P29	5.02	34.63	4.81	33.17	0.08	0.55	0.03	0.19
S20x12-L12-P25	4.29	29.60	4.11	28.32	0.07	0.50	0.03	0.17
S20x12-L12-P27	4.30	29.67	4.15	28.63	0.07	0.48	0.03	0.19
S20x12-L12-P29	4.28	29.51	4.10	28.24	0.07	0.49	0.03	0.18
S16x9-L20-P25	5.23	36.04	5.22	35.96	0.09	0.63	0.06	0.40
S16x9-L20-P27	5.24	36.13	5.20	35.87	0.06	0.43	0.04	0.28
S16x9-L20-P29	5.23	36.07	5.18	35.69	0.05	0.36	0.04	0.27
S16x9-L16-P25	4.47	30.79	4.43	30.52	0.06	0.44	0.04	0.27
S16x9-L16-P27	4.48	30.91	4.44	30.61	0.07	0.50	0.05	0.34
S16x9-L16-P29	4.49	30.98	4.45	30.71	0.05	0.34	0.04	0.26
S16x9-L12-P25	3.65	25.17	3.62	24.93	0.04	0.30	0.03	0.20
S16x9-L12-P27	3.68	25.38	3.67	25.29	0.06	0.42	0.04	0.31
S16x9-L12-P29	3.72	25.68	3.71	25.60	0.04	0.29	0.03	0.20
S12x6-L20-P25	2.40	16.58	2.43	16.77	0.02	0.14	0.01	0.10
S12x6-L20-P27	2.41	16.60	2.44	16.81	0.02	0.15	0.02	0.11
S12x6-L20-P29	2.41	16.62	2.45	16.86	0.02	0.14	0.01	0.10
S12x6-L16-P25	2.06	14.18	2.04	14.06	0.02	0.13	0.01	0.10
S12x6-L16-P27	2.05	14.13	2.02	13.93	0.02	0.14	0.02	0.11
S12x6-L16-P29	2.03	13.99	2.05	14.15	0.02	0.12	0.01	0.09
S12x6-L12-P25	1.68	11.60	1.67	11.50	0.02	0.12	0.01	0.09
S12x6-L12-P27	1.68	11.60	1.66	11.41	0.02	0.11	0.01	0.08
S12x6-L12-P29	1.67	11.49	1.68	11.57	0.01	0.09	0.01	0.08

Table A3.4: Pole Stresses at V=30 mph (13.4 m/s)

Model	S21			
	w/ Walkway		w/o Walkway	
	ksi	MPa	ksi	MPa
S20x12-L20-P25	3.42	23.56	3.23	22.27
S20x12-L20-P27	3.71	25.58	3.54	24.41
S20x12-L20-P29	3.96	27.31	3.91	26.94
S20x12-L16-P25	3.34	23.00	3.20	22.08
S20x12-L16-P27	3.46	23.87	3.44	23.73
S20x12-L16-P29	3.85	26.54	3.81	26.30
S20x12-L12-P25	3.35	23.07	3.12	21.52
S20x12-L12-P27	3.62	24.98	3.48	24.02
S20x12-L12-P29	4.04	27.83	3.81	26.26
S16x9-L20-P25	1.96	13.54	2.00	13.78
S16x9-L20-P27	2.15	14.86	2.25	15.49
S16x9-L20-P29	2.39	16.45	2.47	17.05
S16x9-L16-P25	1.93	13.32	1.98	13.64
S16x9-L16-P27	2.16	14.89	2.22	15.33
S16x9-L16-P29	2.36	16.28	2.42	16.65
S16x9-L12-P25	1.89	13.04	1.91	13.17
S16x9-L12-P27	2.08	14.36	2.12	14.60
S16x9-L12-P29	2.32	16.02	2.31	15.91
S12x6-L20-P25	1.38	9.52	1.46	10.04
S12x6-L20-P27	1.56	10.77	1.62	11.17
S12x6-L20-P29	1.71	11.76	1.73	11.92
S12x6-L16-P25	1.35	9.32	1.41	9.70
S12x6-L16-P27	1.52	10.48	1.54	10.65
S12x6-L16-P29	1.67	11.54	1.69	11.66
S12x6-L12-P25	1.30	8.95	1.30	8.95
S12x6-L12-P27	1.41	9.73	1.44	9.90
S12x6-L12-P29	1.55	10.66	1.57	10.84

Table A3.5: Displacements at V=61.2 mph (27.4 m/s)

