

## Appendix A

### Data and Figures from the Analysis of the Previous Research

## A.1 Hysteresis Loops from the Static Tests

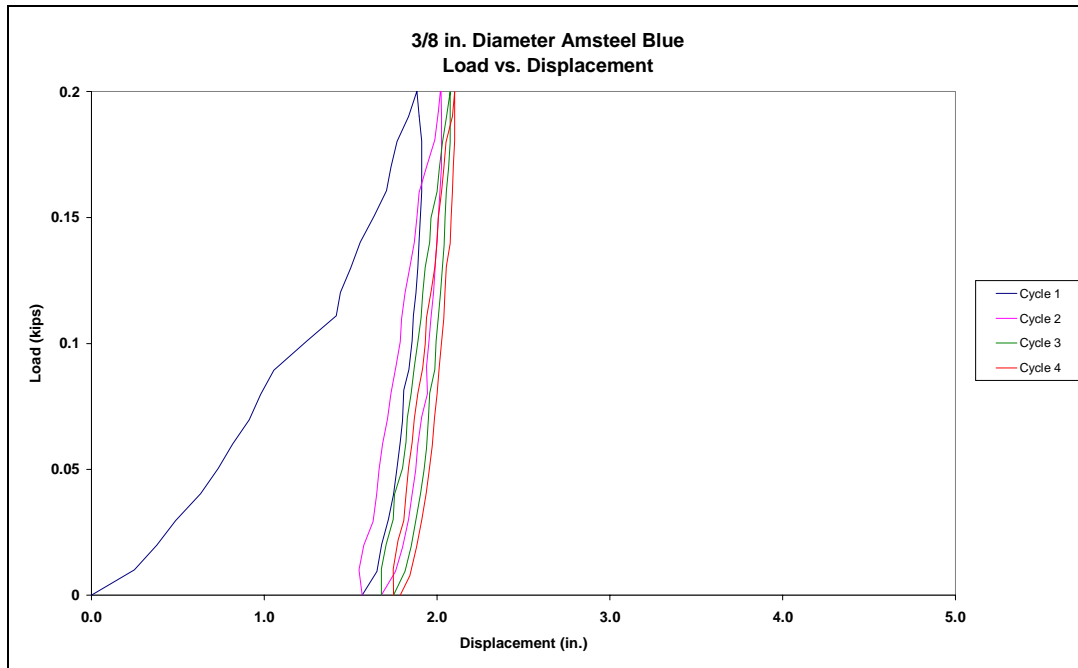


Figure A.1.1: 3/8 in. Amsteel Blue – Static Hysteresis Loops

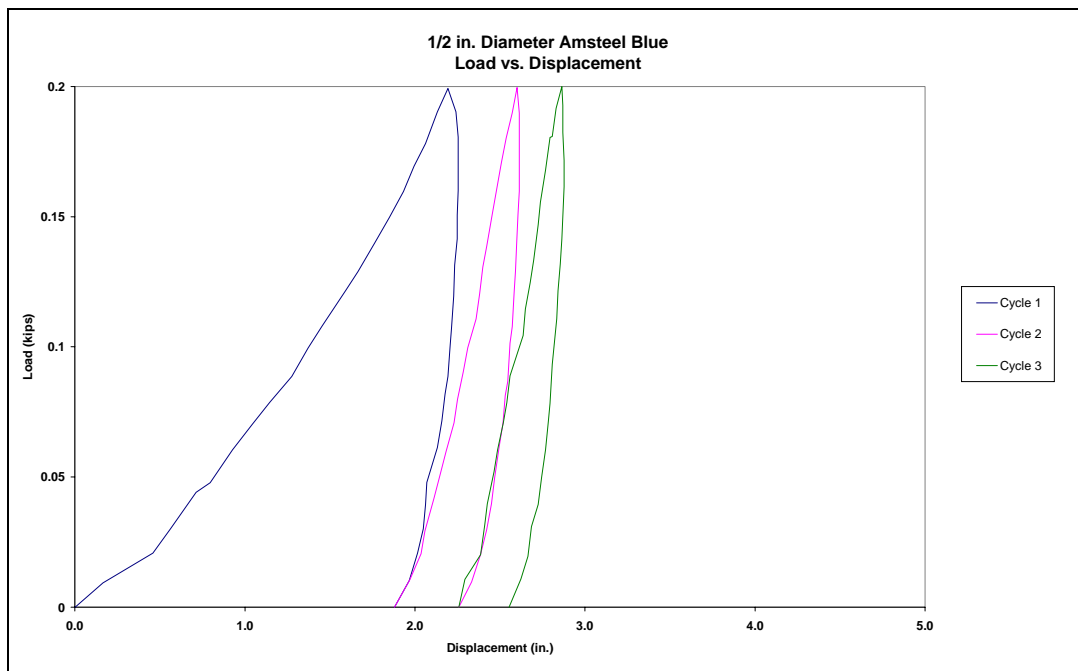


Figure A.1.2: 1/2 in. Amsteel Blue – Static Hysteresis Loops

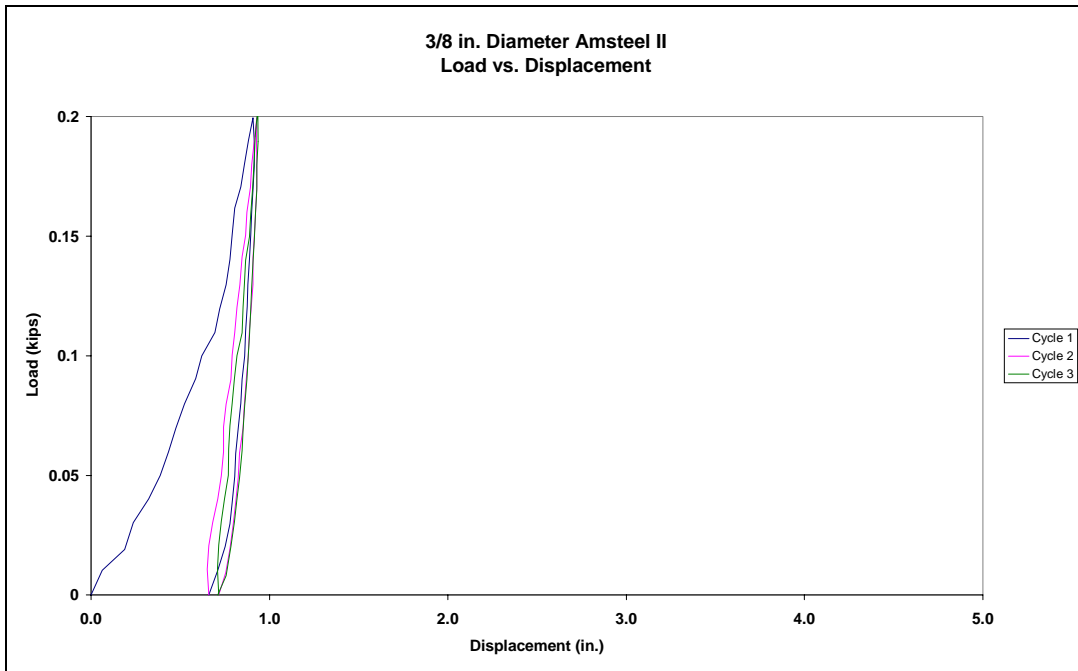


Figure A.1.3: 3/8 in. Amsteel II – Static Hysteresis Loops

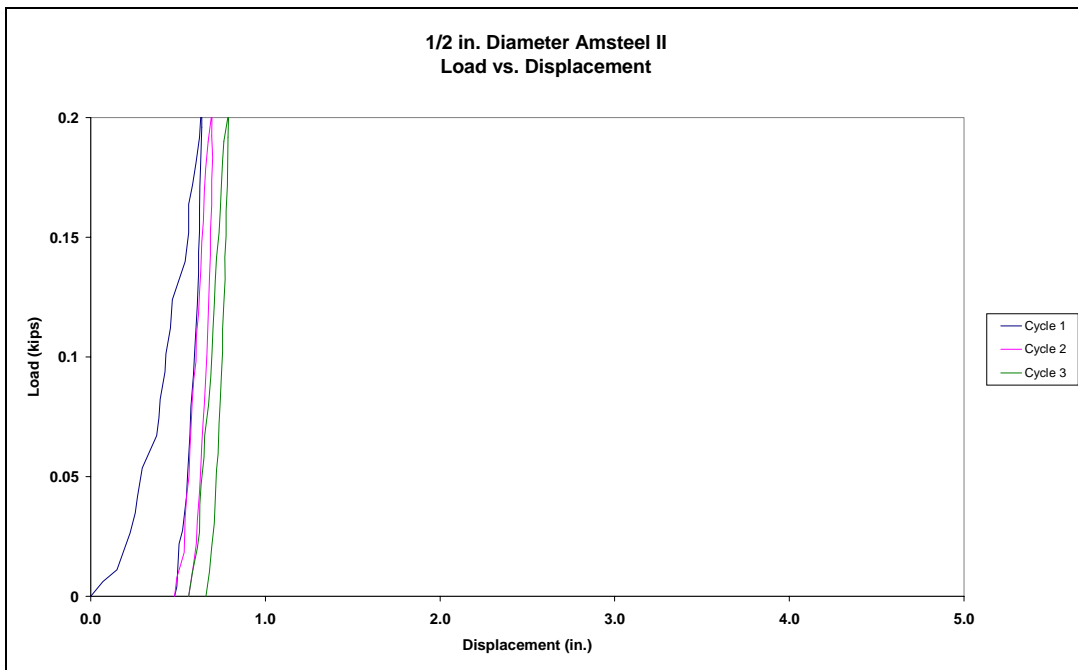


Figure A.1.4: 1/2 in. Amsteel II – Static Hysteresis Loops

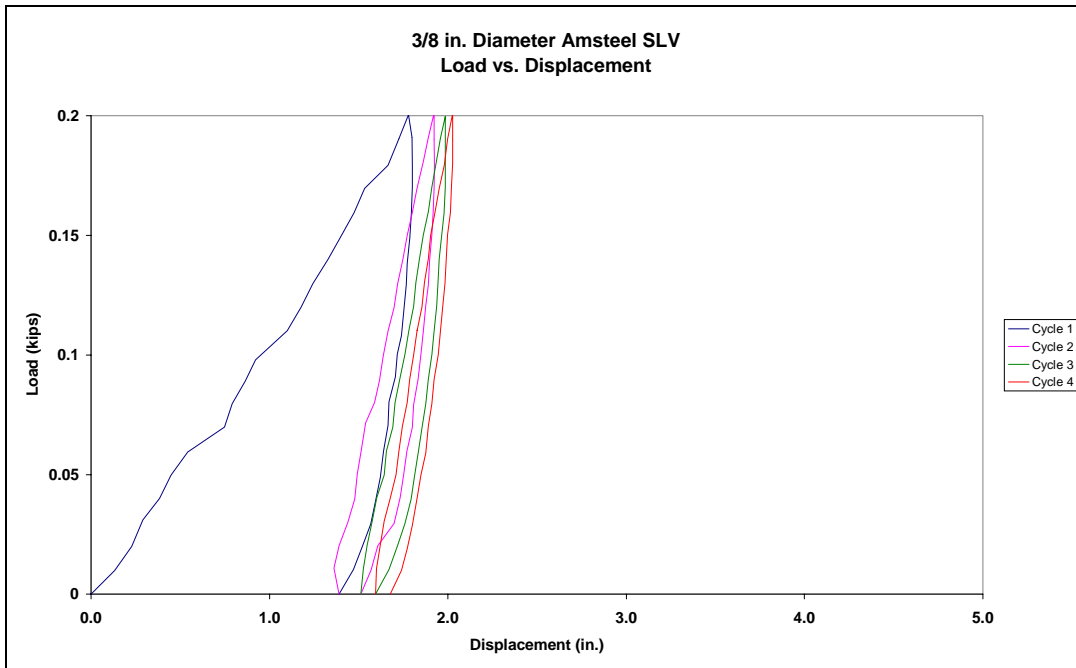


Figure A.1.5: 3/8 in. Amsteel SLV – Static Hysteresis Loops

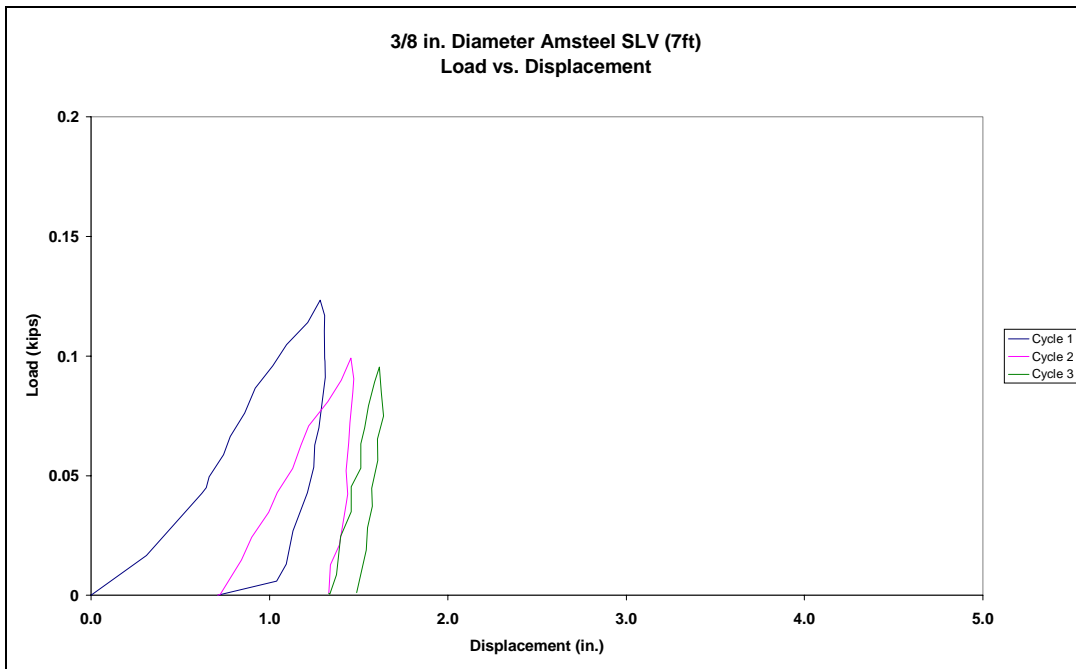


Figure A.1.6: 3/8 in. Amsteel SLV (7 ft) - Static Hysteresis Loops

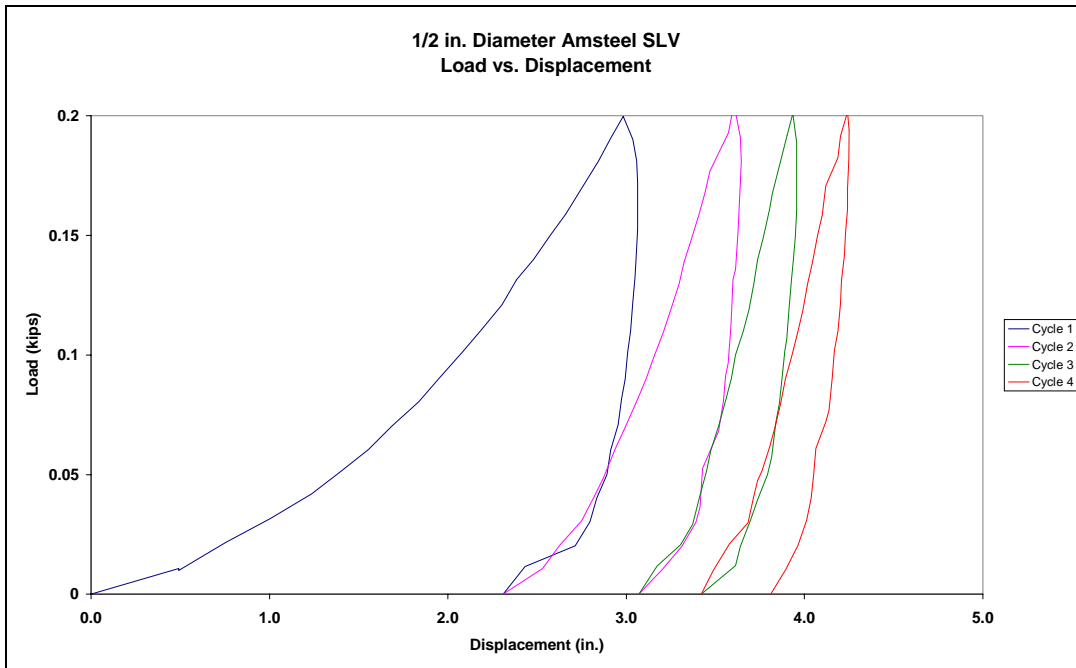


Figure A.1.7: 1/2 in. Amsteel SLV – Static Hysteresis Loops

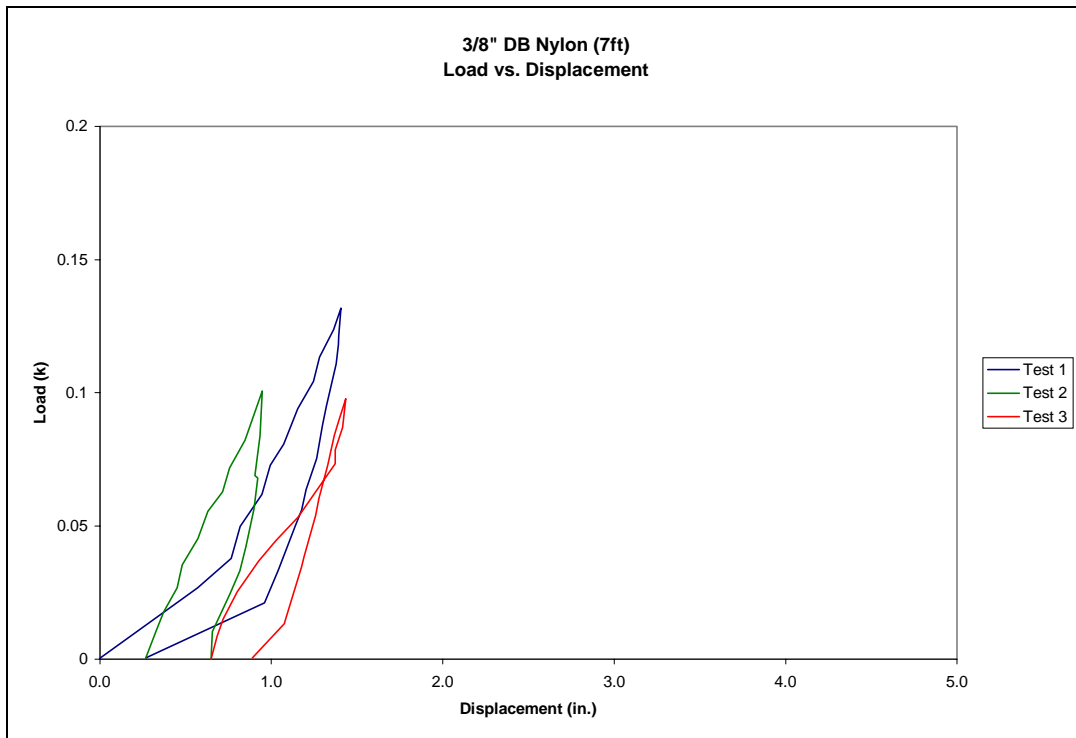


Figure A.1.8: 3/8 in. DB Nylon (7 ft) – Static Hysteresis Loops

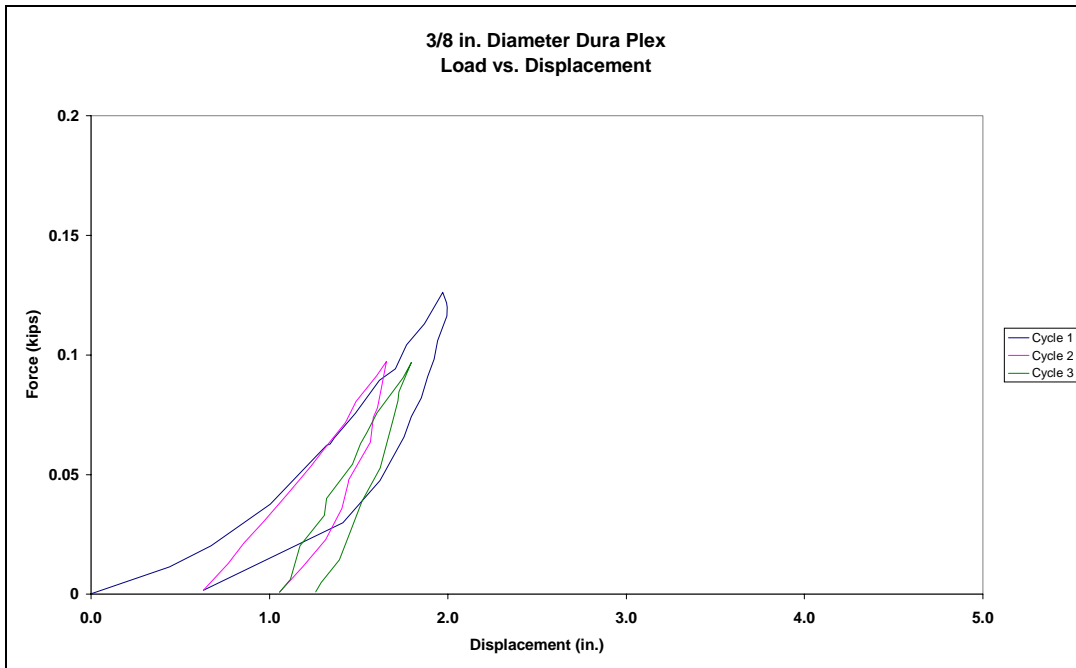


Figure A.1.9: 3/8 in. Dura Plex – Static Hysteresis Loops

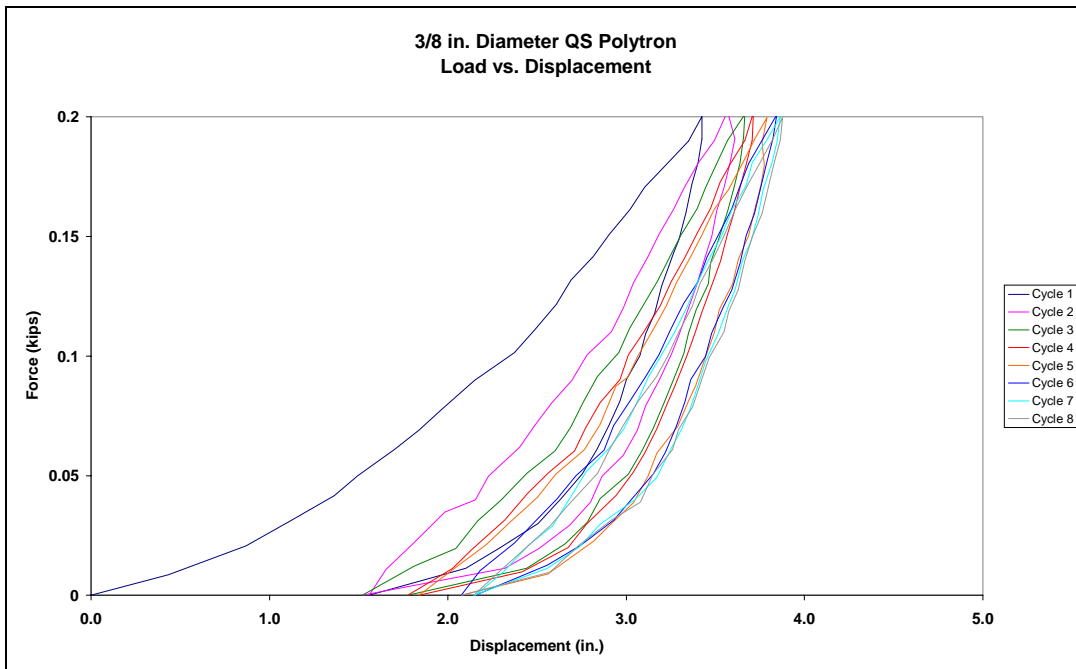


Figure A.1.10: 3/8 in. QS Polytron – Static Hysteresis Loops

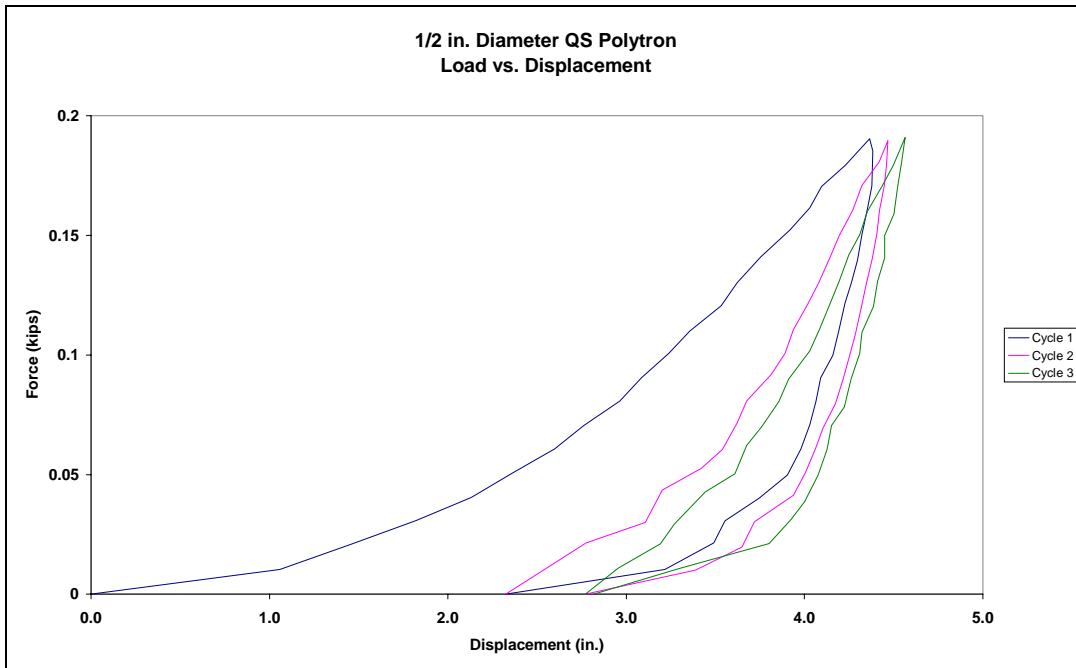


Figure A.1.11: 1/2 in. QS Polytron – Static Hysteresis Loops

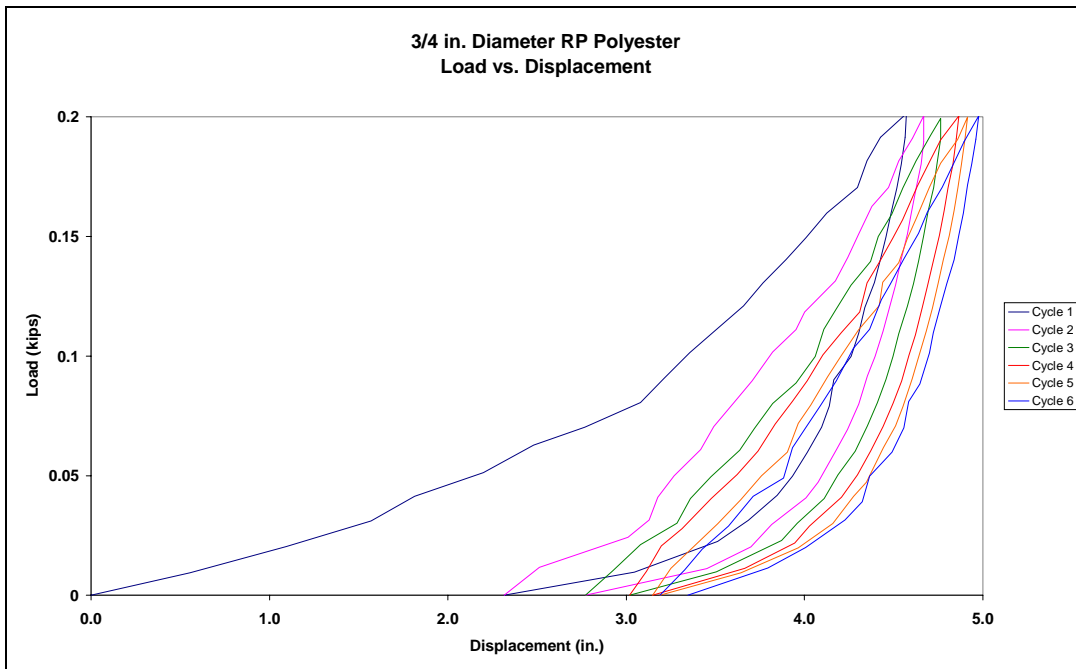


Figure A.1.12: 3/4 in. RP Polyester – Static Hysteresis Loops

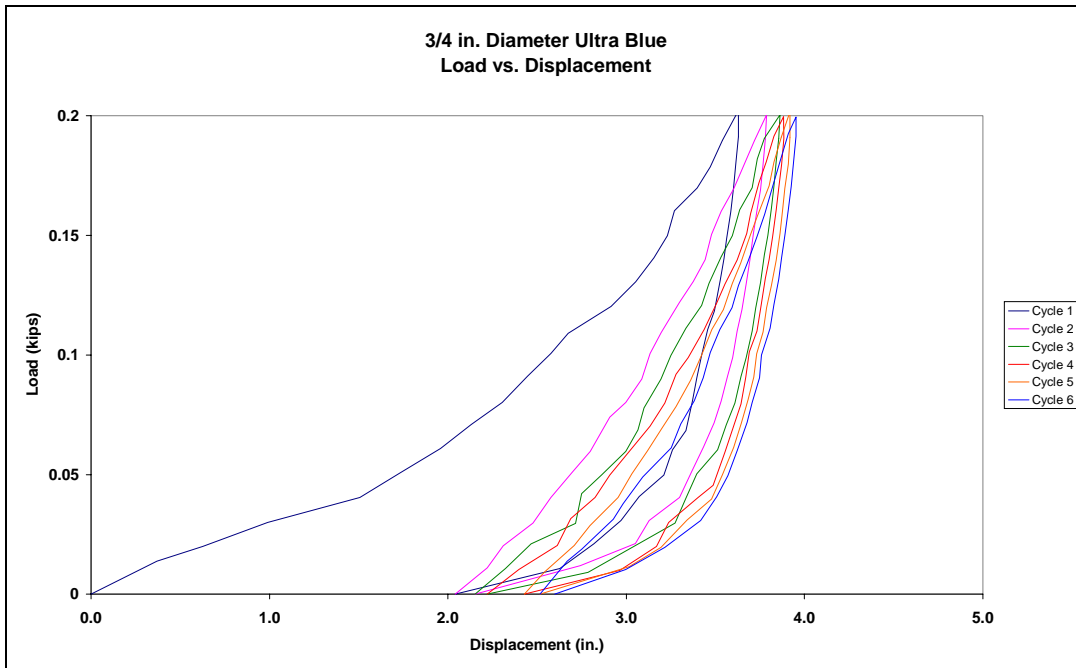


Figure A.1.13: 3/4 in. RP Ultra Blue – Static Hysteresis Loops

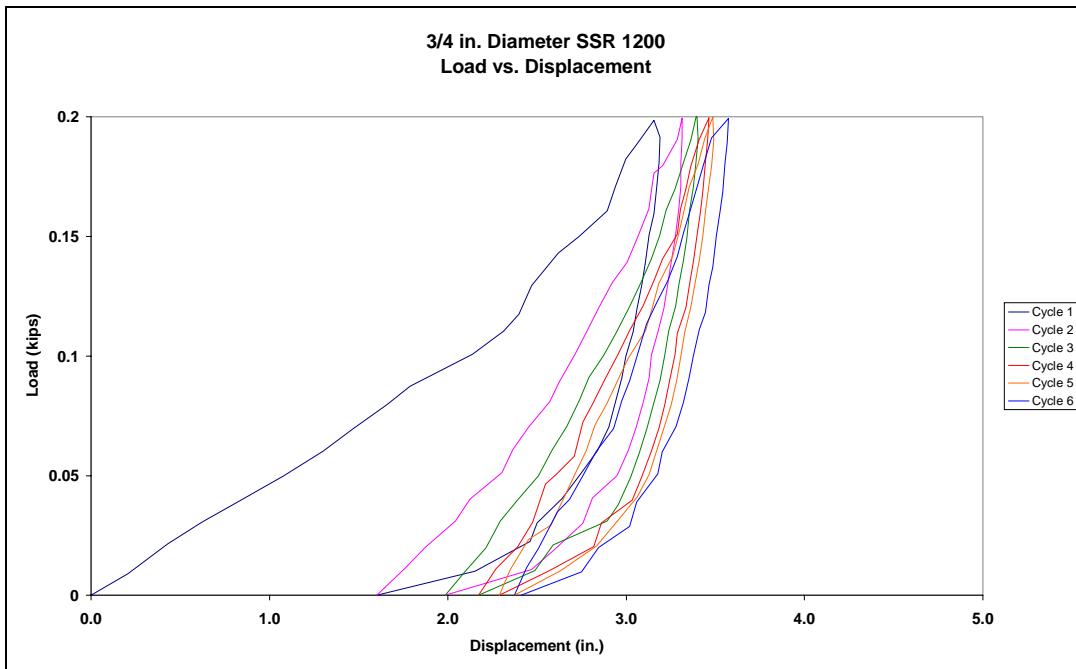


Figure A.1.14: 3/4 in. SSR 1200 – Static Hysteresis Loops



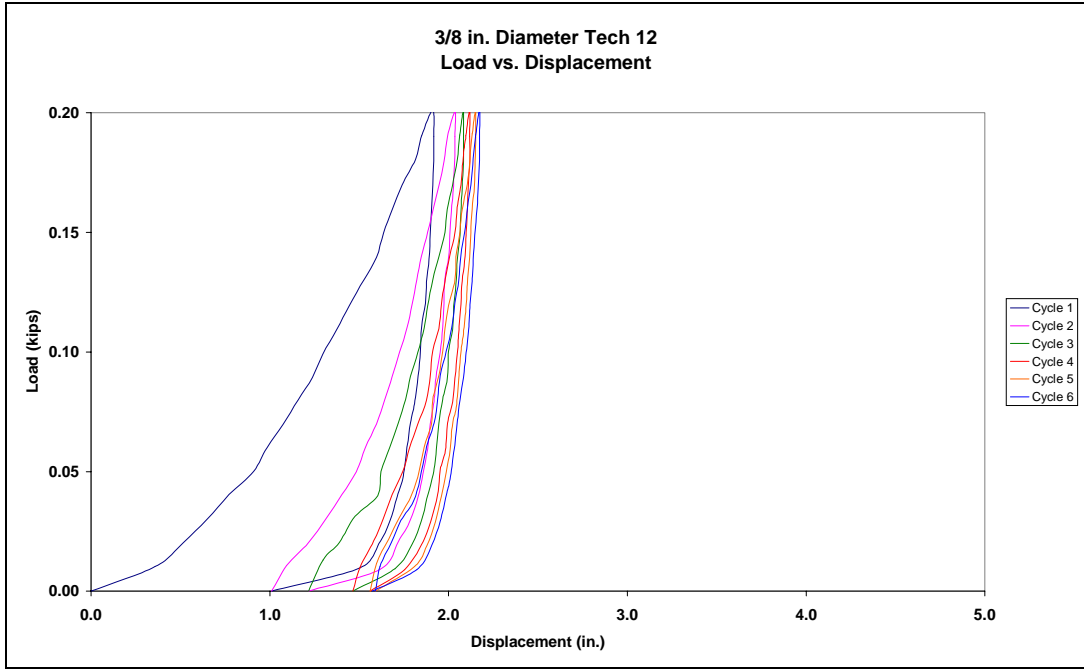


Figure A.1.15: 3/8 in. Tech 12 – Static Hysteresis Loops

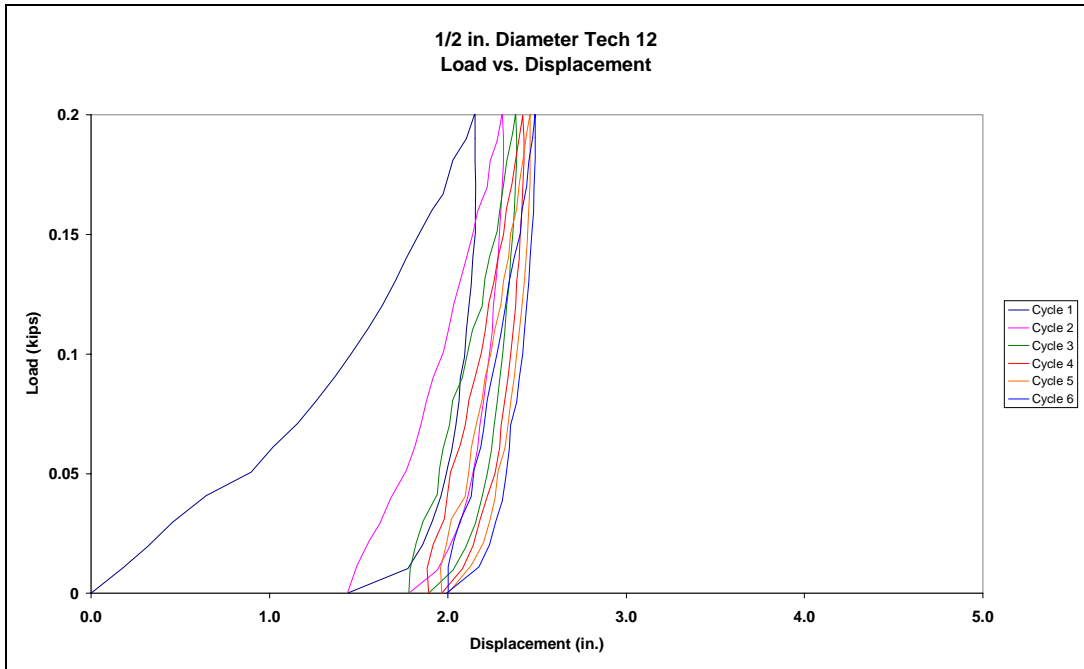


Figure A.1.16: 1/2 in. Tech 12 – Static Hysteresis Loops

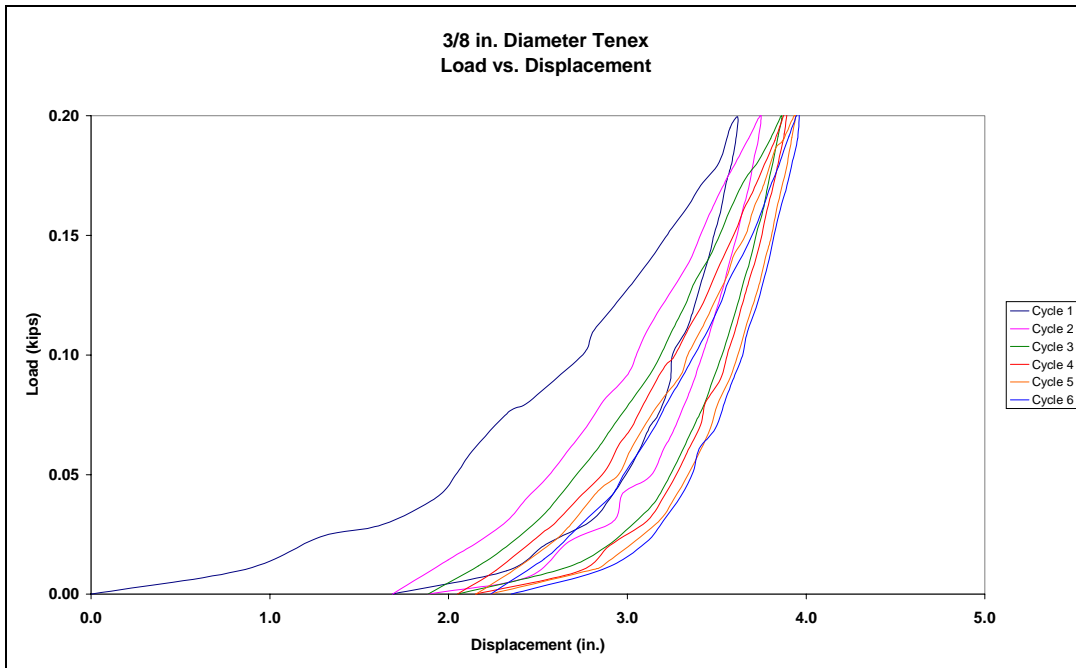


Figure A.1.17: 3/8 in. Tenex CLR – Static Hysteresis Loops

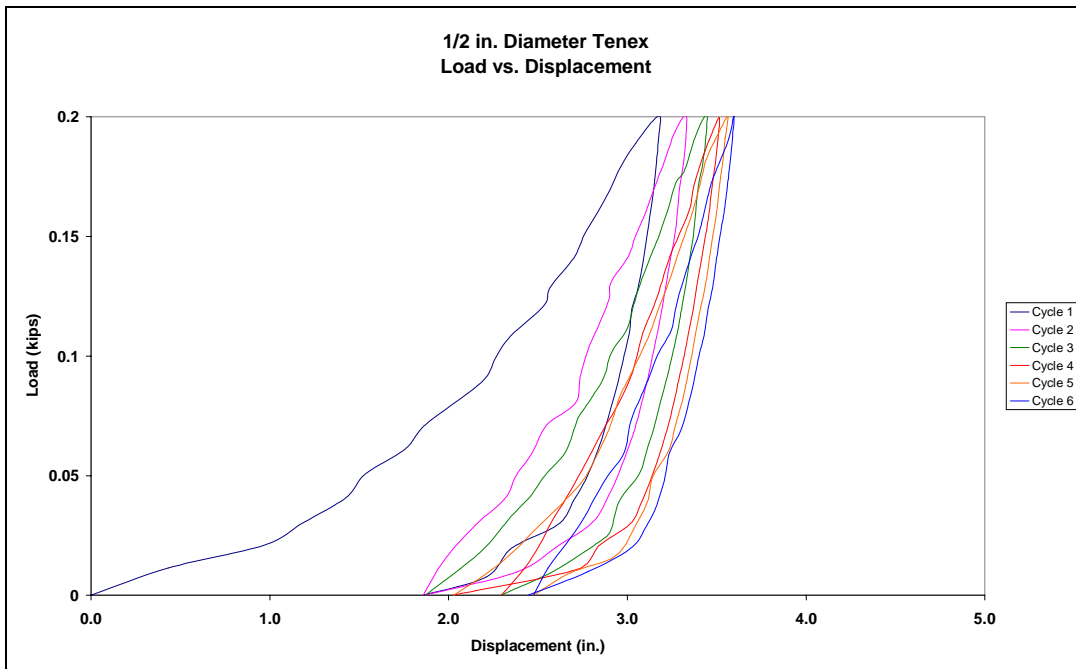


Figure A.1.18: 1/2 in. Tenex CLR – Static Hysteresis Loops

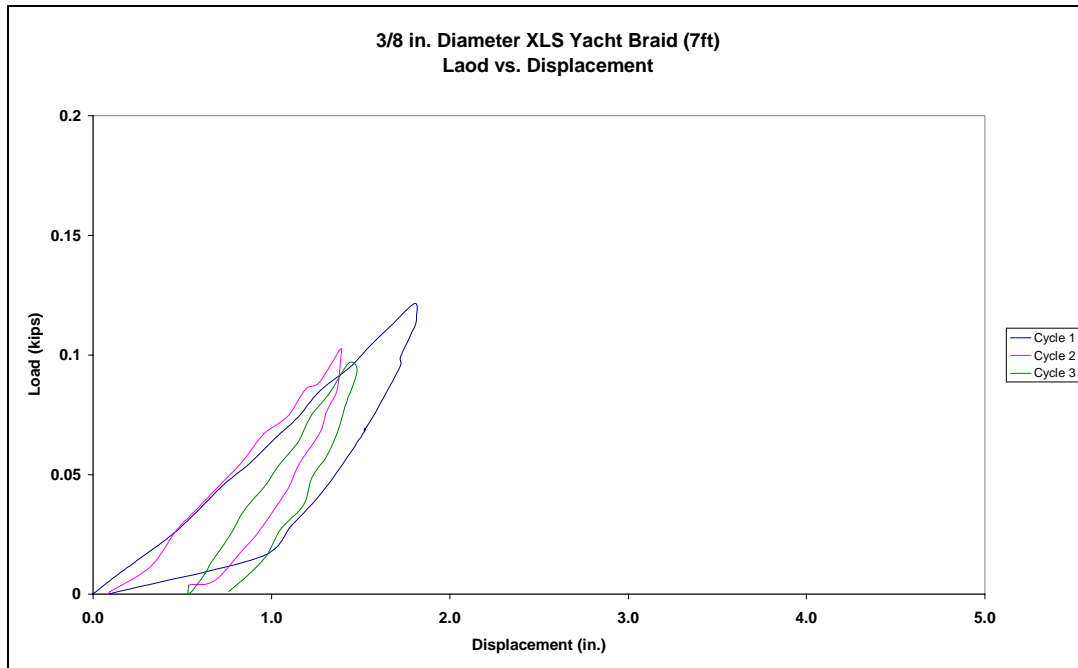


Figure A.1.19: 3/8 in. XLS Yacht Braid – Static Hysteresis Loops

## A.2 Maximum Displacements from the Static Tests

Rope Type	Maximum Displacements (in.)							
	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6	Cycle 7	Cycle 8
Amsteel Blue - 3/8"	1.911	2.207	2.075	2.102				
Amsteel Blue - 1/2"	2.255	2.613	2.876					
Amsteel II - 3/8"	0.915	0.928	0.935					
Amsteel II - 1/2"	0.637	0.698	0.789					
Amsteel SLV - 3/8"	1.801	1.925	1.986	2.027				
Amsteel SLV (7 ft) - 3/8"	1.313	1.473	1.639					
Amsteel SLV - 1/2"	3.064	3.644	3.957	4.250				
DB Nylon (7 ft) - 3/8"	1.406	0.946	1.435					
Dura Plex - 3/8"	1.971	1.655	1.794					
QS Polytron - 3/8"	3.425	3.610	3.666	3.713	3.789	3.844	3.864	3.878
QS Polytron - 1/2"	4.384	4.468	4.564					
RP Polyester - 3/4"	4.570	4.668	4.763	4.866	4.914	4.976		
RP Ultra Blue - 3/4"	3.630	3.787	3.862	3.883	3.918	3.952		
SSR 1200 - 3/4"	3.190	3.314	3.403	3.465	3.491	3.574		
Tech 12 Black - 3/8"	1.197	2.035	2.082	2.118	2.152	2.172		
Tech 12 Black - 1/2"	2.156	2.311	2.386	2.427	2.461	2.489		
Tenex CLR 3/8"	3.616	3.746	3.864	3.89	3.938	3.959		
Tenex CLR - 1/2"	3.176	3.327	3.443	3.513	3.561	3.596		
XLS Yach Braid (7 ft) - 3/8"	1.814	1.301	0.945					