Model	ΔUZ				ΔUY			
	w/ Walkway		w/o Walkway		w/ Walkway		w/o Walkway	
	in.	mm	in.	mm	in.	mm	in.	mm
S20x12-L20-P25	20.94	531.86	21.00	533.39	0.38	9.64	0.30	7.63
S20x12-L20-P27	22.36	567.91	22.39	568.58	0.42	10.66	0.34	8.72
S20x12-L20-P29	23.91	607.39	23.95	608.23	0.55	13.84	0.44	11.22
S20x12-L16-P25	16.34	414.98	16.44	417.60	0.30	7.70	0.24	6.08
S20x12-L16-P27	17.11	434.49	17.59	446.66	0.33	8.45	0.25	6.47
S20x12-L16-P29	18.26	463.84	18.29	464.63	0.35	8.77	0.27	6.85
S20x12-L12-P25	12.07	306.46	11.99	304.56	0.28	6.99	0.20	5.12
S20x12-L12-P27	13.18	334.75	13.13	333.49	0.26	6.59	0.20	5.09
S20x12-L12-P29	14.33	364.01	14.23	361.33	0.27	6.80	0.22	5.54
S16x9-L20-P25	14.10	358.10	14.39	365.49	0.30	7.58	0.21	5.46
S16x9-L20-P27	14.90	378.52	14.97	380.13	0.31	7.94	0.22	5.48
S16x9-L20-P29	15.77	400.64	15.85	402.50	0.33	8.48	0.22	5.49
S16x9-L16-P25	10.64	270.21	10.66	270.65	0.25	6.23	0.16	4.00
S16x9-L16-P27	11.35	288.17	11.33	287.78	0.25	6.25	0.18	4.63
S16x9-L16-P29	12.06	306.34	12.13	307.99	0.27	6.84	0.19	4.92
S16x9-L12-P25	7.55	191.86	7.46	189.55	0.18	4.67	0.11	2.90
S16x9-L12-P27	8.25	209.52	8.11	205.87	0.20	5.16	0.12	3.00
S16x9-L12-P29	8.91	226.39	8.80	223.51	0.21	5.22	0.13	3.21
S12x6-L20-P25	8.31	211.04	8.49	215.54	0.11	2.72	0.10	2.46
S12x6-L20-P27	8.89	225.90	9.08	230.57	0.10	2.58	0.09	2.37
S12x6-L20-P29	9.54	242.20	9.70	246.36	0.10	2.66	0.09	2.28
S12x6-L16-P25	5.92	150.47	6.06	153.98	0.09	2.40	0.08	1.95
S12x6-L16-P27	6.43	163.37	6.54	166.20	0.10	2.42	0.07	1.88
S12x6-L16-P29	6.93	176.08	7.07	179.54	0.09	2.23	0.08	1.96
S12x6-L12-P25	4.16	105.77	4.30	109.15	0.08	1.99	0.06	1.65
S12x6-L12-P27	4.56	115.80	4.70	119.30	0.08	2.06	0.06	1.61
S12x6-L12-P29	4.98	126.38	5.07	128.68	0.08	2.08	0.07	1.67

Table A3.6: Top Box-Connection Stresses at V=61.2 mph (27.4 m/s)

Model	S33				S11			
	w/ Walkway		w/o Walkway		w/ Walkway		w/o Walkway	
	ksi	MPa	ksi	MPa	ksi	MPa	ksi	MPa
S20x12-L20-P25	16.40	113.05	16.65	114.80	0.29	2.01	0.21	1.46
S20x12-L20-P27	16.39	113.01	16.73	115.33	0.26	1.77	0.19	1.31
S20x12-L20-P29	16.41	113.14	16.81	115.94	0.25	1.70	0.21	1.44
S20x12-L16-P25	14.25	98.24	14.30	98.61	0.21	1.42	0.15	1.06
S20x12-L16-P27	14.22	98.05	14.41	99.39	0.17	1.19	0.15	1.04
S20x12-L16-P29	14.15	97.57	14.52	100.11	0.16	1.10	0.15	1.01
S20x12-L12-P25	12.19	84.05	12.25	84.46	0.15	1.07	0.13	0.88
S20x12-L12-P27	12.13	83.62	12.18	83.96	0.13	0.87	0.12	0.84
S20x12-L12-P29	12.16	83.84	12.18	83.98	0.12	0.81	0.11	0.76
S16x9-L20-P25	17.30	119.31	17.23	118.83	0.25	1.74	0.12	0.81
S16x9-L20-P27	17.29	119.21	17.09	117.87	0.21	1.45	0.09	0.65
S16x9-L20-P29	17.19	118.53	17.09	117.83	0.18	1.23	0.09	0.59
S16x9-L16-P25	15.00	103.45	14.97	103.24	0.18	1.26	0.08	0.57
S16x9-L16-P27	15.00	103.39	14.86	102.46	0.15	1.05	0.07	0.49
S16x9-L16-P29	14.93	102.93	14.73	101.57	0.13	0.91	0.06	0.42
S16x9-L12-P25	12.54	86.48	12.52	86.34	0.13	0.91	0.06	0.40
S16x9-L12-P27	12.53	86.43	12.44	85.80	0.11	0.74	0.05	0.35
S16x9-L12-P29	12.49	86.14	12.31	84.90	0.10	0.70	0.05	0.35
S12x6-L20-P25	8.16	56.23	8.23	56.72	0.04	0.24	0.03	0.18
S12x6-L20-P27	8.13	56.03	8.17	56.34	0.03	0.21	0.02	0.17
S12x6-L20-P29	8.10	55.88	8.11	55.93	0.03	0.17	0.02	0.15
S12x6-L16-P25	6.84	47.16	7.01	48.36	0.03	0.20	0.02	0.16
S12x6-L16-P27	6.88	47.46	7.05	48.58	0.03	0.17	0.02	0.14
S12x6-L16-P29	6.92	47.71	7.04	48.52	0.02	0.16	0.02	0.13
S12x6-L12-P25	5.59	38.55	5.74	39.54	0.02	0.14	0.02	0.11
S12x6-L12-P27	5.64	38.87	5.78	39.88	0.02	0.13	0.01	0.10
S12x6-L12-P29	5.69	39.23	5.77	39.77	0.02	0.12	0.01	0.09