Table A.2.1: Static Maximum Displacement Values

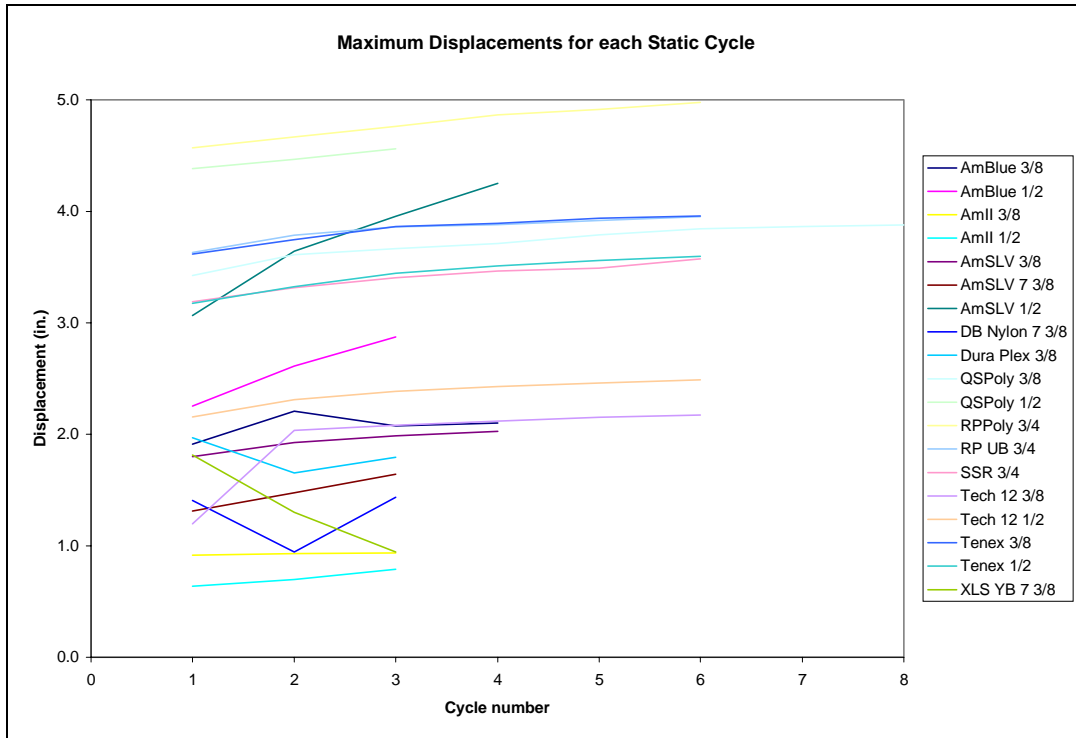


Figure A.2.1: Static Maximum Displacements

### A.3 Rope Stiffnesses from the Static Tests

Rope Type	Static Slope (Stiffness) (k/in.)							
	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6	Cycle 7	Cycle 8
Amsteel Blue - 3/8"	0.109	0.422	0.502	0.558				
Amsteel Blue - 1/2"	0.096	0.321	0.379					
Amsteel II - 3/8"	0.242	0.695	0.820					
Amsteel II - 1/2"	0.416	1.110	1.245					
Amsteel SLV - 3/8"	0.111	0.348	0.420	0.461				
Amsteel SLV (7 ft) - 3/8"	0.122	0.136	0.355					
Amsteel SLV - 1/2"	0.091	0.202	0.31	0.312				
DB Nylon (7 ft) - 3/8"	0.129	0.143	0.102					
Dura Plex - 3/8"	0.092	0.094	0.125					
QS Polytron - 3/8"	0.078	0.115	0.128	0.138	0.137	0.136	0.138	0.141
QS Polytron - 1/2"	0.069	0.136	0.148					
RP Polyester - 3/4"	0.081	0.104	0.114	0.115	0.129	0.131		
RP Ultra Blue - 3/4"	0.068	0.131	0.148	0.151	0.167	0.200		
SSR 1200 - 3/4"	0.054	0.131	0.143	0.153	0.174	0.200		
Tech 12 Black - 3/8"	0.150	0.270	0.307	0.377	0.446	0.438		
Tech 12 Black - 1/2"	0.110	0.257	0.337	0.374	0.426	0.430		
Tenex CLR 3/8"	0.087	0.122	0.129	0.147	0.154	0.155		
Tenex CLR - 1/2"	0.099	0.163	0.175	0.200	0.196	0.218		
XLS Yach Braid (7 ft) - 3/8"	0.068	0.080	0.108					

Table A.3.1: Static Rope Stiffness Values

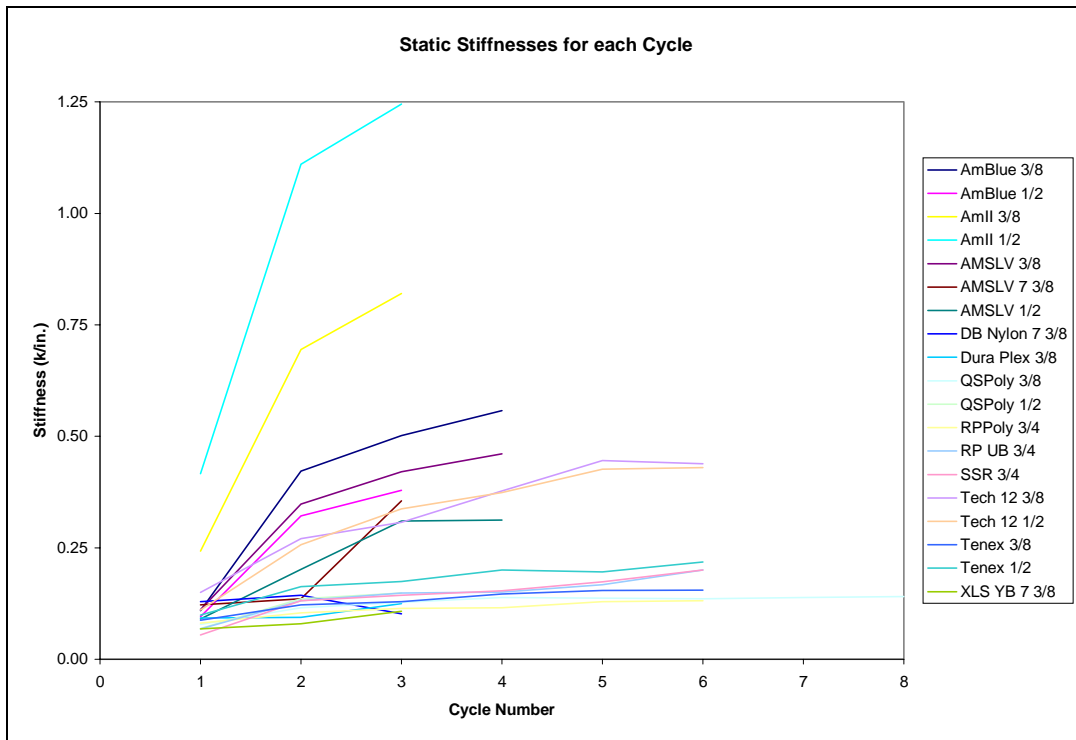


Figure A.3.1: Static Rope Stiffnesses

## A.4 Area Inside the Static Hysteresis Loops

Rope Type	Static Areas (k-in.)								Total Static Area (k-in.)
	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6	Cycle 7	Cycle 8	
Amsteel Blue - 3/8"	0.134	0.031	0.019	0.017					0.201
Amsteel Blue - 1/2"	0.172	0.046	0.040						0.258
Amsteel II - 3/8"	0.054	0.015	0.010						0.079
Amsteel II - 1/2"	0.034	0.011	0.012						0.057
Amsteel SLV - 3/8"	0.149	0.036	0.026	0.023					0.234
Amsteel SLV (7 ft) - 3/8"	0.061	0.033	0.010						0.104
Amsteel SLV - 1/2"	0.202	0.082	0.050	0.046					0.783
DB Nylon (7 ft) - 3/8"	0.032	0.023	0.032						0.087
Dura Plex - 3/8"	0.044	0.027	0.015						0.178
QS Polytron - 3/8"	0.162	0.087	0.073	0.059	0.071	0.050	0.046	0.045	0.593
QS Polytron - 1/2"	0.199	0.080	0.059						0.338
RP Polyester - 3/4"	0.219	0.103	0.086	0.085	0.074	0.074			0.641
RP Ultra Blue - 3/4"	0.193	0.081	0.071	0.067	0.059	0.054			0.525
SSR 1200 - 3/4"	0.200	0.084	0.061	0.055	0.050	0.054			0.504
Tech 12 Black - 3/8"	0.112	0.049	0.038	0.027	0.022	0.022			0.270
Tech 12 Black - 1/2"	0.146	0.052	0.035	0.030	0.025	0.040			0.328
Tenex CLR 3/8"	0.129	0.070	0.066	0.056	0.053	0.049			0.423
Tenex CLR - 1/2"	0.160	0.069	0.067	0.047	0.059	0.041			0.443
XLS Yach Braid (7 ft) - 3/8"	0.050	0.033	0.021						0.104

Table A.4.1: Values of Area under the Static Hysteresis Loops

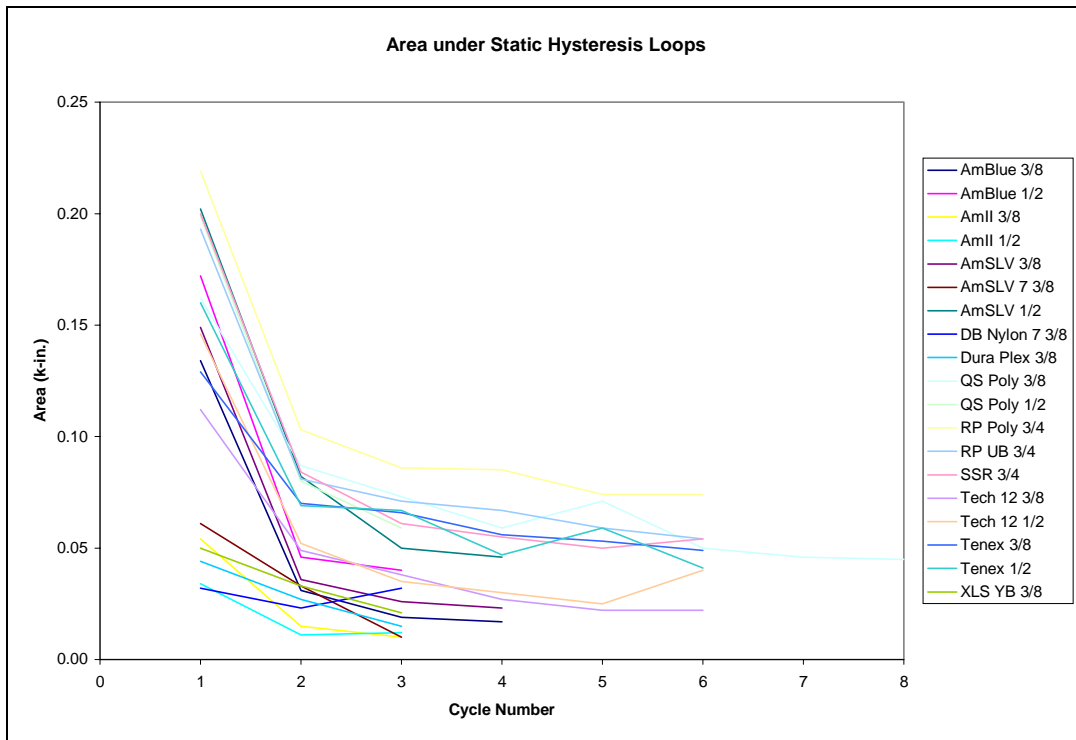


Figure A.4.1: Static Area Trends

## A.5 Amsteel Blue Dynamic Test Comparisons

3/8-in. Amsteel Blue - Recycled					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	56	25	0.36	0.0098	0.0632
2	56	65	1.53	0.0395	0.0556
3	56	85	2.60	0.0604	0.0468
4	56	105	3.92	0.0856	0.0484
5	56	125	5.25	0.1138	0.0496
6	56	125	5.68	0.1123	0.0506
7	56	125	6.30	0.1168	0.0486
8	56	125	6.43	0.1059	0.0394

3/8-in. Amsteel Blue - New					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	57	45	1.11	0.0263	0.0532
2	57	65	2.05	0.0503	0.049
3	57	85	3.15	0.0702	0.044
4	57	105	4.44	0.0955	0.0454
5	57	125	5.61	0.108	0.0444

1/2-in. Amsteel Blue - Recycled					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	97	65	2.33	0.0645	0.0674
2	91	65	3.26	0.0660	0.0500
3	85	65	3.68	0.0677	0.0400
4	79	65	3.52	0.0601	0.0394
5	73	65	3.86	0.0644	0.0422
6	67	65	1.69	0.0315	0.0382
7	60	85	4.27	0.0735	0.0398
8	72	85	4.91	0.0845	0.0382
9	84	85	5.69	0.0959	0.0372
10	90	85	5.80	0.0916	0.0362
11	59	65	3.35	0.0528	0.0630
12	53	65	3.70	0.0572	0.0490
13	47	65	3.62	0.0560	0.0535
14	41	65	3.40	0.0528	0.0655
15	35	65	3.40	0.0532	0.0540
16	29	65	2.79	0.0453	0.0515
17	23	65	2.70	0.0443	0.0605
18	17	65	2.41	0.0397	0.0495
19	11	65	1.99	0.0340	0.0460
20	5	65	1.45	0.0256	0.0540

1/2-in. Amsteel Blue - New					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	90	65	1.77	0.0452	0.0474
2	84	65	2.25	0.0495	0.0462
3	78	65	2.64	0.0541	0.0456
4	72	65	2.57	0.0500	0.0468
5	66	65	3.01	0.0566	0.0414
6	58	85	3.46	0.0663	0.0414
7	70	85	4.00	0.0747	0.0428
8	82	85	4.73	0.0865	0.0372
9	88	85	4.93	0.0855	0.0382
10	54	125	5.03	0.0989	0.0490
11	54	125	5.75	0.1085	0.0436
12	54	125	5.94	0.1079	0.0438
13	54	105	5.70	0.0994	0.0444
14	54	85	3.62	0.0595	0.0420
15	54	85	4.16	0.0681	0.0362
16	54	65	3.23	0.0494	0.0560
17	56	65	4.11	0.0651	0.0460
18	50	65	4.35	0.0646	0.0545
19	44	65	3.81	0.0605	0.0735
20	38	65	3.56	0.0576	0.0715
21	32	65	3.19	0.0533	0.0555
22	26	65	3.07	0.0496	0.0730
23	20	65	2.64	0.0432	0.0460
24	14	65	2.26	0.0382	0.0400
25	8	65	1.97	0.0332	0.0585
26	2	65	1.29	0.0245	0.0480

Table A.5.1: Amsteel Blue Dynamic Test Data

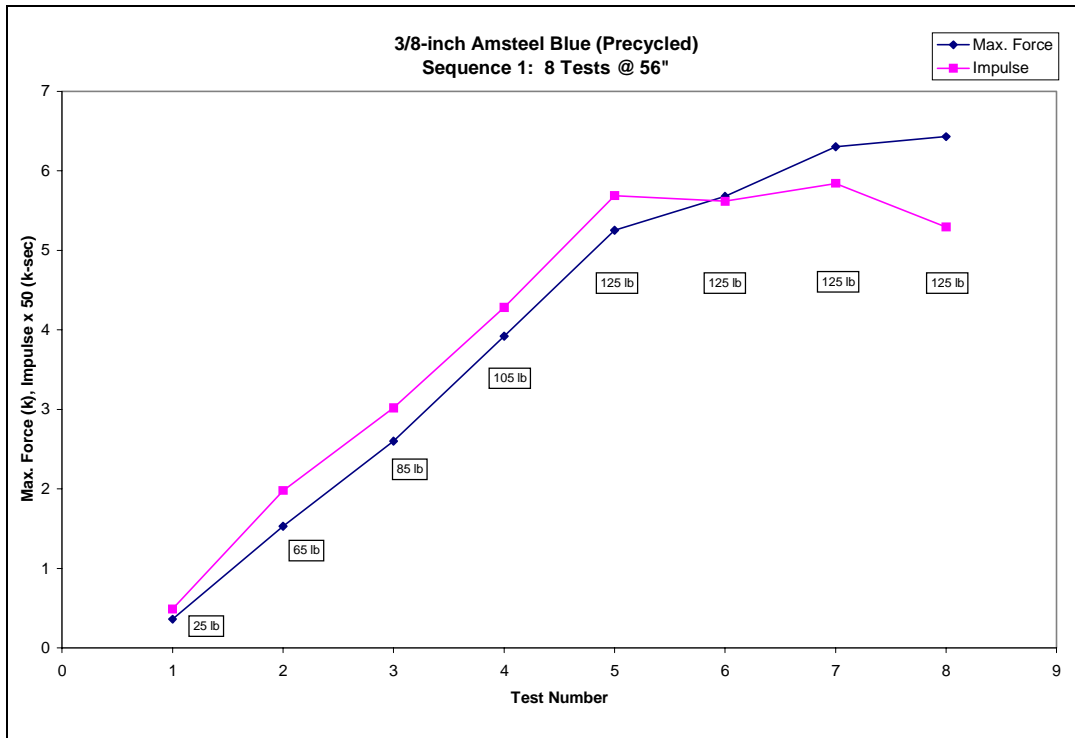


Figure A.5.1: 3/8 in. Amsteel Blue – Precycled – Maximum Force and Impulse

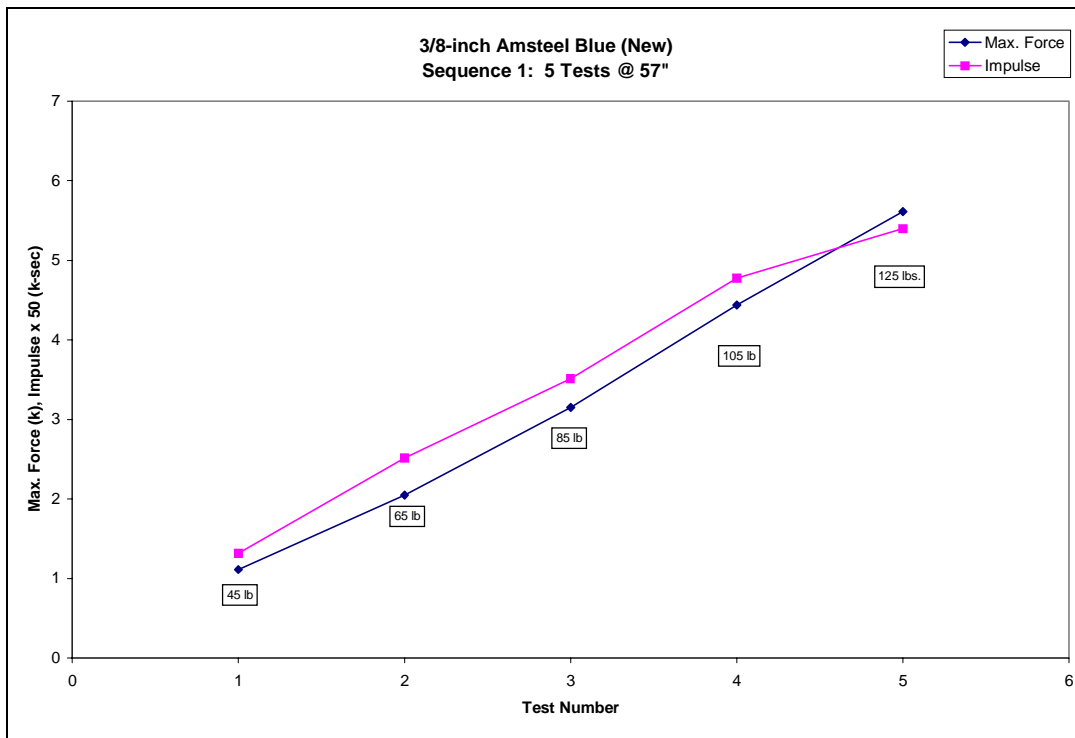


Figure A.5.2: 3/8 in. Amsteel Blue – New – Maximum Force and Impulse



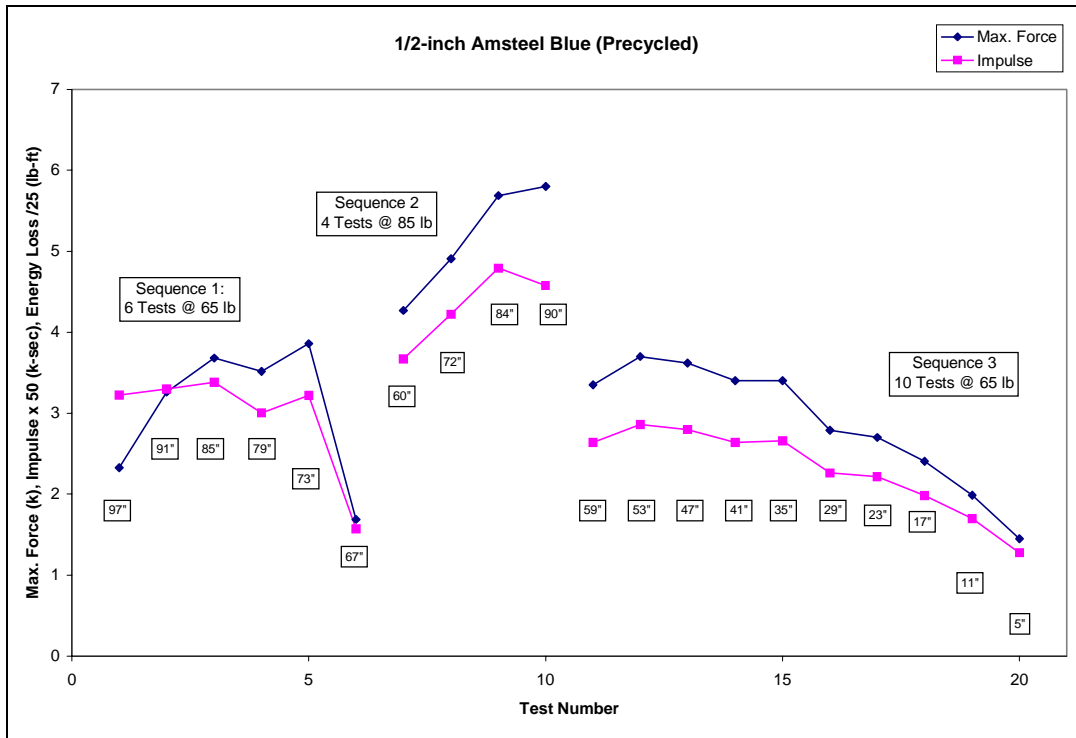


Figure A.5.3: 1/2 in. Amsteel Blue – Precycled – Maximum Force and Impulse

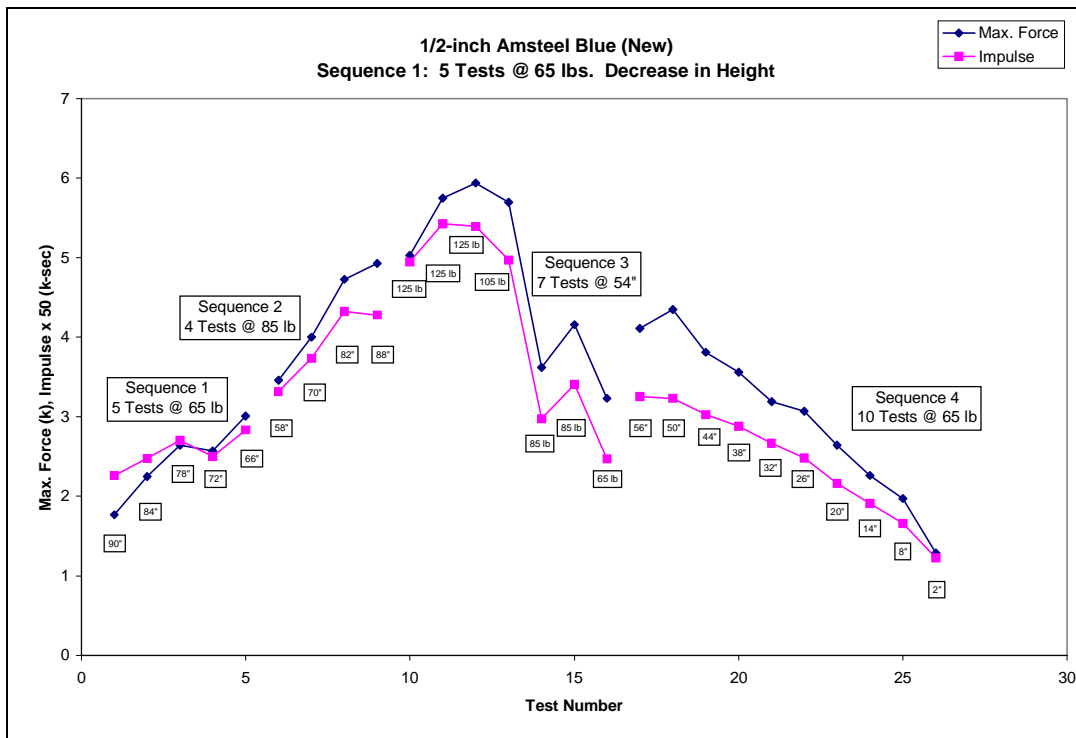


Figure A.5.4: 1/2 in. Amsteel Blue – New – Maximum Force and Impulse

## A.6 Amsteel II Dynamic Test Comparisons

3/8-in. Amsteel II - Precycled					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	97	65	3.24	0.0631	0.0398
2	91	65	4.38	0.0783	0.0424
3	85	65	4.04	0.0663	0.0428
4	79	65	4.57	0.0771	0.0452
5	73	65	4.53	0.0758	0.0442
6	67	65	4.05	0.0684	0.0354
7	57	85	4.53	0.0849	0.0384
8	63	85	4.69	0.0873	0.0404
9	69	85	4.90	0.0905	0.0390
10	55	65	3.39	0.0576	0.0435
11	49	65	3.65	0.0641	0.0620
12	43	65	3.53	0.0652	0.0450
13	37	65	3.32	0.0594	0.0495
14	31	65	3.18	0.0551	0.0430
15	25	65	2.85	0.0496	0.0620
16	19	65	2.47	0.0445	0.0470
17	13	65	2.16	0.0392	0.0445
18	7	65	1.59	0.0310	0.0415
19	1	65	1.02	0.0211	0.0465

3/8-in. Amsteel II - New					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	97	65	3.39	0.0655	0.0410
2	91	65	4.59	0.0817	0.0382
3	85	65	4.67	0.0792	0.0382
4	79	65	4.66	0.0779	0.0362
5	73	65	4.00	0.0684	0.0340
6	67	65	3.67	0.0592	0.0348
7	57	85	4.63	0.0866	0.0404
8	63	85	4.43	0.0762	0.0386
9	69	85	5.12	0.0947	0.0406
10	55	65	2.99	0.0512	0.0580
11	49	65	3.54	0.0575	0.0495
12	43	65	3.46	0.0590	0.0540
13	37	65	3.59	0.0611	0.0535
14	31	65	3.31	0.0591	0.0595
15	25	65	2.81	0.0494	0.0400
16	19	65	2.49	0.0444	0.0405
17	13	65	2.05	0.0384	0.0445
18	7	65	1.59	0.0308	0.0490
19	1	65	0.90	0.0199	0.0740

1/2-in. Amsteel II - Precycled					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	56	85	3.20	0.0603	0.0430
2	56	85	4.08	0.0735	0.0440
3	56	85	4.37	0.0757	0.0466
4	56	85	3.96	0.0670	0.0454
5	56	85	4.21	0.0722	0.0464
6	56	85	4.30	0.0742	0.0438
7	57	105	4.24	0.0758	0.0508
8	57	105	4.59	0.0846	0.0430
9	57	105	4.85	0.0871	0.0428
10	57	105	5.10	0.0908	0.0456
11	57	105	5.49	0.0974	0.0428

1/2-in. Amsteel II - New					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	56	85	2.88	0.0579	0.0650
2	56	85	3.23	0.0619	0.0622
3	56	85	3.38	0.0640	0.0614
4	56	85	3.36	0.0656	0.0734
5	56	85	3.17	0.0587	0.0616
6	56	85	3.64	0.0665	0.0464
7	57	105	4.61	0.0898	0.0454
8	57	105	5.61	0.1037	0.0378
9	57	105	5.83	0.1055	0.0384
10	57	105	5.88	0.1061	0.0472
11	56	115	5.01	0.0916	0.0430
12	56	115	5.69	0.1060	0.0470
13	56	115	5.73	0.1070	0.0444
14	56	105	5.37	0.0980	0.0450
15	56	85	4.67	0.0780	0.0474
16	56	65	3.66	0.0530	0.0352
17	56	45	2.74	0.0388	0.0366

Table A.6.1: Amsteel II Dynamic Test Data

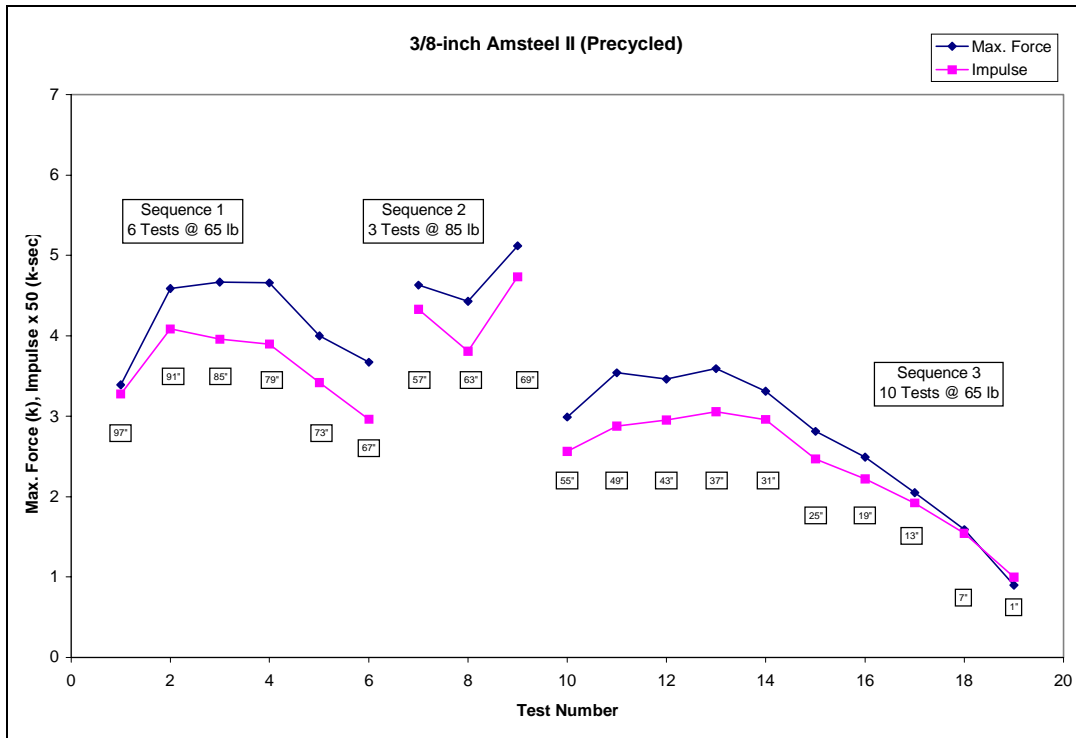


Figure A.6.1: 3/8 in. Amsteel II – Precycled – Maximum Force and Impulse

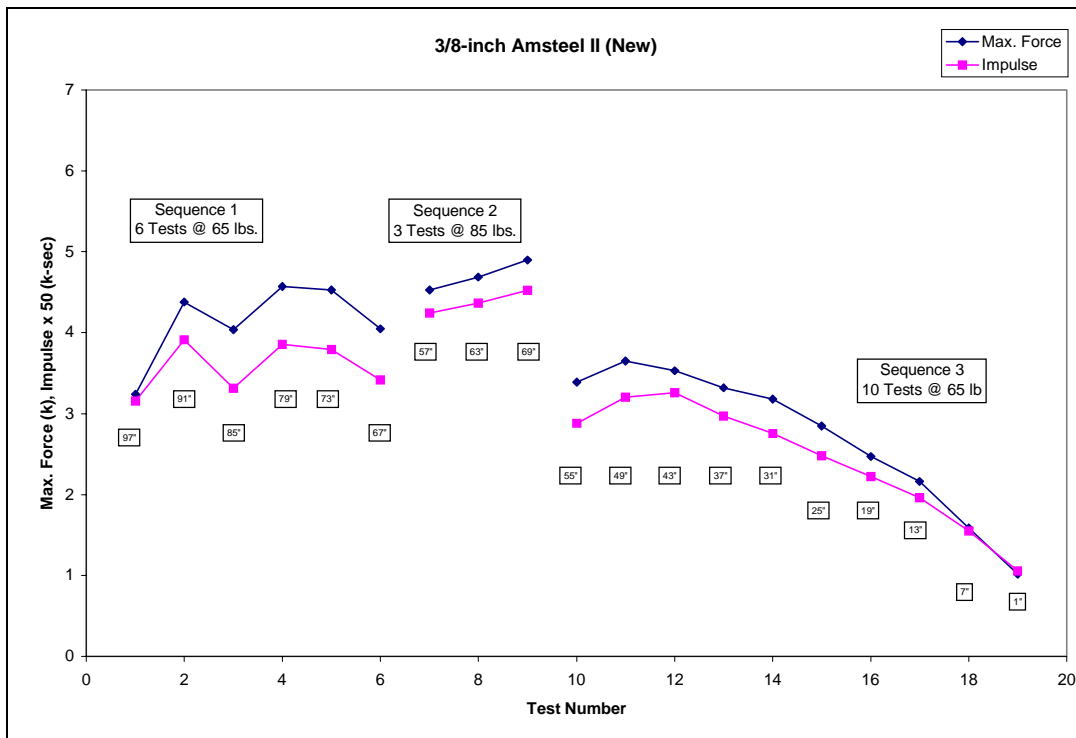


Figure A.6.2: 3/8 in. Amsteel II – New – Maximum Force and Impulse

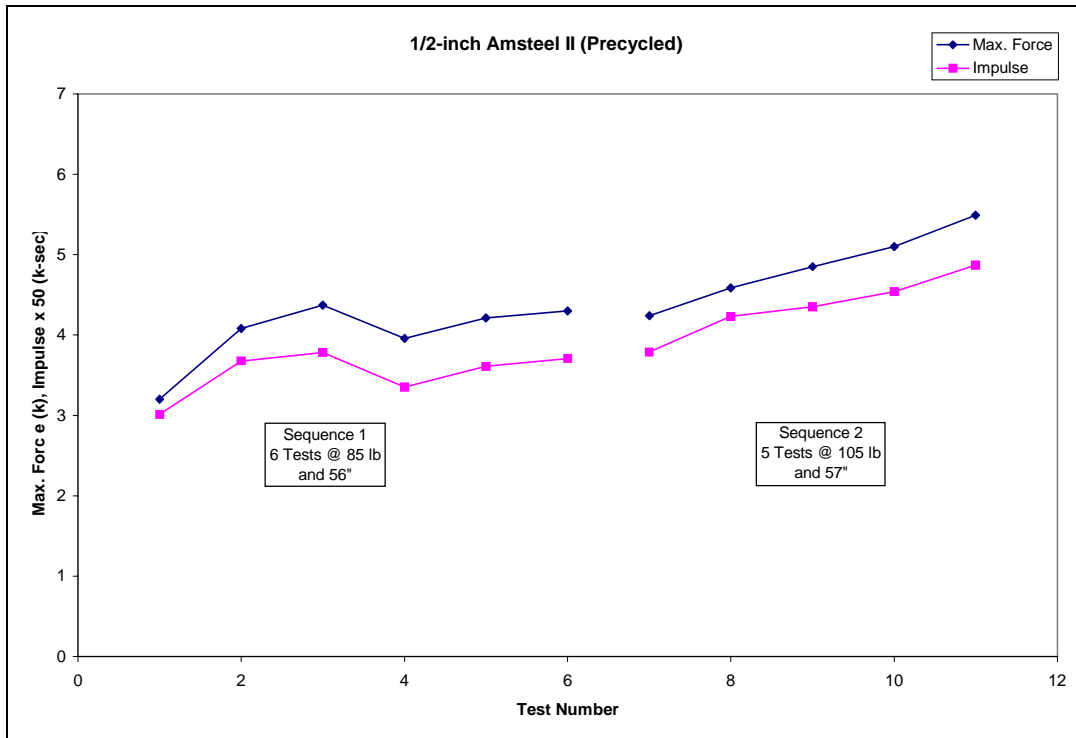


Figure A.6.3: 1/2 in. Amsteel II – Precycled – Maximum Force and Impulse

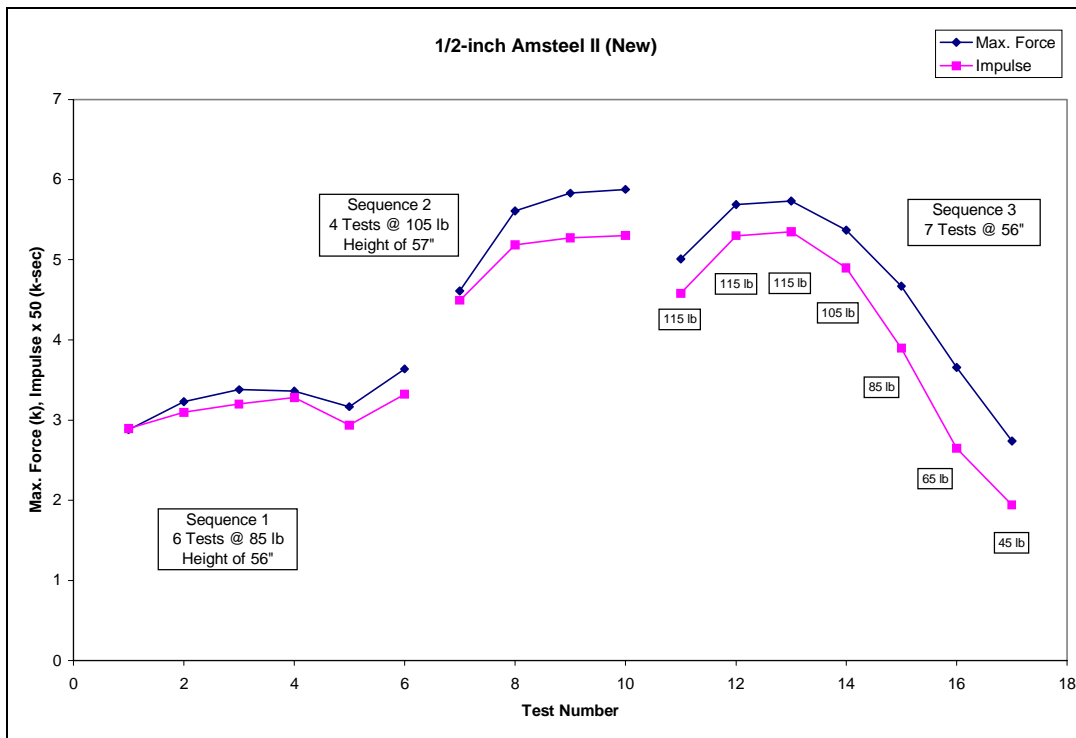


Figure A.6.4: 1/2 in. Amsteel II – New – Maximum Force and Impulse

## A.7 Amsteel SLV Dynamic Test Comparisons

3/8-in. Amsteel SLV - Precycled					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	68	65	0.99	0.0333	0.0886
2	80	65	1.18	0.0359	0.0704
3	92	65	1.49	0.0385	0.0654
4	98	65	1.49	0.0385	0.0654
5	61	85	1.97	0.0539	0.0610

3/8-in. Amsteel SLV - New					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	54	65	0.93	0.0384	0.0970
2	66	65	1.38	0.0417	0.0680
3	78	65	1.71	0.0441	0.0552
4	90	65	1.94	0.0458	0.0706
5	54	85	2.43	0.0579	0.0502
6	54	85	2.58	0.0585	0.0484
7	54	85	2.80	0.0619	0.0556
8	54	65	2.05	0.0383	0.0372
9	54	65	2.12	0.0425	0.0460
10	54	65	2.16	0.0418	0.0456
11	54	65	2.66	0.0503	0.0478
12	54	45	1.75	0.0292	0.0400
13	54	65	2.71	0.0506	0.0412
14	54	85	3.62	0.0755	0.0406
15	54	105	4.44	0.0956	0.0470
16	54	125	5.42	0.1166	0.0514

3/8-in. Amsteel SLV - Precycled - 7ft					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	64	45	2.21	0.0411	0.0474
2	64	65	2.34	0.0622	0.0434
3	64	105	4.50	0.0888	0.0400
4	64	105	5.64	0.1059	0.0482
5	64	105	6.00	0.1086	0.0422

1/2-in. Amsteel SLV - Precycled					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	56	65	0.82	0.0331	0.0974
2	68	65	1.02	0.0346	0.0860
3	81	65	1.21	0.0369	0.0950
4	93	65	1.35	0.0386	0.0782
5	98	65	1.48	0.0400	0.0724
6	59	85	1.99	0.0529	0.0656
7	71	85	2.62	0.0635	0.0742
8	83	85	3.23	0.0710	0.0730
9	60	85	2.86	0.0570	0.0482
10	60	85	3.20	0.0618	0.0448
11	60	85	3.33	0.0631	0.0454

1/2-in. Amsteel SLV - New					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	54	65	0.88	0.0372	0.0894
2	66	65	0.98	0.0334	0.0828
3	78	65	1.21	0.0372	0.0704
4	90	65	1.54	0.0435	0.0696
5	96	65	1.73	0.0442	0.0544
6	59	85	2.47	0.0620	0.0528
7	71	85	4.23	0.0847	0.0588
8	59	65	3.81	0.0652	0.0520
9	59	65	3.95	0.0650	0.0502
10	59	65	3.95	0.0652	0.0444
11	59	65	3.91	0.0638	0.0494
12	59	65	3.97	0.0645	0.0472
13	59	65	3.70	0.0613	0.0364