Table A3.7: Bottom Box-Connection Stresses at V=61.2 mph (27.4 m/s)

Model	S33				S11			
	w/ Walkway		w/o Walkway		w/ Walkway		w/o Walkway	
	ksi	MPa	ksi	MPa	ksi	MPa	ksi	MPa
S20x12-L20-P25	23.84	164.35	23.88	164.62	0.48	3.31	0.36	2.45
S20x12-L20-P27	23.92	164.93	23.80	164.13	0.43	2.94	0.32	2.19
S20x12-L20-P29	23.93	164.99	23.67	163.18	0.41	2.86	0.35	2.41
S20x12-L16-P25	20.94	144.35	20.85	143.78	0.36	2.48	0.28	1.92
S20x12-L16-P27	21.05	145.12	20.80	143.44	0.31	2.13	0.27	1.85
S20x12-L16-P29	21.04	145.07	20.69	142.63	0.28	1.91	0.26	1.78
S20x12-L12-P25	18.03	124.30	17.84	123.02	0.28	1.96	0.22	1.52
S20x12-L12-P27	18.13	125.03	17.83	122.97	0.25	1.73	0.21	1.43
S20x12-L12-P29	17.96	123.87	17.75	122.36	0.22	1.55	0.19	1.33
S16x9-L20-P25	21.54	148.52	21.32	147.00	0.42	2.87	0.20	1.39
S16x9-L20-P27	21.56	148.68	21.27	146.63	0.36	2.47	0.16	1.11
S16x9-L20-P29	21.51	148.34	21.17	145.96	0.30	2.05	0.14	1.00
S16x9-L16-P25	18.49	127.50	18.26	125.88	0.34	2.34	0.16	1.11
S16x9-L16-P27	18.54	127.86	18.30	126.20	0.28	1.92	0.13	0.92
S16x9-L16-P29	18.57	128.07	18.37	126.63	0.24	1.64	0.11	0.77
S16x9-L12-P25	15.63	107.74	15.23	105.02	0.25	1.72	0.11	0.79
S16x9-L12-P27	15.48	106.74	15.39	106.08	0.21	1.44	0.10	0.66
S16x9-L12-P29	15.61	107.62	15.51	106.93	0.20	1.38	0.10	0.68
S12x6-L20-P25	9.77	67.34	9.79	67.53	0.07	0.47	0.05	0.37
S12x6-L20-P27	9.73	67.06	9.86	68.01	0.07	0.46	0.05	0.33
S12x6-L20-P29	9.72	67.03	9.89	68.19	0.05	0.36	0.04	0.30
S12x6-L16-P25	8.51	58.71	8.51	58.69	0.06	0.42	0.05	0.32
S12x6-L16-P27	8.47	58.38	8.41	57.97	0.05	0.37	0.04	0.27
S12x6-L16-P29	8.37	57.70	8.36	57.63	0.05	0.33	0.04	0.25
S12x6-L12-P25	7.09	48.88	7.09	48.90	0.05	0.31	0.04	0.26
S12x6-L12-P27	7.05	48.64	7.00	48.24	0.04	0.29	0.03	0.23
S12x6-L12-P29	6.95	47.94	6.91	47.61	0.04	0.24	0.03	0.20

Table A3.8: Pole Stresses at V=61.2 mph (27.4 m/s)