Table A.7.1: Amsteel SLV Dynamic Test Data

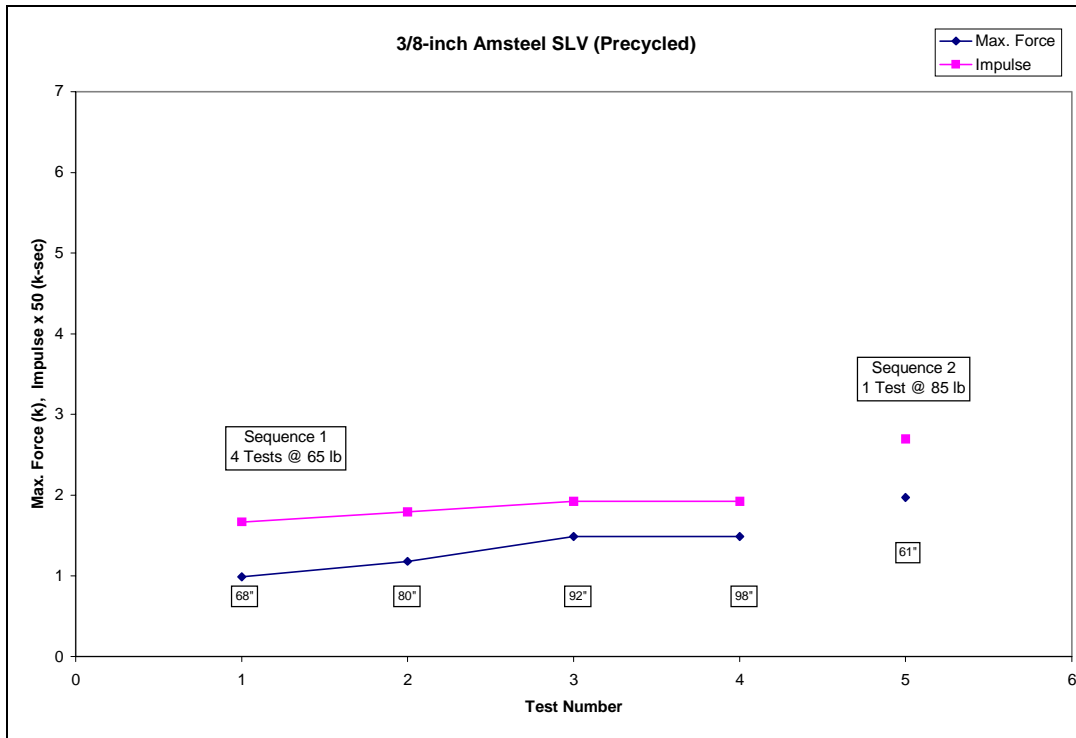


Figure A.7.1: 3/8 in. Amsteel SLV – Precycled – Maximum Force and Impulse

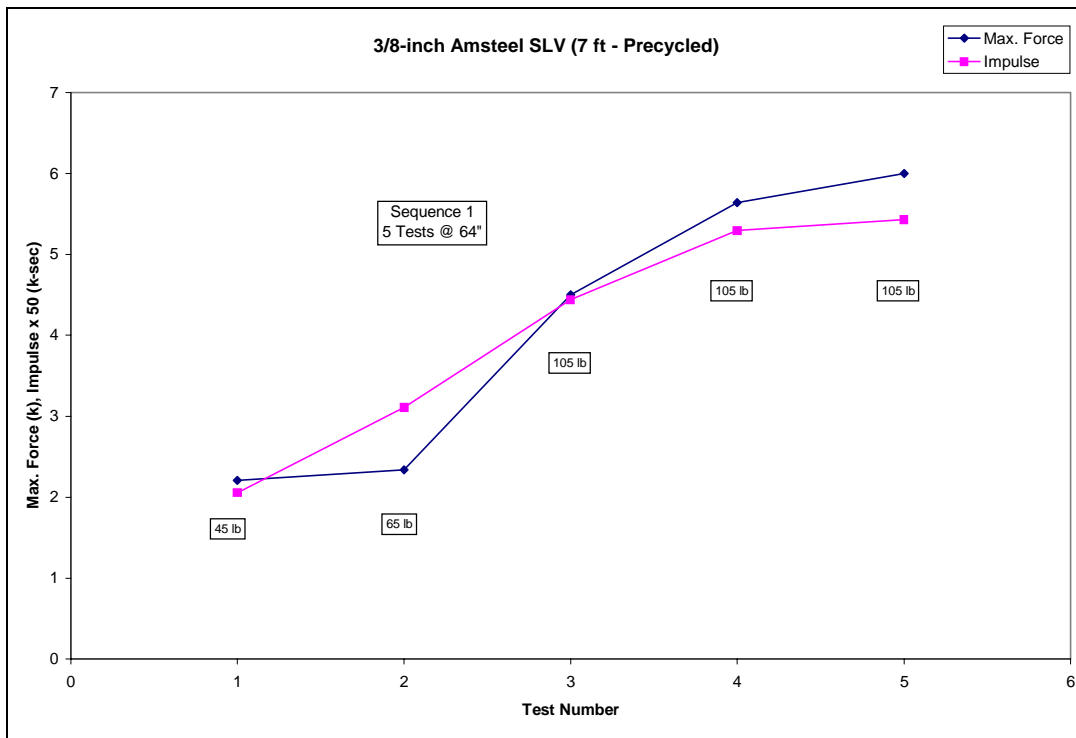


Figure A.7.2: 3/8 in. Amsteel SLV (7ft) – Precycled – Maximum Force and Impulse

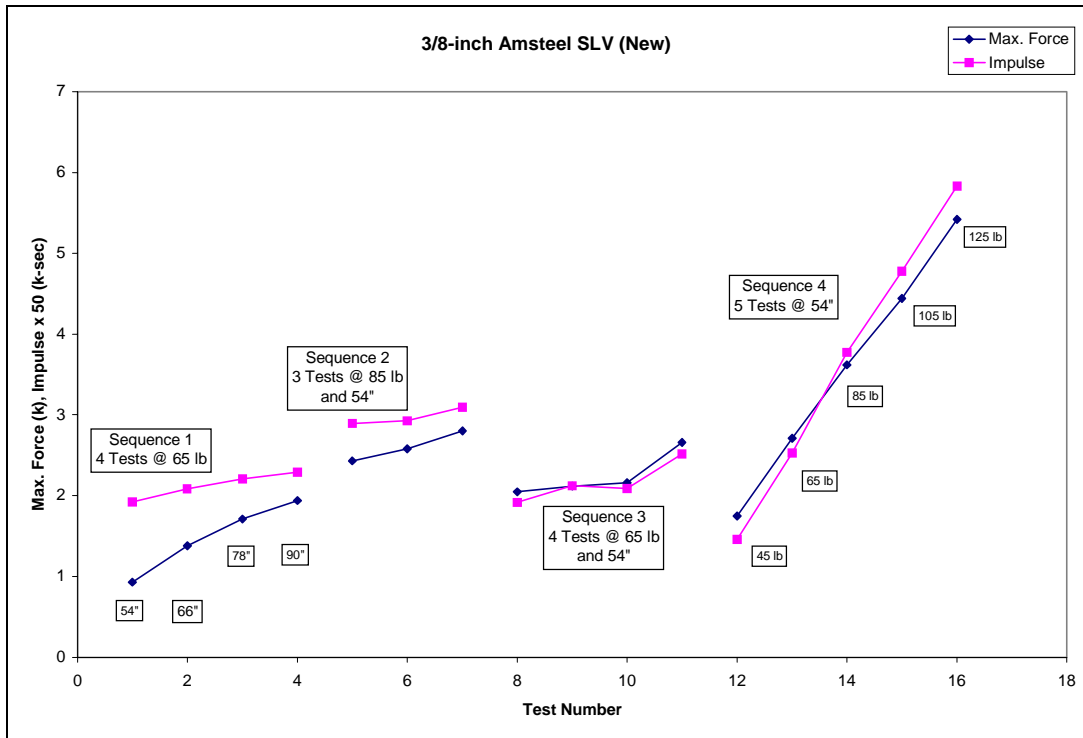


Figure A.7.3: 3/8 in. Amsteel SLV – New – Maximum Force and Impulse

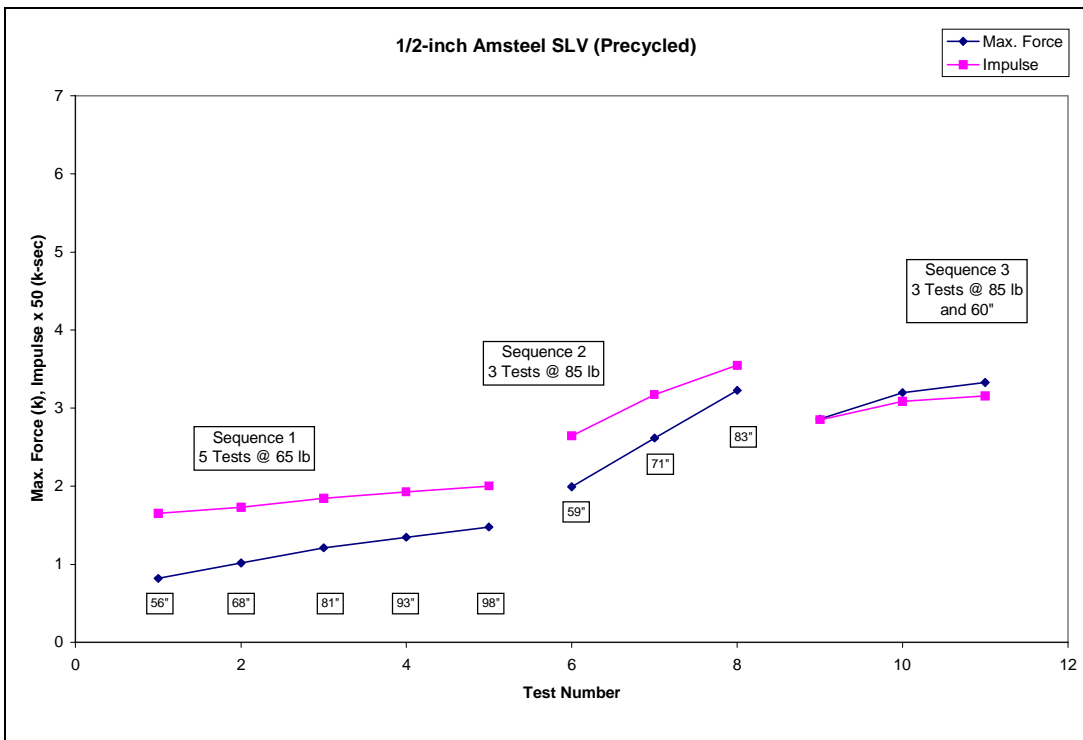


Figure A.7.4: 1/2 in. Amsteel SLV – Precycled – Maximum Force and Impulse

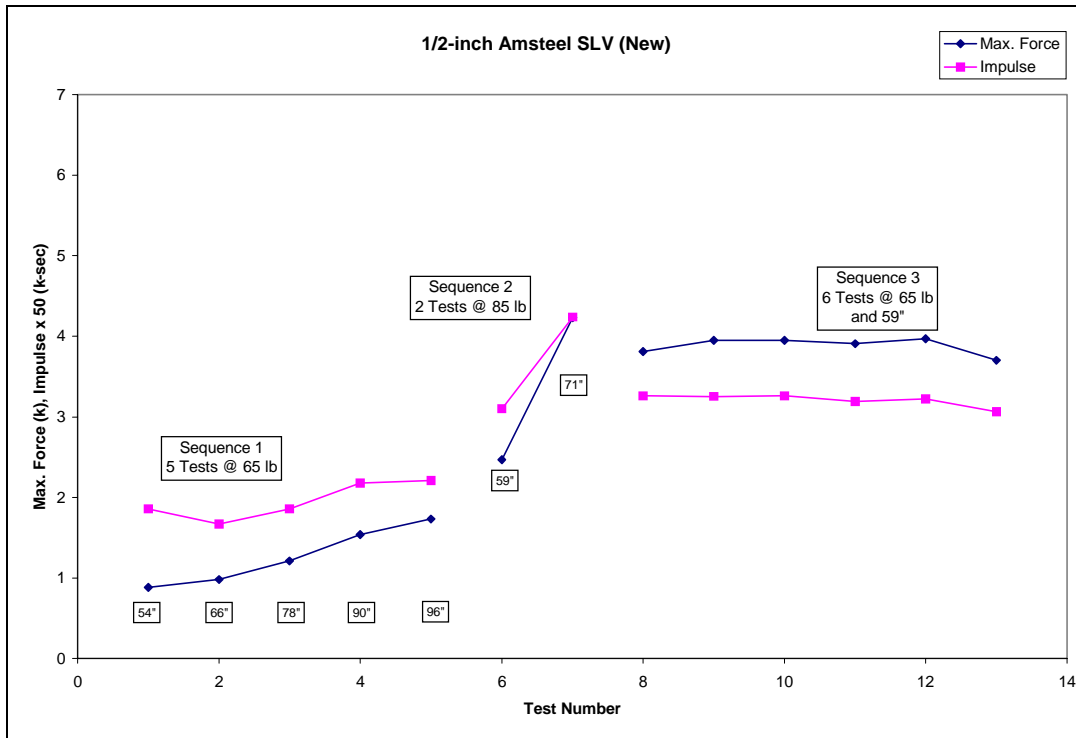


Figure A.7.5: 1/2 in. Amsteel SLV – New – Maximum Force and Impulse



## A.8 Dura Plex Dynamic Test Comparisons

3/8-in. Dura Plex - Precycled - 7ft					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	78	65	1.07	0.0577	0.109
2	72	65	1.27	0.0767	0.1244
3	66	65	1.27	0.0769	0.1312
4	60	65	1.22	0.0737	0.1306
5	54	85	0.98	0.0519	0.1016
6	54	105	1.31	0.0869	0.1216
7	54	125	1.69	0.1275	0.1596

Table A.8.1: Dura Plex Dynamic Test Data

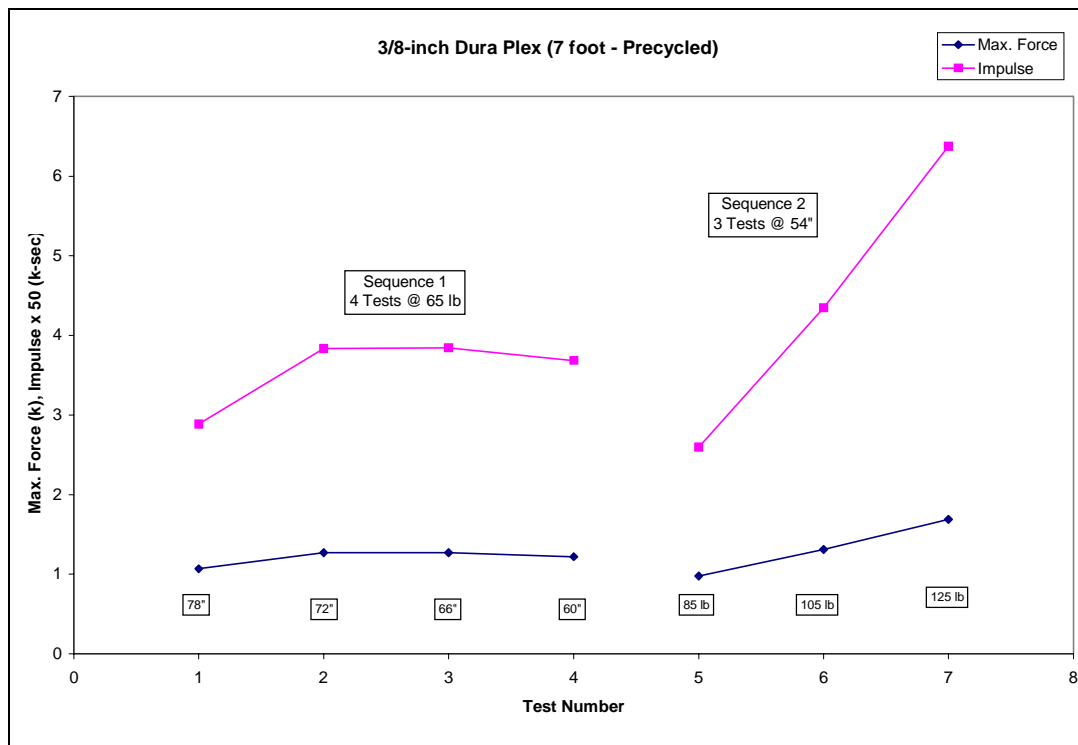


Figure A.8.1: 3/8 in. Dura Plex (7 ft) – Precycled – Maximum Force and Impulse

## A.9 QS Polytron Dynamic Test Comparisons

3/8-in. QS Polytron - Recycled					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	67	25	0.42	0.0171	0.1040
2	73	25	0.69	0.0320	0.1046
3	79	25	0.62	0.0290	0.1134
4	85	25	0.74	0.0332	0.1036
5	55	45	0.97	0.0508	0.1166
6	61	45	1.05	0.0525	0.1042

3/8-in. QS Polytron - New					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	54	45	0.81	0.0438	0.1086
2	60	45	0.94	0.0499	0.1174

3/8-in. QS Polytron - New					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	62	25	0.72	0.0227	0.1022
2	68	25	0.87	0.0266	0.0962
3	74	25	0.83	0.0300	0.0972

Table A.9.1: QS Polytron Dynamic Test Data

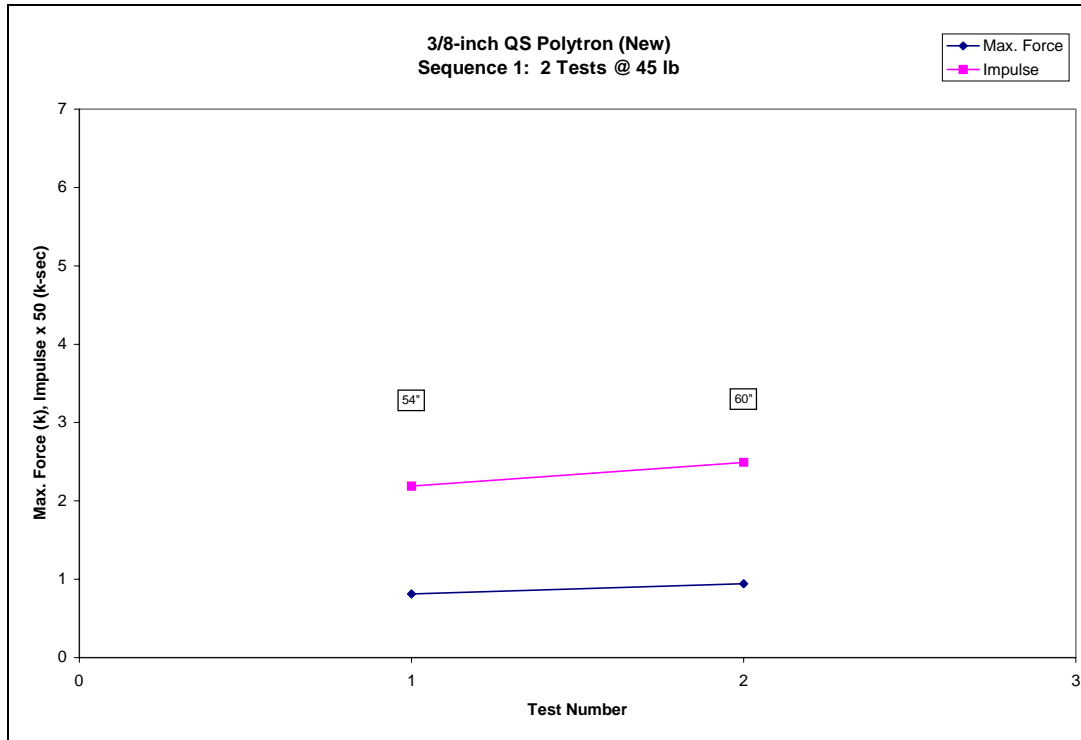


Figure A.9.1: 3/8 in. QS Polytron – New – Maximum Force and Impulse

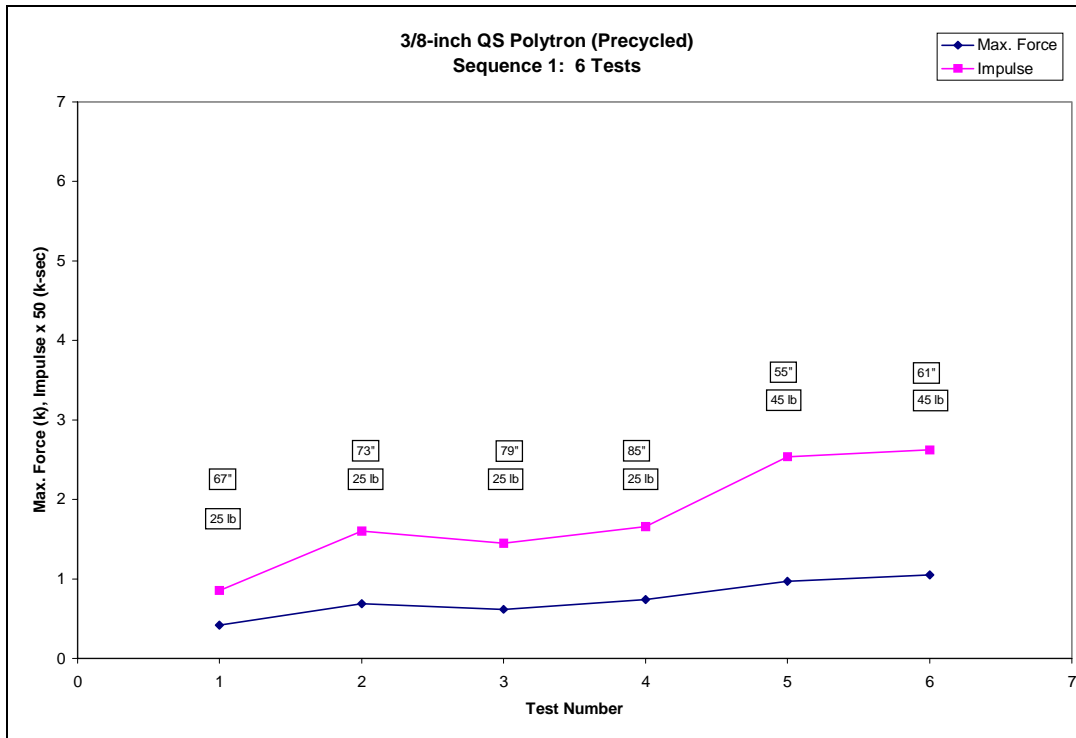


Figure A.9.2: 1/2 in. QS Polytron – Precycled – Maximum Force and Impulse

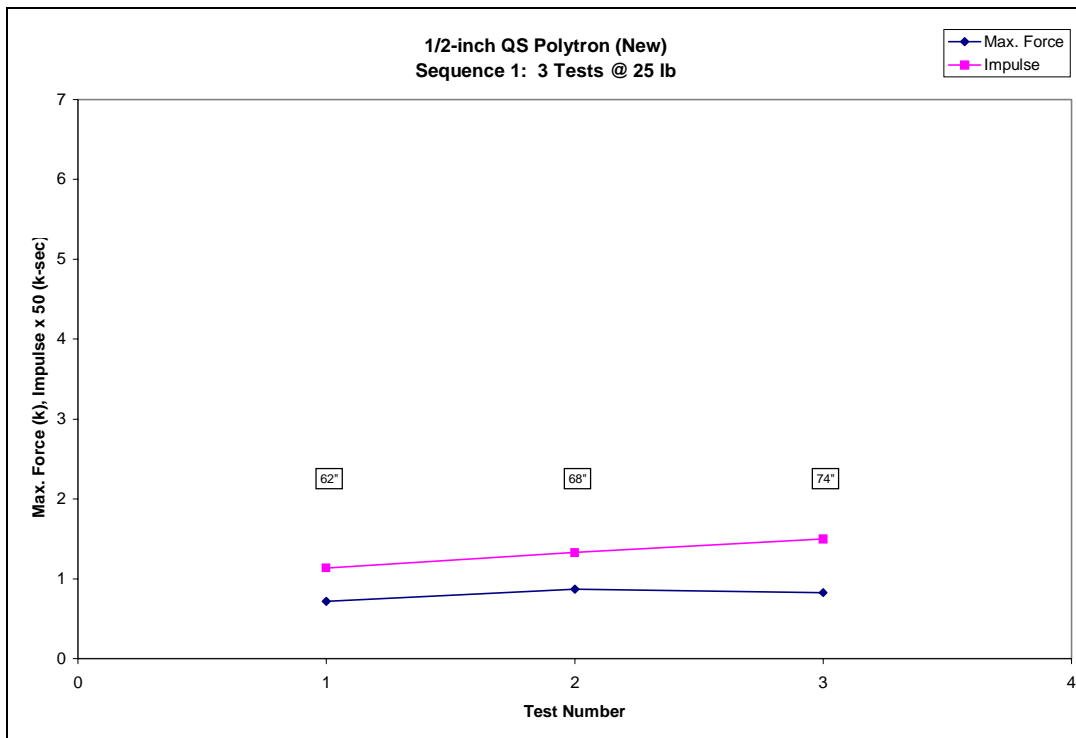


Figure A.9.3: 1/2 in. QS Polytron – New – Maximum Force and Impulse

## A.10 RP Polyester Dynamic Test Comparisons

3/4-in. RP Polyester - Recycled					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	54	45	1.22	0.0418	0.1186
2	54	45	1.24	0.0408	0.1122
3	54	45	1.12	0.0402	0.1152
4	54	45	0.81	0.0323	0.1168
5	60	45	1.16	0.0457	0.1106

3/4-in. RP Polyester - New					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	53	45	0.88	0.0405	0.1066
2	59	45	0.94	0.0428	0.1102
3	65	45	1.04	0.0477	0.1074
4	71	45	1.00	0.0492	0.1328
5	77	45	1.00	0.0487	0.1180

Table A.10.1: RP Polyester Dynamic Test Data

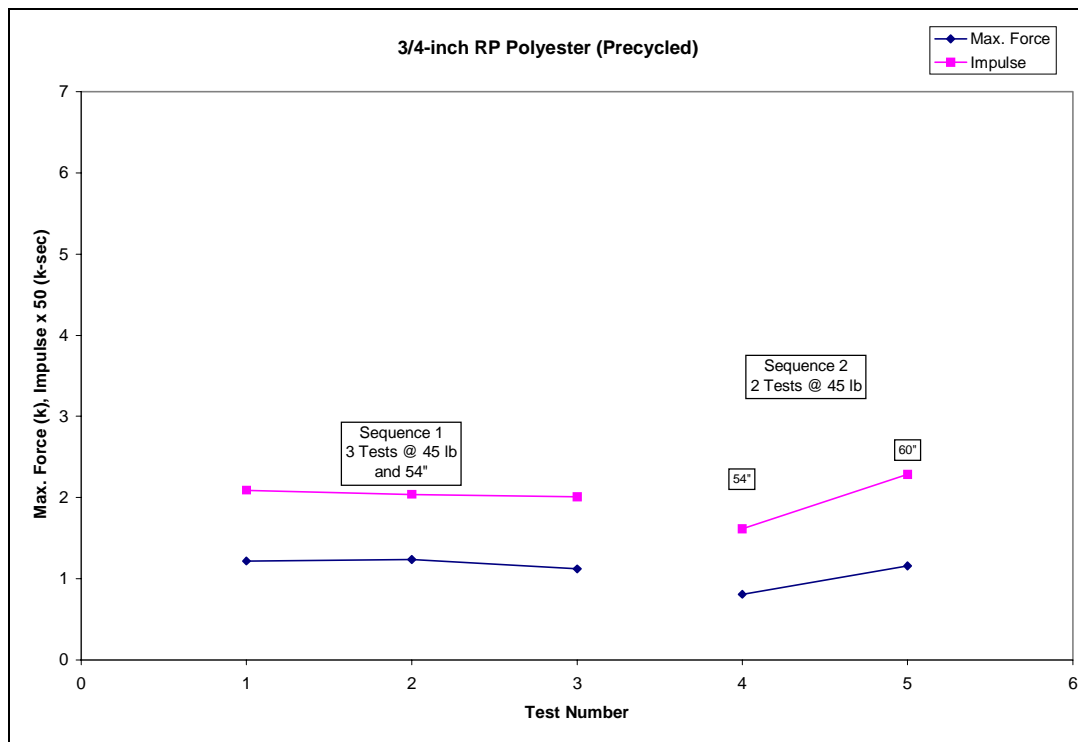


Figure A.10.1: 3/4 in. RP Polyester – Recycled – Maximum Force and Impulse

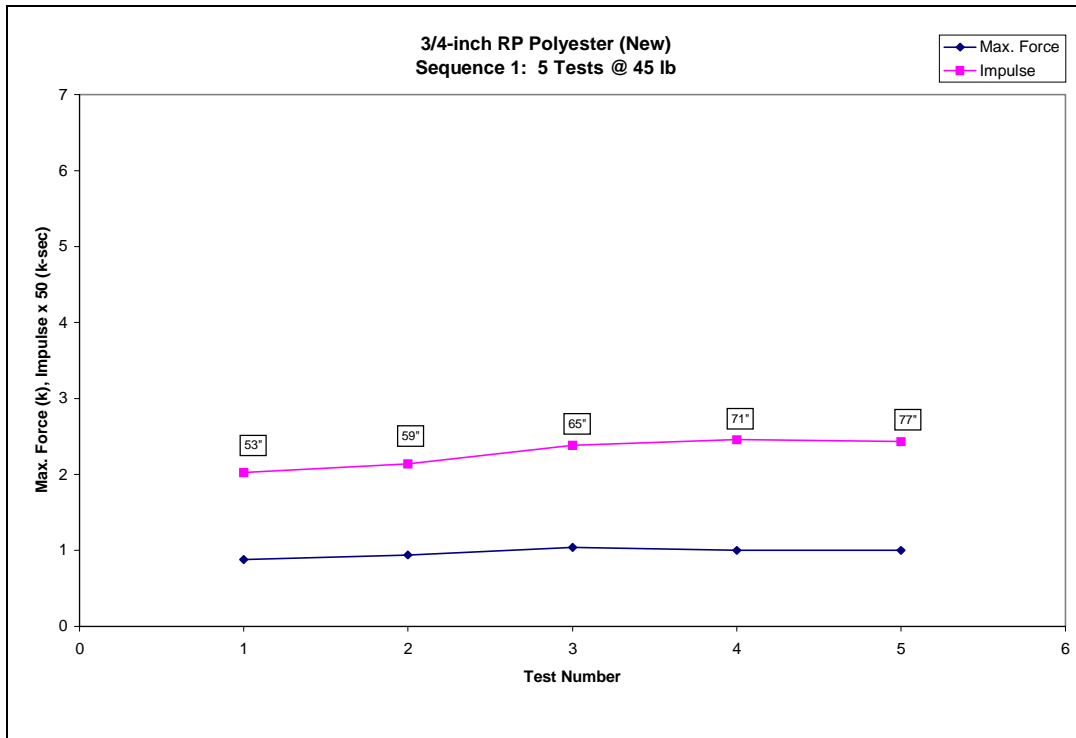


Figure A.10.2: 3/4 in. RP Polyester – New – Maximum Force and Impulse

### A.11 RP Ultra Blue Dynamic Test Comparisons

3/4-in. RP Ultra Blue - Precycled						3/4-in. RP Ultra Blue - New					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)	Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	54	65	1.09	0.0429	0.0878	1	53	65	0.94	0.0409	0.1144
2	66	65	1.51	0.0614	0.1088	2	53	65	1.23	0.0502	0.1002
3	78	65	1.75	0.0674	0.1030	3	53	65	1.35	0.0624	0.1198
4	90	65	1.60	0.0587	0.0918	4	53	65	1.55	0.0649	0.1262
5	96	65	1.95	0.0736	0.0918	5	53	65	1.32	0.0513	0.0950
6	58	85	1.51	0.0608	0.0820	6	58	85	1.50	0.0604	0.0884
7	70	85	1.79	0.0694	0.0890	7	58	85	1.88	0.0770	0.0980
8	82	85	2.19	0.0907	0.1090	8	58	85	2.14	0.0901	0.1214
9	94	85	2.16	0.0828	0.0870	9	58	85	1.91	0.0705	0.0824
10	59	105	2.10	0.0872	0.0988	10	53	65	1.16	0.0395	0.0952
11	59	105	2.44	0.1004	0.1204	11	53	85	1.66	0.0666	0.1094
12	59	105	2.18	0.0865	0.0968	12	53	105	2.33	0.0902	0.1066
						13	53	105	2.34	0.0847	0.1088
						14	53	85	1.89	0.0750	0.1088
						15	53	65	1.63	0.0626	0.1074
						16	53	45	1.23	0.0387	0.1030

Table A.11.1: RP Ultra Blue Dynamic Test Data

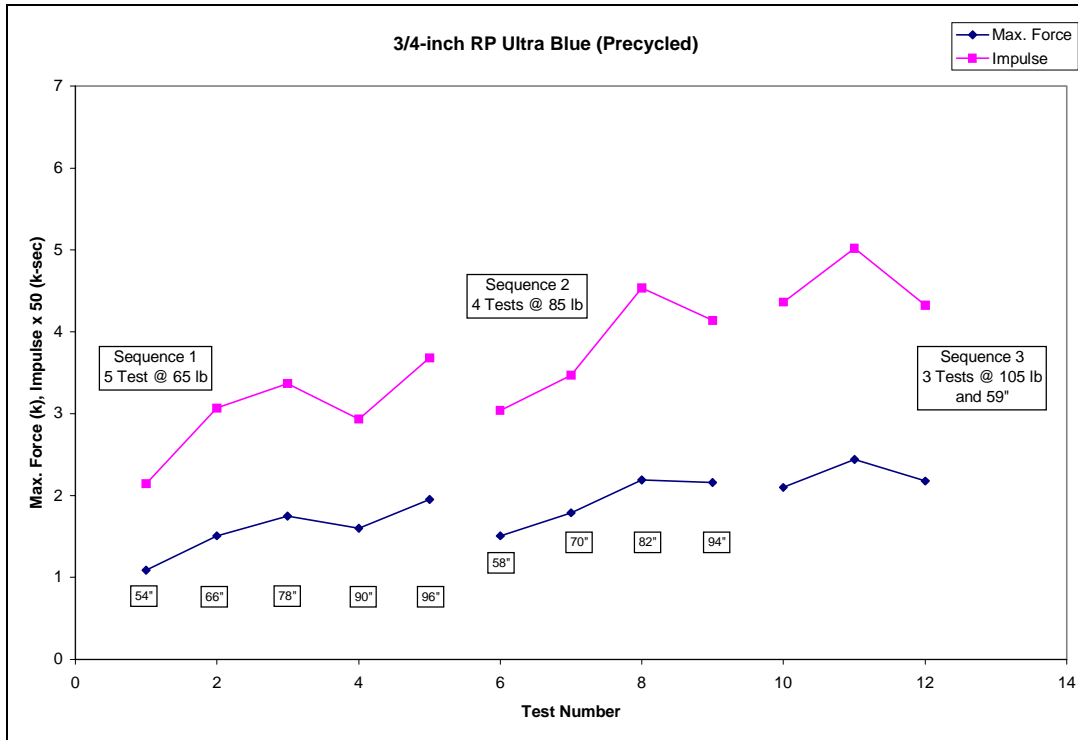


Figure A.11.1: 3/4 in. RP Ultra Blue – Precycled – Maximum Force and Impulse

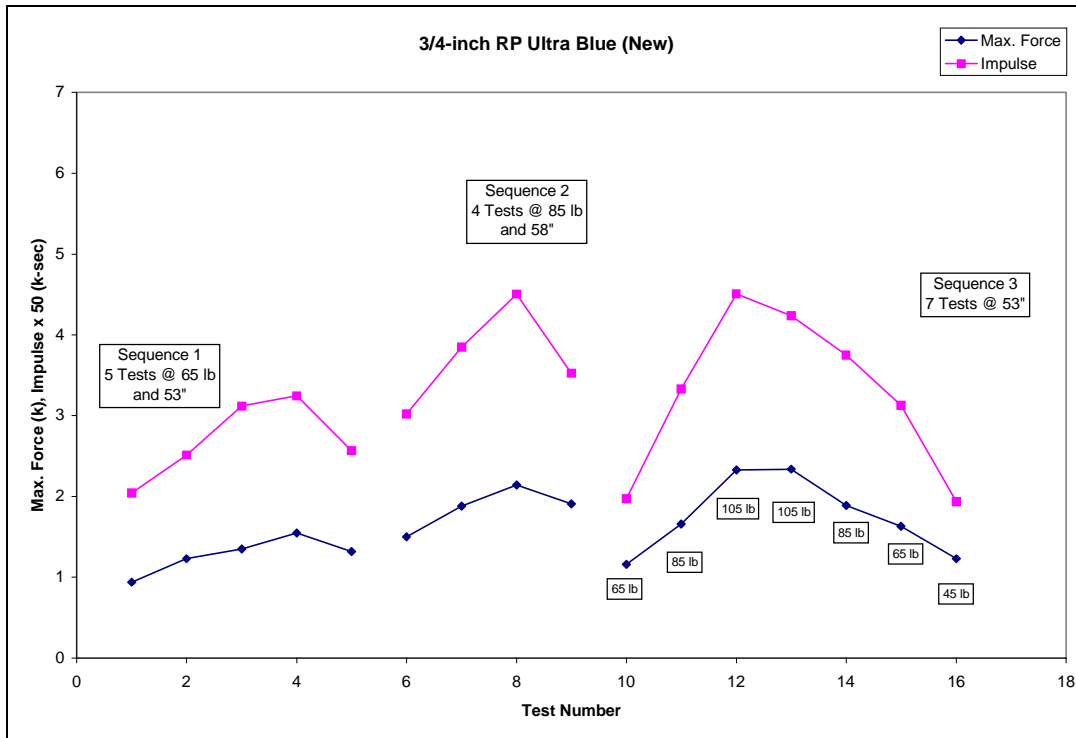


Figure A.11.2: 3/4 in. RP Ultra Blue – New – Maximum Force and Impulse

## A.12 SSR 1200 Dynamic Test Comparisons

3/4-in. SSR 1200 - Precycled					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	96	65	1.16	0.0539	0.1004
2	90	65	1.57	0.0619	0.0994
3	84	65	1.67	0.0669	0.1016
4	78	65	1.52	0.0541	0.0926
5	72	65	1.60	0.0560	0.0986
6	66	65	1.58	0.0581	0.1016
7	59	85	2.18	0.0851	0.1266
8	71	85	1.95	0.0743	0.1052

3/4-in. SSR 1200 - New					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	96	65	1.24	0.0532	0.1198
2	90	65	1.77	0.0645	0.0812

Table A.12.1: SSR 1200 Dynamic Test Data

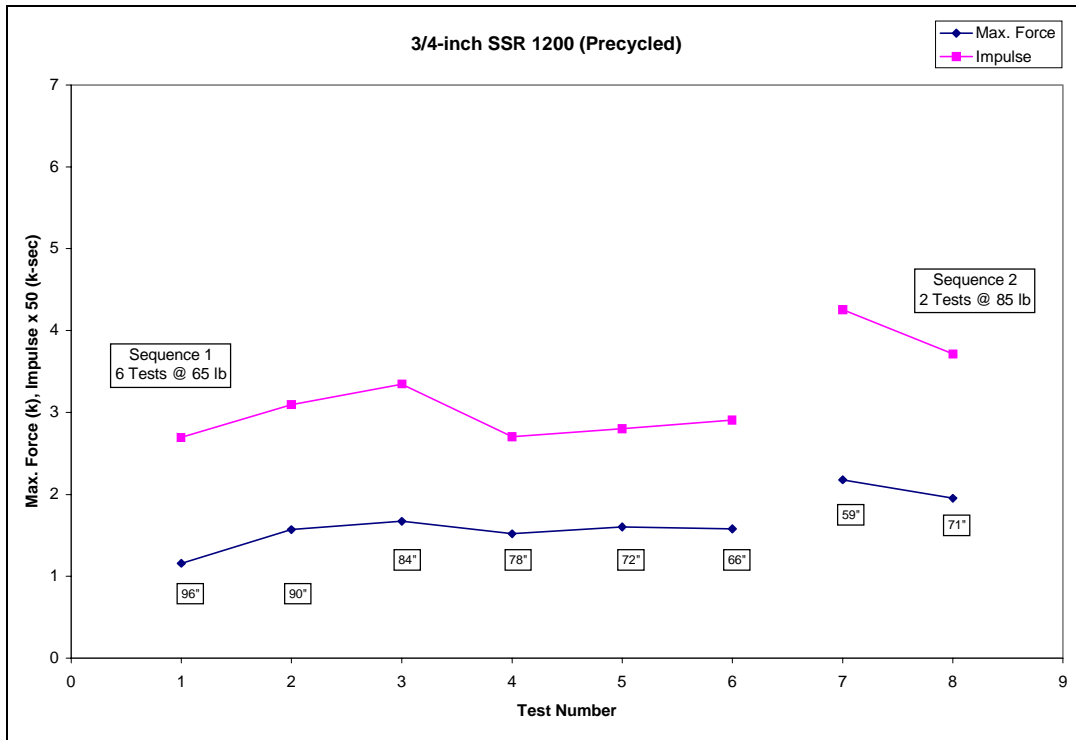


Figure A.12.1: 3/4 in. SSR 1200 – Precycled – Maximum Force and Impulse



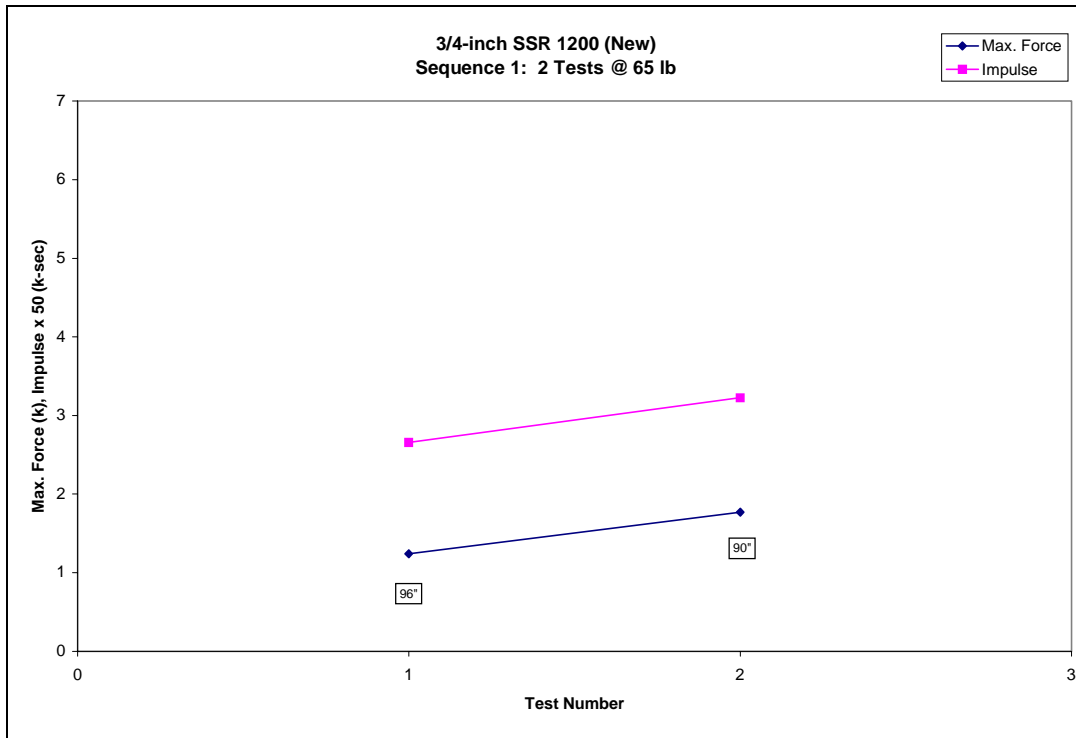


Figure A.12.2: 3/4 in. SSR 1200 – New – Maximum Force and Impulse

### A.13 Tech 12 Dynamic Test Comparisons

3/8-in. Tech 12 - Precycled					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	56	65	1.69	0.0424	0.0578
2	68	65	2.44	0.0529	0.0596
3	80	65	2.95	0.0630	0.0584
4	92	65	3.24	0.0668	0.0482
5	59	85	3.31	0.0754	0.0572
6	71	85	3.71	0.0820	0.0562
7	83	85	3.75	0.0764	0.0490
8	59	105	4.25	0.0957	0.0474
9	59	105	4.48	0.1022	0.0558
10	59	105	4.41	0.0997	0.0510