Model	S21			
	w/ Walkway		w/o Walkway	
	ksi	MPa	ksi	MPa
S20x12-L20-P25	14.13	97.43	13.79	95.11
S20x12-L20-P27	15.22	104.91	15.17	104.59
S20x12-L20-P29	16.41	113.14	16.75	115.48
S20x12-L16-P25	13.96	96.26	13.50	93.06
S20x12-L16-P27	14.43	99.46	14.84	102.31
S20x12-L16-P29	16.16	111.42	16.43	113.32
S20x12-L12-P25	14.08	97.08	13.55	93.40
S20x12-L12-P27	14.96	103.13	15.06	103.81
S20x12-L12-P29	16.93	116.72	16.52	113.87
S16x9-L20-P25	8.04	55.41	8.17	56.35
S16x9-L20-P27	8.85	61.04	9.16	63.15
S16x9-L20-P29	9.81	67.62	10.03	69.16
S16x9-L16-P25	7.90	54.49	8.16	56.25
S16x9-L16-P27	8.76	60.40	9.10	62.78
S16x9-L16-P29	9.75	67.24	9.88	68.15
S16x9-L12-P25	8.01	55.25	8.04	55.47
S16x9-L12-P27	8.76	60.39	8.90	61.36
S16x9-L12-P29	9.70	66.90	9.71	66.93
S12x6-L20-P25	5.55	38.27	5.84	40.24
S12x6-L20-P27	6.24	43.00	6.42	44.29
S12x6-L20-P29	6.76	46.61	7.09	48.90
S12x6-L16-P25	5.54	38.22	5.65	38.96
S12x6-L16-P27	6.18	42.58	6.25	43.11
S12x6-L16-P29	6.69	46.12	6.59	45.41
S12x6-L12-P25	5.49	37.83	5.52	38.03
S12x6-L12-P27	5.97	41.15	6.01	41.46
S12x6-L12-P29	6.46	44.52	6.59	45.45

Table A3.9: Displacements at V=105mph (46.9 m/s)

Model	ΔUZ				ΔUY			
	w/ Walkway		w/o Walkway		w/ Walkway		w/o Walkway	
	in.	mm	in.	mm	in.	mm	in.	mm
S20x12-L20-P25	66.38	1686.08	64.51	1638.60	0.92	23.24	1.24	31.51
S20x12-L20-P27	70.87	1800.10	68.72	1745.60	0.94	23.82	1.14	29.08
S20x12-L20-P29	75.66	1921.82	73.27	1861.07	0.90	22.83	1.03	26.27
S20x12-L16-P25	49.78	1264.44	48.31	1227.16	0.82	20.79	1.12	28.47
S20x12-L16-P27	53.62	1362.03	52.04	1321.78	0.78	19.75	1.09	27.57
S20x12-L16-P29	57.76	1467.14	55.95	1421.13	0.79	20.04	1.00	25.46
S20x12-L12-P25	35.01	889.21	34.58	878.43	0.60	15.21	0.80	20.32
S20x12-L12-P27	38.28	972.20	37.76	959.16	0.60	15.29	0.85	21.67
S20x12-L12-P29	41.85	1062.90	40.92	1039.27	0.61	15.37	0.87	22.20
S16x9-L20-P25	42.93	1090.54	42.46	1078.49	0.47	11.83	0.42	10.56
S16x9-L20-P27	45.56	1157.32	45.12	1146.16	0.48	12.23	0.45	11.40
S16x9-L20-P29	47.75	1212.79	47.70	1211.65	0.52	13.17	0.48	12.14
S16x9-L16-P25	31.09	789.59	30.70	779.73	0.44	11.10	0.31	7.75
S16x9-L16-P27	33.31	846.15	32.86	834.56	0.39	9.96	0.27	6.89
S16x9-L16-P29	35.85	910.71	35.13	892.27	0.38	9.70	0.30	7.74
S16x9-L12-P25	21.26	539.89	21.18	537.89	0.31	7.76	0.36	9.11
S16x9-L12-P27	23.29	591.44	22.93	582.43	0.32	8.18	0.31	7.91
S16x9-L12-P29	25.25	641.31	24.85	631.13	0.34	8.62	0.27	6.97
S12x6-L20-P25	23.36	593.40	23.93	607.89	0.21	5.42	0.21	5.35
S12x6-L20-P27	24.87	631.64	25.39	645.02	0.24	6.22	0.22	5.66
S12x6-L20-P29	26.40	670.62	26.75	679.52	0.26	6.69	0.24	5.98
S12x6-L16-P25	17.36	441.01	17.96	456.22	0.19	4.80	0.20	5.16
S12x6-L16-P27	18.68	474.35	19.15	486.38	0.20	5.02	0.18	4.64
S12x6-L16-P29	19.96	506.86	20.67	524.97	0.22	5.51	0.20	4.97
S12x6-L12-P25	12.18	309.27	12.61	320.30	0.15	3.74	0.13	3.33
S12x6-L12-P27	13.37	339.55	13.91	353.20	0.15	3.88	0.14	3.52
S12x6-L12-P29	14.67	372.57	15.07	382.66	0.18	4.49	0.15	3.69

Table A3.10: Top Box-Connection Stresses at V=105mph (46.9 m/s)

Model	S33				S11			
	w/ Walkway		w/o Walkway		w/ Walkway		w/o Walkway	
	ksi	MPa	ksi	MPa	ksi	MPa	ksi	MPa
S20x12-L20-P25	48.76	336.22	48.78	336.35	0.73	5.03	0.57	3.95
S20x12-L20-P27	48.77	336.30	48.93	337.40	0.60	4.16	0.51	3.51
S20x12-L20-P29	48.66	335.53	49.18	339.12	0.51	3.51	0.44	3.06
S20x12-L16-P25	42.33	291.85	42.03	289.80	0.52	3.56	0.53	3.63
S20x12-L16-P27	42.32	291.78	42.15	290.62	0.43	2.95	0.47	3.23
S20x12-L16-P29	42.15	290.60	42.17	290.75	0.39	2.68	0.42	2.87
S20x12-L12-P25	35.59	245.36	35.49	244.71	0.36	2.47	0.42	2.86
S20x12-L12-P27	35.61	245.51	35.26	243.10	0.36	2.48	0.45	3.09
S20x12-L12-P29	35.40	244.10	35.48	244.60	0.32	2.20	0.41	2.84
S16x9-L20-P25	50.20	346.14	50.09	345.36	0.48	3.30	0.35	2.38
S16x9-L20-P27	50.05	345.13	49.73	342.89	0.35	2.39	0.26	1.77
S16x9-L20-P29	49.99	344.70	49.58	341.88	0.30	2.05	0.22	1.48
S16x9-L16-P25	43.44	299.53	43.40	299.24	0.34	2.33	0.22	1.55
S16x9-L16-P27	36.00	248.22	36.00	248.22	0.30	2.10	0.20	1.37
S16x9-L16-P29	43.25	298.23	42.77	294.88	0.23	1.61	0.16	1.09
S16x9-L12-P25	36.29	250.25	36.35	250.67	0.20	1.39	0.16	1.10
S16x9-L12-P27	36.27	250.08	36.13	249.13	0.18	1.22	0.14	0.93
S16x9-L12-P29	36.17	249.36	35.80	246.84	0.16	1.13	0.12	0.81
S12x6-L20-P25	23.36	161.09	23.56	162.46	0.11	0.72	0.08	0.52
S12x6-L20-P27	23.28	160.54	23.43	161.54	0.10	0.66	0.07	0.50
S12x6-L20-P29	23.24	160.24	23.30	160.63	0.09	0.60	0.07	0.52
S12x6-L16-P25	19.57	134.96	20.07	138.35	0.09	0.64	0.07	0.48
S12x6-L16-P27	19.72	135.95	20.20	139.29	0.08	0.58	0.06	0.43
S12x6-L16-P29	19.85	136.89	20.22	139.43	0.08	0.53	0.06	0.39
S12x6-L12-P25	16.20	111.71	16.62	114.63	0.07	0.47	0.04	0.26
S12x6-L12-P27	16.26	112.08	16.60	114.46	0.07	0.45	0.04	0.26
S12x6-L12-P29	16.34	112.65	16.60	114.43	0.06	0.44	0.04	0.27

Table A3.11: Bottom Box-Connection Stresses at V=105mph (46.9 m/s)

Model	S33				S11			
	w/ Walkway		w/o Walkway		w/ Walkway		w/o Walkway	
	Ksi	MPa	ksi	MPa	ksi	MPa	ksi	MPa
S20x12-L20-P25	70.61	486.85	69.99	482.56	1.21	8.32	0.99	6.84
S20x12-L20-P27	70.92	488.96	69.81	481.37	1.03	7.13	0.86	5.96
S20x12-L20-P29	71.03	489.76	69.48	479.05	0.84	5.81	0.73	5.06
S20x12-L16-P25	62.08	428.03	61.22	422.12	0.91	6.26	0.90	6.18
S20x12-L16-P27	62.39	430.17	61.05	420.91	0.77	5.32	0.81	5.59
S20x12-L16-P29	62.38	430.12	61.08	421.13	0.71	4.90	0.71	4.91
S20x12-L12-P25	53.61	369.62	52.48	361.82	0.68	4.67	0.79	5.47
S20x12-L12-P27	53.40	368.19	52.29	360.55	0.66	4.53	0.82	5.64
S20x12-L12-P29	53.20	366.81	52.16	359.63	0.58	3.99	0.76	5.27
S16x9-L20-P25	62.43	430.46	61.73	425.64	0.80	5.50	0.60	4.12
S16x9-L20-P27	62.03	427.73	61.60	424.72	0.64	4.42	0.44	3.02
S16x9-L20-P29	62.45	430.57	61.36	423.11	0.51	3.49	0.38	2.59
S16x9-L16-P25	53.54	369.18	52.84	364.31	0.64	4.44	0.44	3.02
S16x9-L16-P27	36.00	248.23	36.00	248.22	0.79	5.43	0.51	3.53
S16x9-L16-P29	53.78	370.82	53.19	366.74	0.39	2.67	0.29	2.02
S16x9-L12-P25	44.71	308.30	44.11	304.15	0.42	2.87	0.32	2.18
S16x9-L12-P27	44.84	309.14	44.59	307.46	0.35	2.40	0.25	1.76
S16x9-L12-P29	45.23	311.89	44.99	310.21	0.33	2.25	0.22	1.52
S12x6-L20-P25	28.09	193.71	28.03	193.27	0.19	1.29	0.15	1.00
S12x6-L20-P27	27.81	191.75	28.09	193.71	0.19	1.30	0.15	1.02
S12x6-L20-P29	27.74	191.28	28.34	195.43	0.17	1.16	0.14	0.94
S12x6-L16-P25	24.43	168.47	24.49	168.88	0.19	1.28	0.13	0.93
S12x6-L16-P27	24.35	167.87	24.24	167.13	0.17	1.15	0.12	0.82
S12x6-L16-P29	24.12	166.29	23.99	165.44	0.16	1.11	0.12	0.80
S12x6-L12-P25	20.34	140.27	20.44	140.95	0.13	0.87	0.09	0.64
S12x6-L12-P27	20.29	139.88	20.47	141.16	0.11	0.78	0.09	0.60
S12x6-L12-P29	20.06	138.30	19.82	136.64	0.12	0.81	0.09	0.61