3/8-in. Tech 12 - New					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	56	65	0.86	0.0277	0.0846
2	68	65	2.74	0.0591	0.0524
3	80	65	3.22	0.0665	0.0560
4	92	65	3.81	0.0764	0.0558
5	59	85	3.84	0.0851	0.0694
6	71	85	4.31	0.0915	0.0630
7	83	85	4.73	0.0976	0.0590
8	59	105	4.68	0.1064	0.0630
9	59	105	4.64	0.1045	0.0560

1/2-in. Tech 12 - Precycled					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	54	65	1.21	0.0369	0.0826
2	66	65	1.85	0.0459	0.0690
3	78	65	2.29	0.0528	0.0586
4	90	65	2.75	0.0608	0.0690
5	96	65	2.51	0.0521	0.0536
6	58	85	3.15	0.0692	0.0554
7	70	85	3.51	0.0774	0.0626
8	82	85	3.79	0.0824	0.0720
9	94	85	4.18	0.0883	0.0654
10	58	105	4.16	0.0936	0.0824
11	58	105	4.26	0.0945	0.0682
12	58	105	4.26	0.0947	0.0750

1/2-in. Tech 12 - New					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	54	65	1.05	0.0363	0.0718
2	66	65	1.79	0.0473	0.0768
3	78	65	2.20	0.0538	0.0810
4	90	65	2.16	0.0484	0.0636
5	96	65	2.59	0.0557	0.0698
6	58	85	2.88	0.0686	0.0758
7	70	85	3.32	0.0741	0.0600
8	82	85	3.38	0.0695	0.0522
9	94	85	4.05	0.0852	0.0614
10	58	105	4.07	0.0919	0.0916
11	58	105	4.26	0.0937	0.0862
12	58	105	4.27	0.0939	0.0924
13	54	45	1.09	0.0250	0.0640
14	54	65	2.07	0.0470	0.0626
15	54	85	3.04	0.0677	0.0582
16	54	105	4.05	0.0919	0.0766
17	54	125	4.84	0.1119	0.0668
18	54	125	4.97	0.1139	0.0670
19	54	105	4.38	0.0946	0.0746
20	54	85	3.57	0.0749	0.0624
21	54	65	2.72	0.0549	0.0660
22	54	45	1.73	0.0346	0.0626

Table A.13.1: Tech 12 Dynamic Test Data

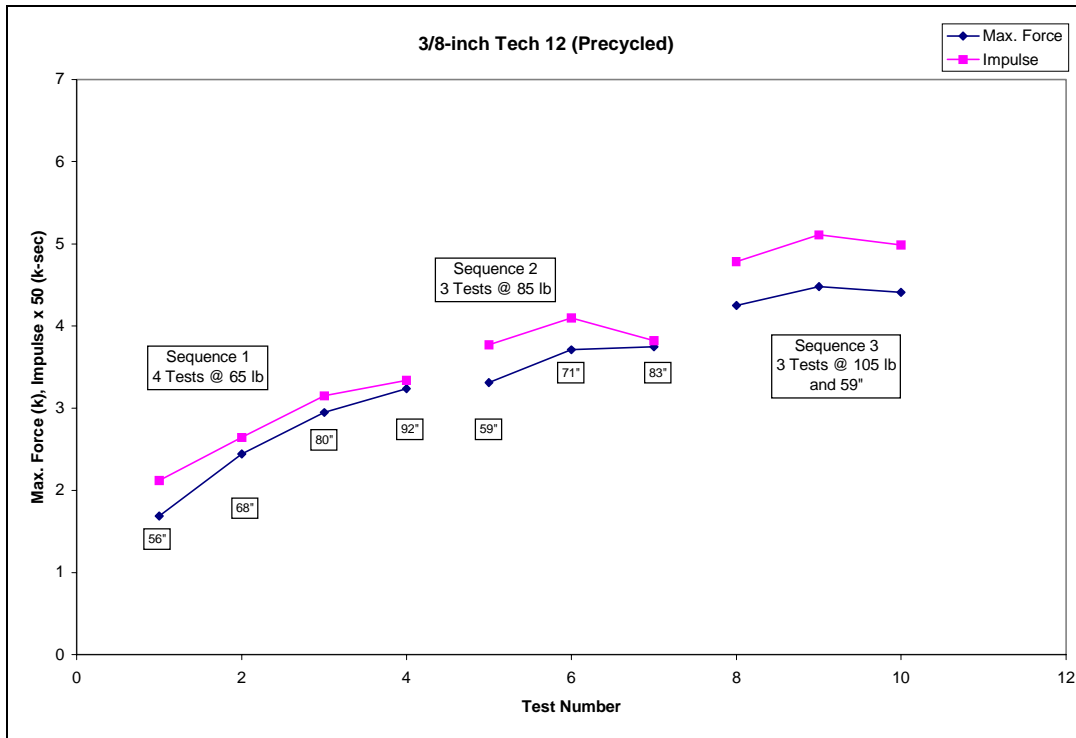


Figure A.13.1: 3/8 in. Tech 12 – Precycled – Maximum Force and Impulse

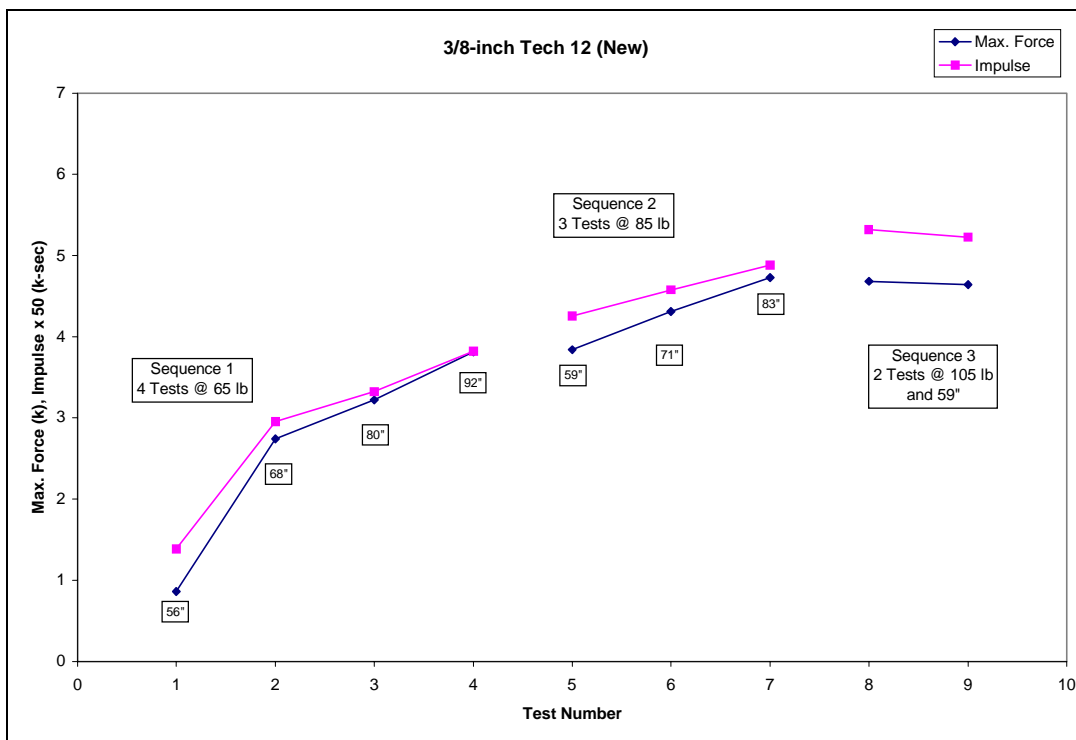


Figure A.13.2: 3/8 in. Tech 12 – New – Maximum Force and Impulse

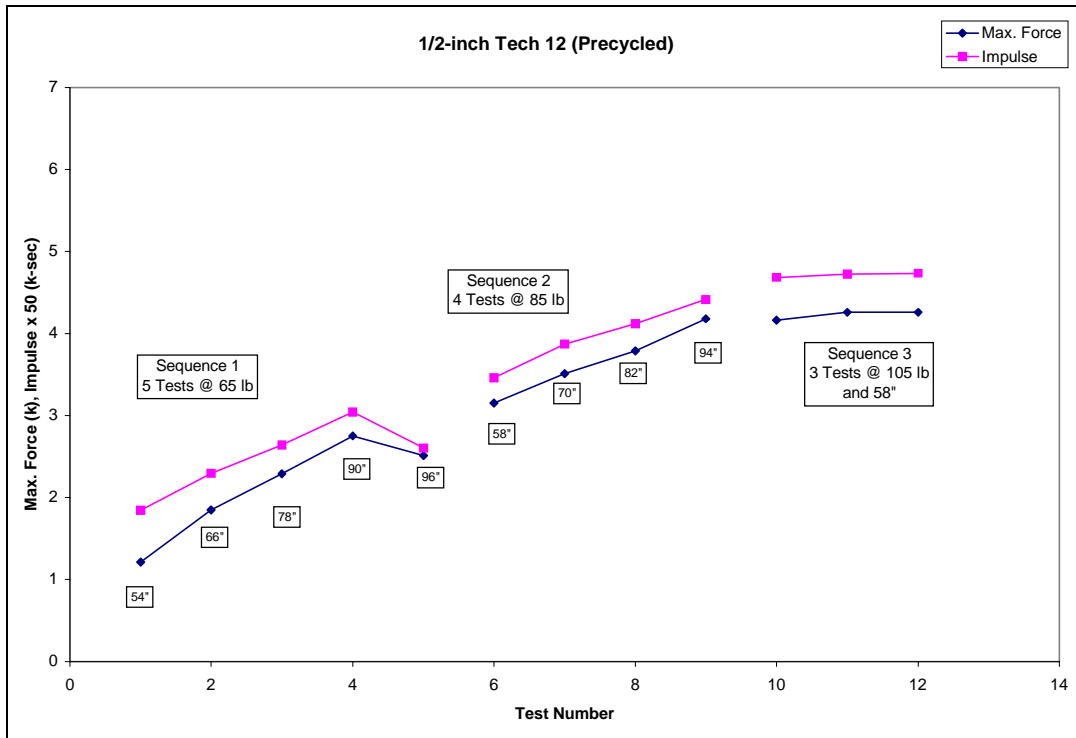


Figure A.13.3: 1/2 in. Tech 12 – Precycled – Maximum Force and Impulse

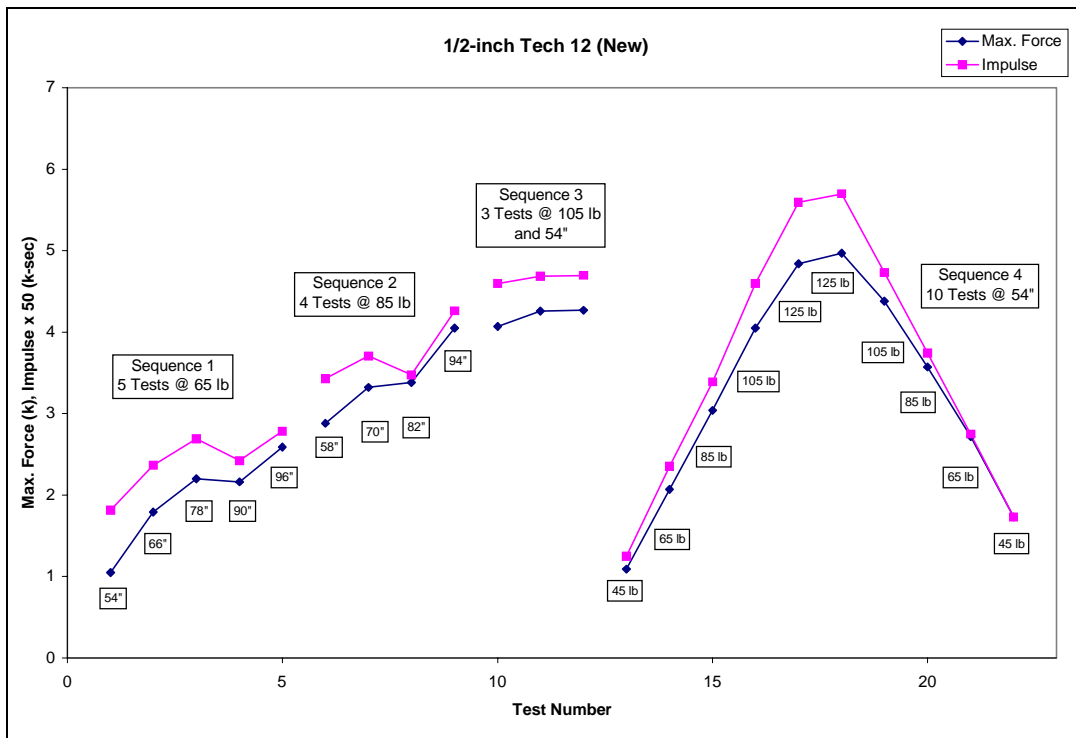


Figure A.13.4: 1/2 in. Tech 12 – New – Maximum Force and Impulse

## A.14 Tenex Dynamic Test Comparisons

3/8-in. Tenex - Precycled					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	54	45	0.49	0.0246	0.1146
2	59	45	0.72	0.0369	0.1190
3	59	45	0.73	0.0367	0.1154
4	59	45	0.71	0.0362	0.1230

3/8-in. Tenex - New					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	55	45	0.54	0.0264	0.0264
2	61	45	0.83	0.0325	0.0325

1/2-in. Tenex - Precycled					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	91	65	1.130	0.0502	0.0956
2	55	45	1.110	0.0349	0.0824
3	61	45	1.200	0.0430	0.0910

1/2-in. Tenex - New					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	54	45	0.94	0.0368	0.0948
2	60	45	0.94	0.0368	0.0948
3	66	45	0.94	0.0395	0.1078
4	72	45	1.01	0.0423	0.1024
5	78	45	1.06	0.0427	0.1154

Table A.14.1: Tenex Dynamic Test Data

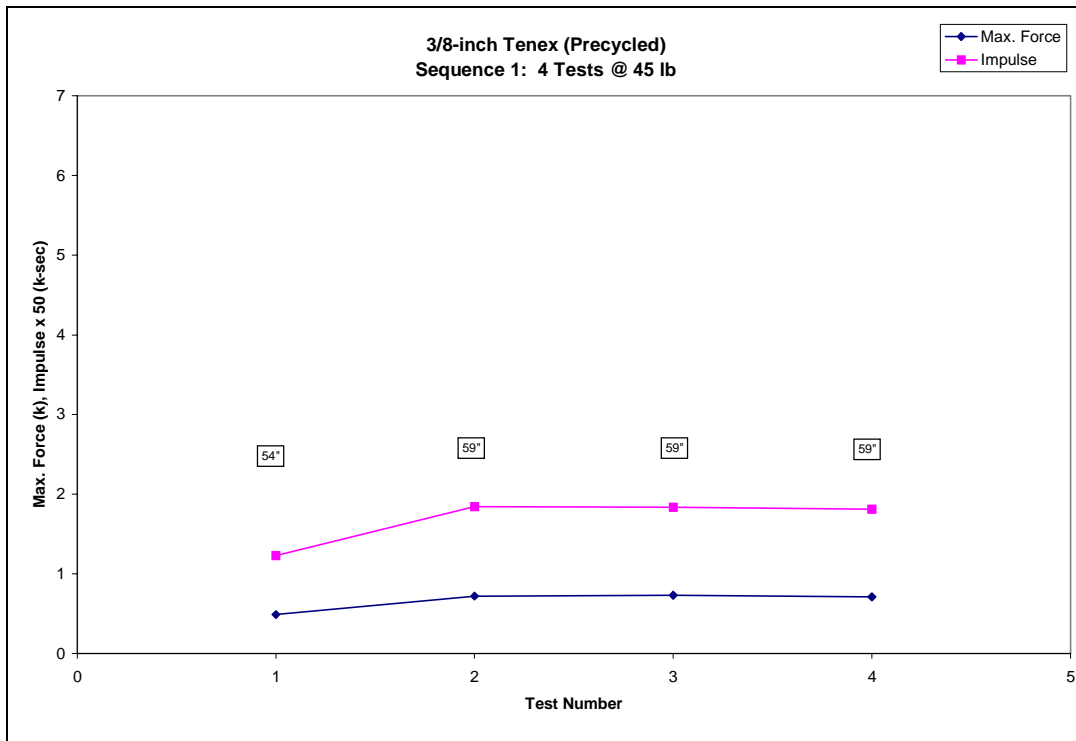


Figure A.14.1: 3/8 in. Tenex – Precycled – Maximum Force and Impulse

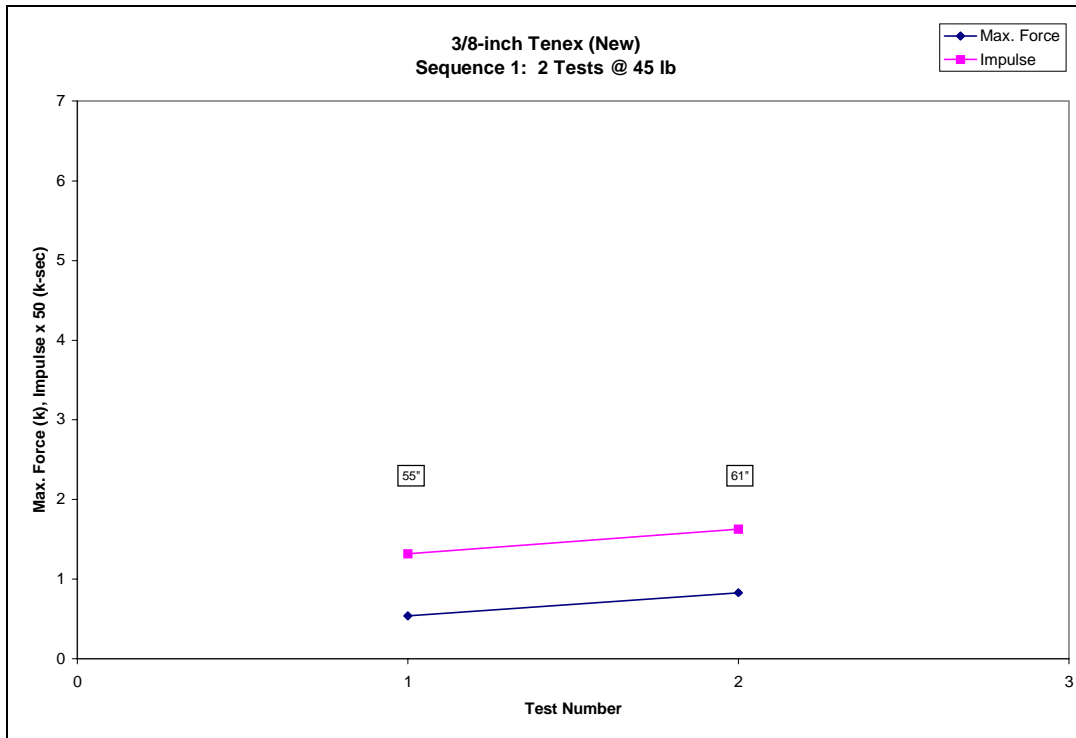


Figure A.14.2: 3/8 in. Tenex – New – Maximum Force and Impulse

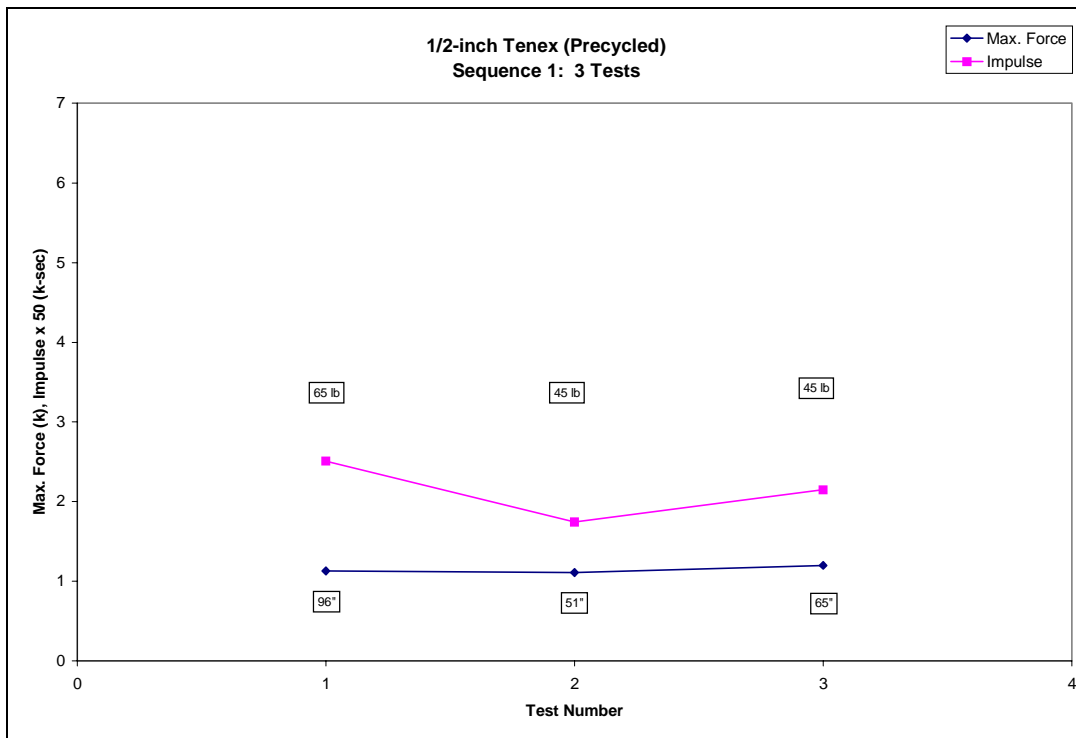


Figure A.14.3: 1/2 in. Tenex – Precycled – Maximum Force and Impulse

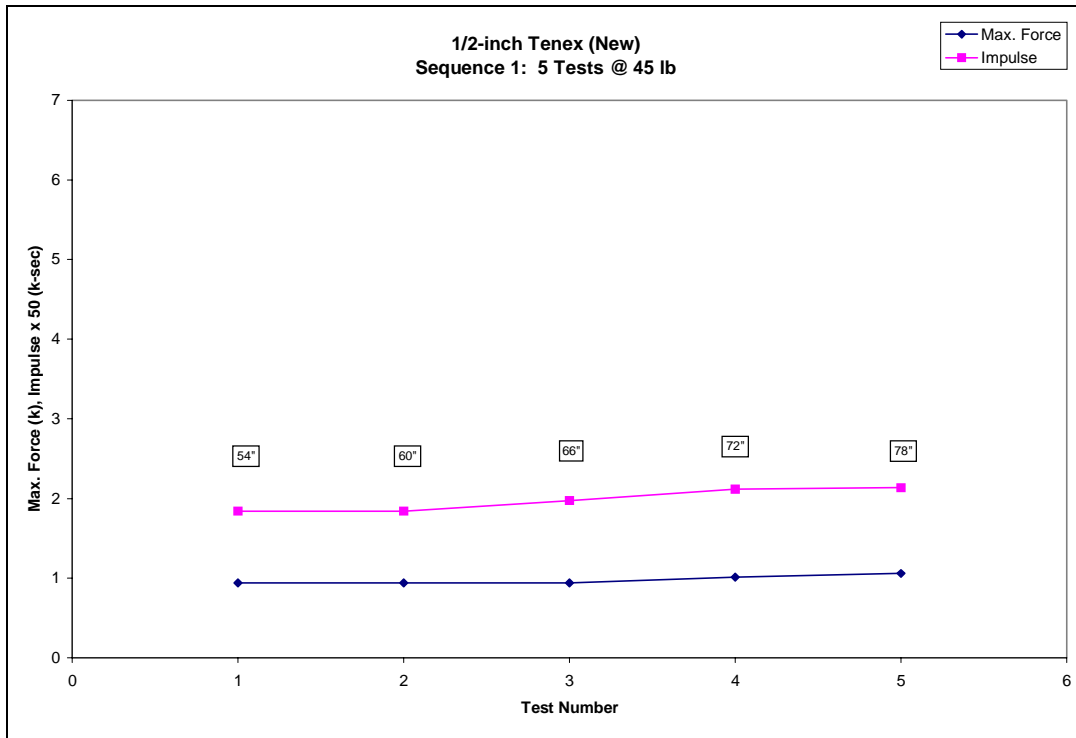


Figure A.14.4: 1/2 in. Tenex – New – Maximum Force and Impulse

### A.15 XLS Yacht Braid Dynamic Test Comparisons

3/8-in. XLS Yach Braid - Precycled - 7ft					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	48	105	0.99	0.0807	0.1504
2	48	85	1.20	0.0856	0.1438
3	48	65	0.94	0.0662	0.1374
4	48	45	0.75	0.0488	0.1244