Table A3.12: Pole Stresses at V=105mph (46.9 m/s)

Model	S21			
	w/ Walkway		w/o Walkway	
	ksi	MPa	ksi	MPa
S20x12-L20-P25	42.24	291.24	40.47	279.05
S20x12-L20-P27	45.85	316.17	44.47	306.64
S20x12-L20-P29	48.74	336.03	49.12	338.65
S20x12-L16-P25	40.50	279.28	39.14	269.87
S20x12-L16-P27	42.52	293.19	43.40	299.25
S20x12-L16-P29	47.99	330.92	48.18	332.22
S20x12-L12-P25	40.46	278.97	39.20	270.27
S20x12-L12-P27	43.49	299.84	44.32	305.56
S20x12-L12-P29	49.10	338.51	48.56	334.84
S16x9-L20-P25	23.29	160.58	23.68	163.24
S16x9-L20-P27	26.77	184.60	26.60	183.38
S16x9-L20-P29	28.46	196.25	29.18	201.20
S16x9-L16-P25	22.94	158.18	23.63	162.90
S16x9-L16-P27	25.83	178.08	26.35	181.71
S16x9-L16-P29	28.26	194.84	28.93	199.46
S16x9-L12-P25	23.24	160.22	23.27	160.46
S16x9-L12-P27	25.42	175.26	25.69	177.11
S16x9-L12-P29	28.13	193.94	27.98	192.93
S12x6-L20-P25	16.03	110.51	16.91	116.56
S12x6-L20-P27	18.01	124.16	18.59	128.18
S12x6-L20-P29	19.52	134.62	19.85	136.89
S12x6-L16-P25	16.11	111.04	16.94	116.79
S12x6-L16-P27	17.89	123.36	18.96	130.74
S12x6-L16-P29	19.67	135.60	19.35	133.43
S12x6-L12-P25	16.00	110.30	16.43	113.26
S12x6-L12-P27	17.05	117.57	17.29	119.24
S12x6-L12-P29	18.51	127.65	19.96	137.60

Appendix B

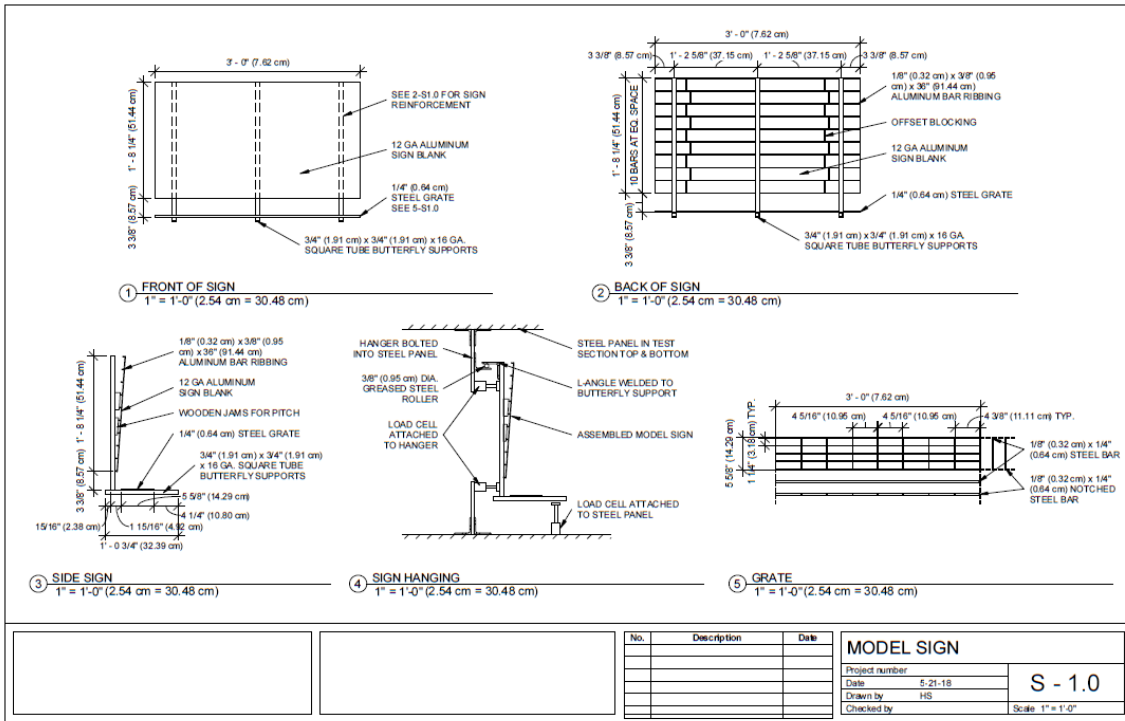


Figure B.1: Schematic of model sign used in wind tunnel testing at the University of Kansas

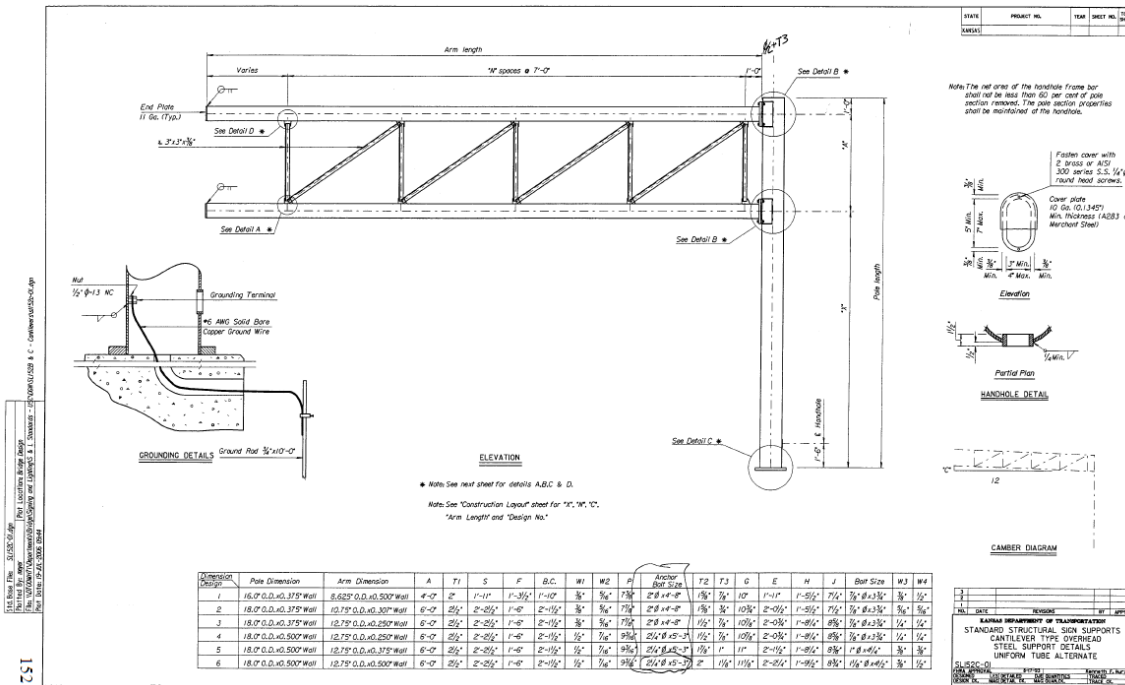


Figure B.2: KDOT standard detail for cantilevered structural sign supports

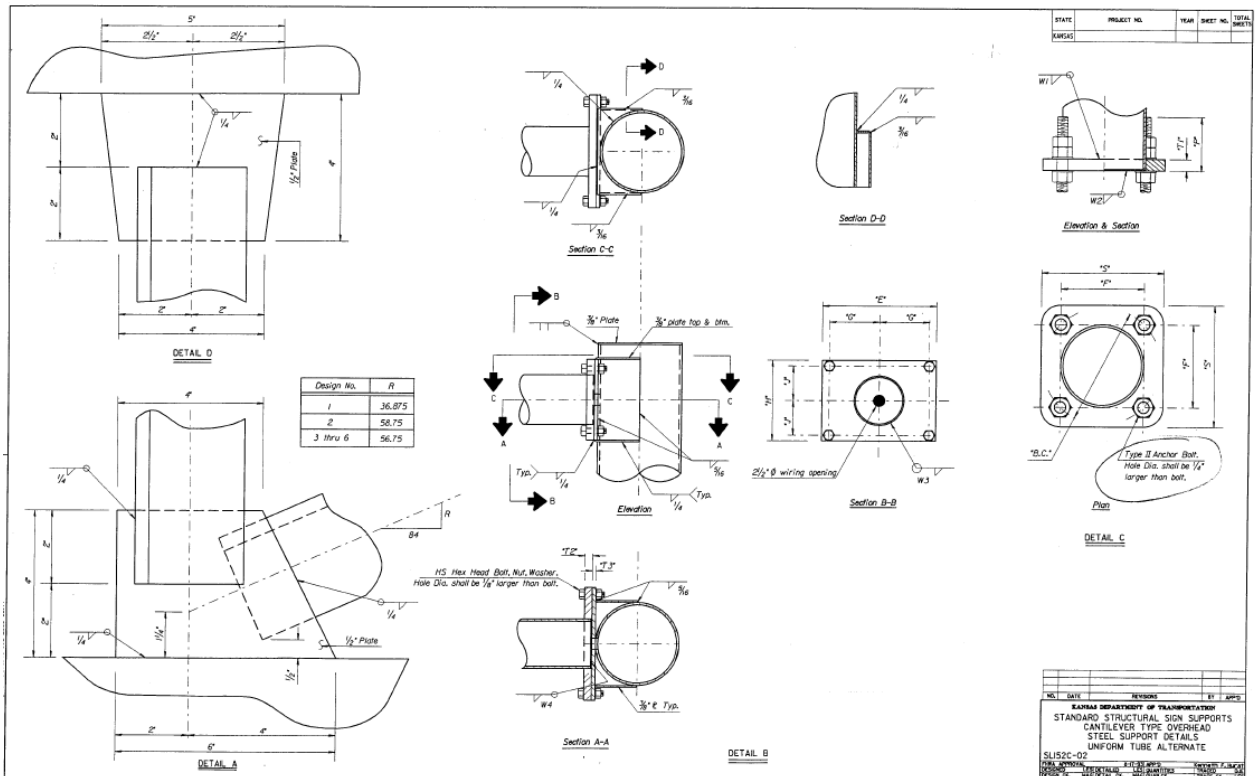


Figure B.3: KDOT standard detail for cantilevered structural sign supports

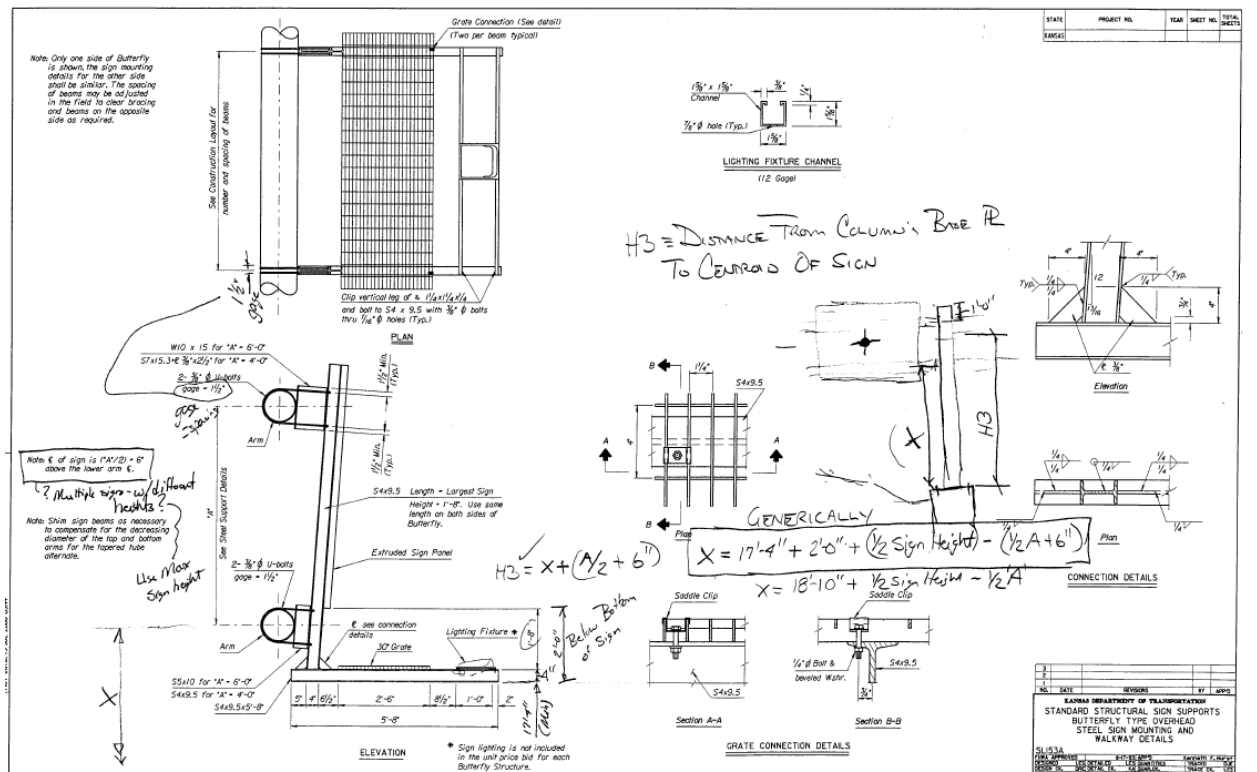


Figure B.4: KDOT standard detail for cantilevered structural sign supports

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