Table A.15.1: XLS Yacht Braid Dynamic Test Data

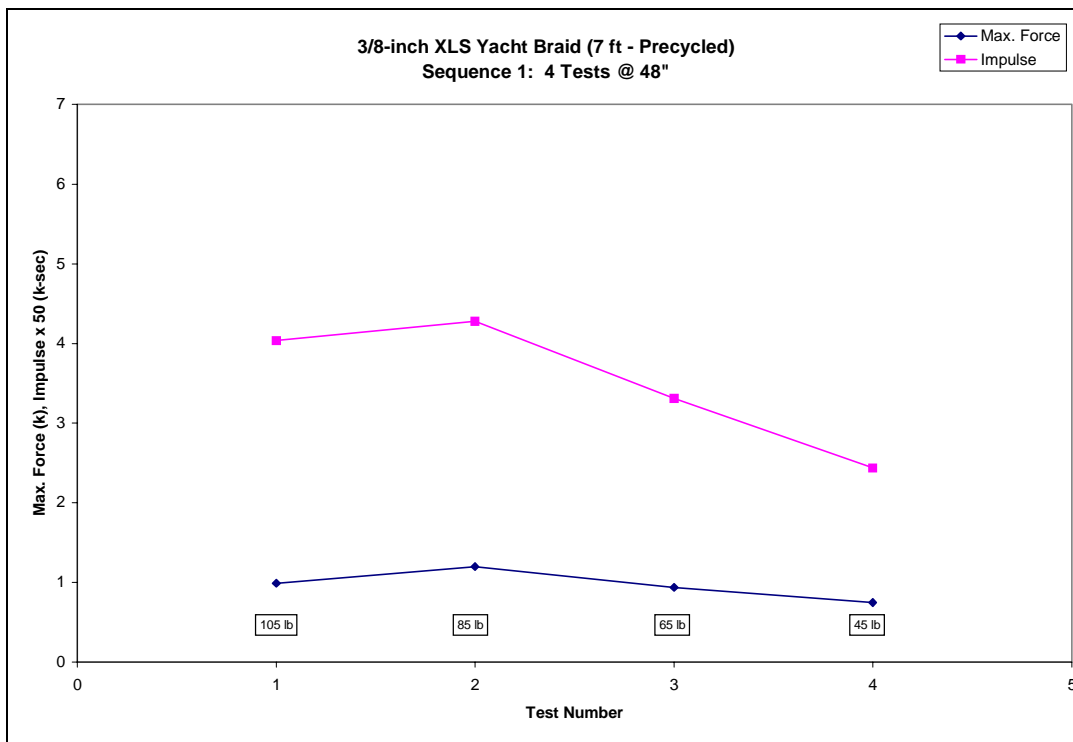


Figure A.15.1: 3/8 in. XLS Yacht Braid – Precycled – Maximum Force and Impulse



A.16 Comparison of Dynamic Test Sequences with Constant Drop Heights and Weights

1/2-inch Amsteel II (Precycled)					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	56	85	3.20	0.0603	0.0430
2	56	85	4.08	0.0735	0.0440
3	56	85	4.37	0.0757	0.0466
4	56	85	3.96	0.0670	0.0454
5	56	85	4.21	0.0722	0.0464
6	56	85	4.30	0.0742	0.0438
7	57	105	4.24	0.0758	0.0508
8	57	105	4.59	0.0846	0.0430
9	57	105	4.85	0.0871	0.0428
10	57	105	5.10	0.0908	0.0456
11	57	105	5.49	0.0974	0.0428

1/2-inch Amsteel II (New)					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	56	85	2.88	0.0579	0.0650
2	56	85	3.23	0.0619	0.0622
3	56	85	3.38	0.0640	0.0614
4	56	85	3.36	0.0656	0.0734
5	56	85	3.17	0.0587	0.0616
6	56	85	3.64	0.0665	0.0464
7	57	105	4.61	0.0898	0.0454
8	57	105	5.61	0.1037	0.0378
9	57	105	5.83	0.1055	0.0384
10	57	105	5.88	0.1061	0.0472

1/2-inch Amsteel SLV (Precycled)					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
9	60	85	2.86	0.0570	0.0482
10	60	85	3.20	0.0618	0.0448
11	60	85	3.33	0.0631	0.0454

3/8-inch Amsteel SLV (New)					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
5	54	85	2.43	0.0579	0.0502
6	54	85	2.58	0.0585	0.0484
7	54	85	2.80	0.0619	0.0556
8	54	65	2.05	0.0383	0.0372
9	54	65	2.12	0.0425	0.0460
10	54	65	2.16	0.0418	0.0456
11	54	65	2.66	0.0503	0.0478

3/4-inch RP Polyester (Precycled)					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	54	45	1.22	0.0418	0.1186
2	54	45	1.24	0.0408	0.1122
3	54	45	1.12	0.0402	0.1152

3/4-inch RP Ultra Blue (Precycled)					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
10	59	105	2.10	0.0872	0.0988
11	59	105	2.44	0.1004	0.1204
12	59	105	2.18	0.0865	0.0968

1/2-inch Tech 12 (New)					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
10	58	105	4.07	0.0919	0.0916
11	58	105	4.26	0.0937	0.0862
12	58	105	4.27	0.0939	0.0924

1/2-inch Tech 12 (Precycled)					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
10	58	105	4.16	0.0936	0.0824
11	58	105	4.26	0.0945	0.0682
12	58	105	4.26	0.0947	0.0750

3/4-inch RP Ultra Blue (New)					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
1	53	65	0.94	0.0409	0.1144
2	53	65	1.23	0.0502	0.1002
3	53	65	1.35	0.0624	0.1198
4	53	65	1.55	0.0649	0.1262
5	53	65	1.32	0.0513	0.0950
6	58	85	1.50	0.0604	0.0884
7	58	85	1.88	0.0770	0.0980
8	58	85	2.14	0.0901	0.1214
9	58	85	1.91	0.0705	0.0824

3/8-inch Tech 12 (Precycled)					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Pulse Duration (sec)
8	59	105	4.25	0.0957	0.0474
9	59	105	4.48	0.1022	0.0558
10	59	105	4.41	0.0997	0.0510

Table A.16.1: Dynamic Test Data of Sequences with Constant Drop Heights and Weights

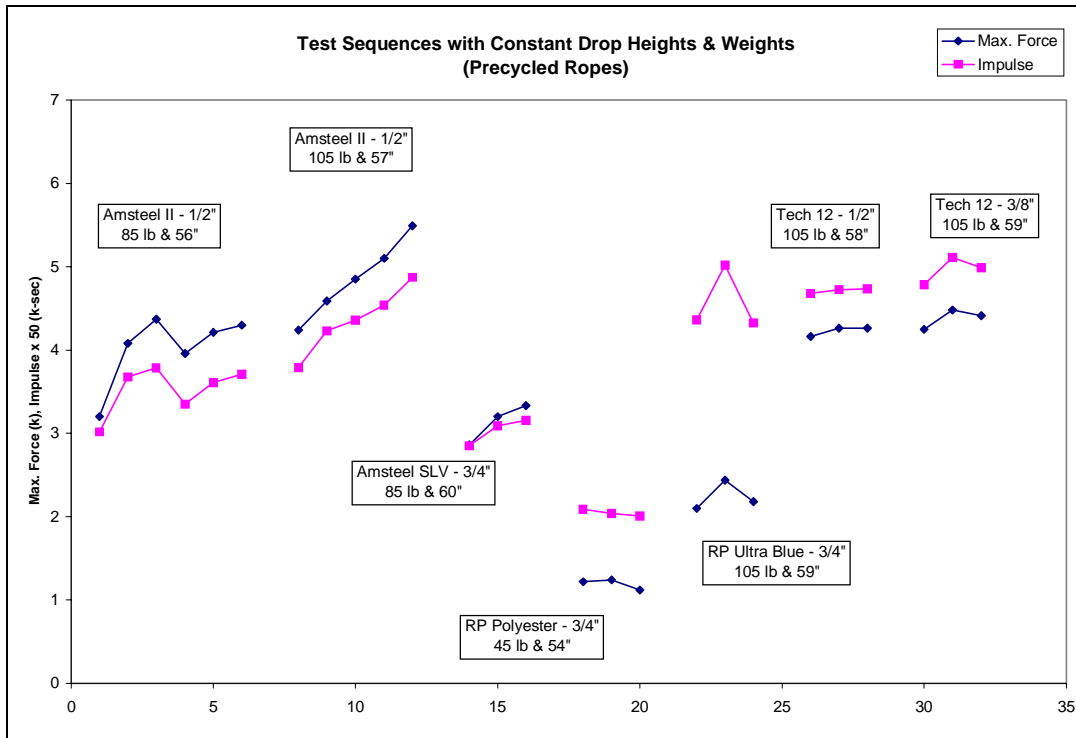


Figure A.16.1: Constant Height and Weight Sequences – Precycled – Maximum Force and Impulse

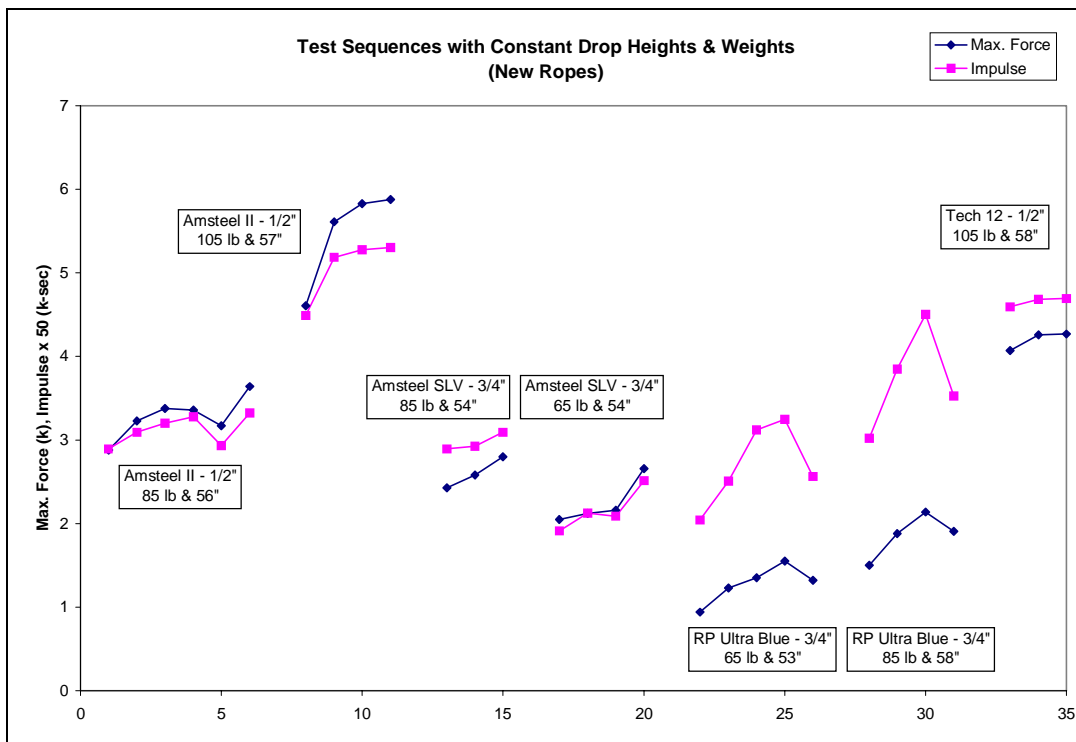


Figure A.16.2: Constant Height and Weight Sequences – New – Maximum Force and Impulse

A.17 Comparison of Dynamic Sequences with Constant Drop Heights and Changing Weights

3/8 in. Amsteel Blue - Recycled					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec.)	Pulse Duration (sec)
1	56	25	0.36	0.0098	0.0632
2	56	65	1.53	0.0395	0.0556
3	56	85	2.60	0.0604	0.0468
4	56	105	3.92	0.0856	0.0484
5	56	125	5.25	0.1138	0.0496

3/8 in. Amsteel Blue - New					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec.)	Pulse Duration (sec)
1	57	45	1.11	0.0263	0.0532
2	57	65	2.05	0.0503	0.0490
3	57	85	3.15	0.0702	0.0440
4	57	105	4.44	0.0955	0.0454
5	57	125	5.61	0.1080	0.0444

3/8 in. Amsteel SLV (7 ft) - Recycled					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec.)	Pulse Duration (sec)
1	64	45	2.21	0.0411	0.0474
2	64	65	2.34	0.0622	0.0434
3	64	105	4.50	0.0888	0.0400
4	64	105	5.64	0.1059	0.0482
5	64	105	6.00	0.1086	0.0422

3/4 in. RP Polyester - New					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec.)	Pulse Duration (sec)
10	53	65	1.16	0.0395	0.0952
11	53	85	1.66	0.0666	0.1094
12	53	105	2.33	0.0902	0.1066
13	53	105	2.34	0.0847	0.1088
14	53	85	1.89	0.0750	0.1088
15	53	65	1.63	0.0626	0.1074
16	53	45	1.23	0.0387	0.1030

3/8 in. Dura Plex (7 ft) Recycled					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec.)	Pulse Duration (sec)
5	54	85	0.98	0.0519	0.1016
6	54	105	1.31	0.0869	0.1216
7	54	125	1.69	0.1275	0.1596

1/2 in. Tech 12 - New					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec.)	Pulse Duration (sec)
13	54	45	1.09	0.0250	0.0640
14	54	65	2.07	0.0470	0.0626
15	54	85	3.04	0.0677	0.0582
16	54	105	4.05	0.0919	0.0766
17	54	125	4.84	0.1119	0.0668
18	54	125	4.97	0.1139	0.0670
19	54	105	4.38	0.0946	0.0746
20	54	85	3.57	0.0749	0.0624
21	54	65	2.72	0.0549	0.0660
22	54	45	1.73	0.0346	0.0626

3/8 in. Yach Braid (7 ft) - Recycled					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec.)	Pulse Duration (sec)
1	48	105	0.99	0.0807	0.1504
2	48	85	1.20	0.0856	0.1438
3	48	65	0.94	0.0662	0.1374
4	48	45	0.75	0.0488	0.1244

Table A.17.1: Dynamic Data of Sequences with Constant Drop Heights and Changing Weights

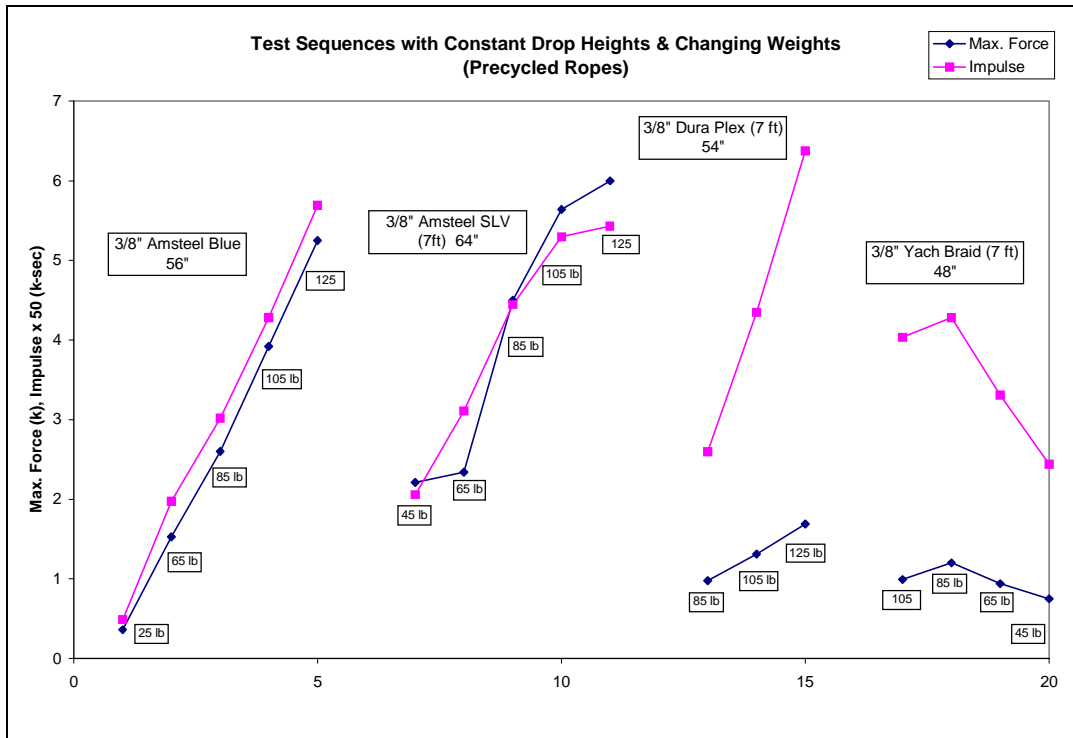


Figure A.17.1: Const. Height & Changing Weight Seq. – Precycled – Max. Force and Impulse

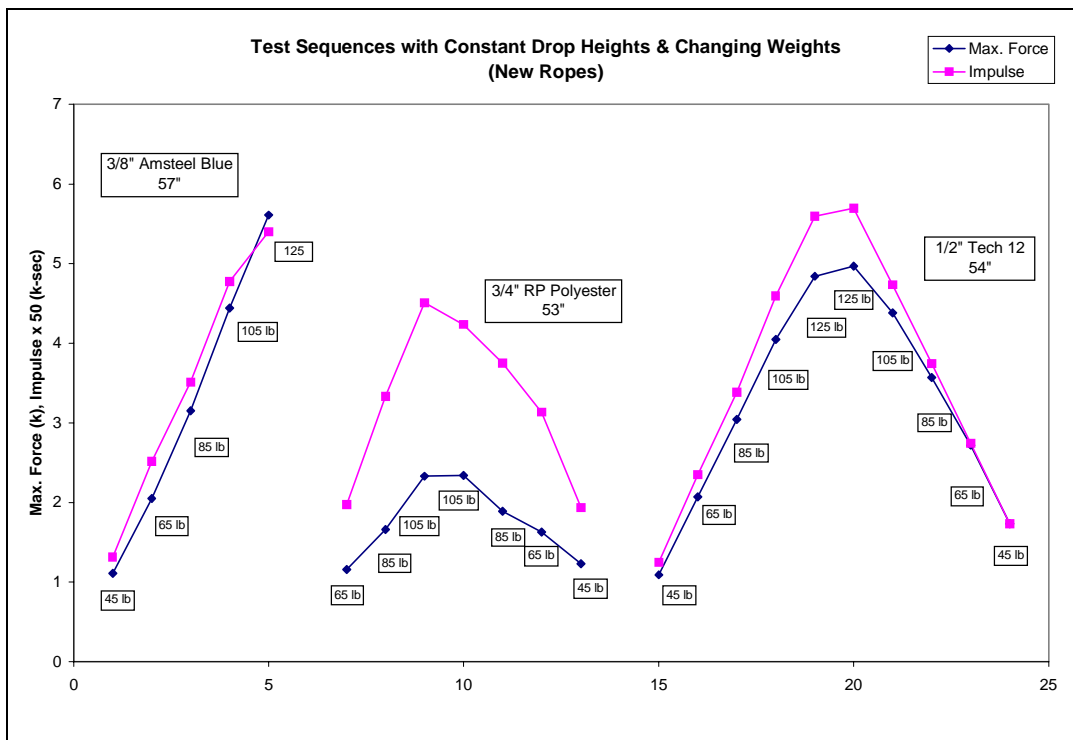


Figure A.17.2: Const. Height & Changing Weight Seq. – New – Max. Force and Impulse

A.18 Amsteel Blue & Amsteel II Follow-Up Dynamic Test Comparisons

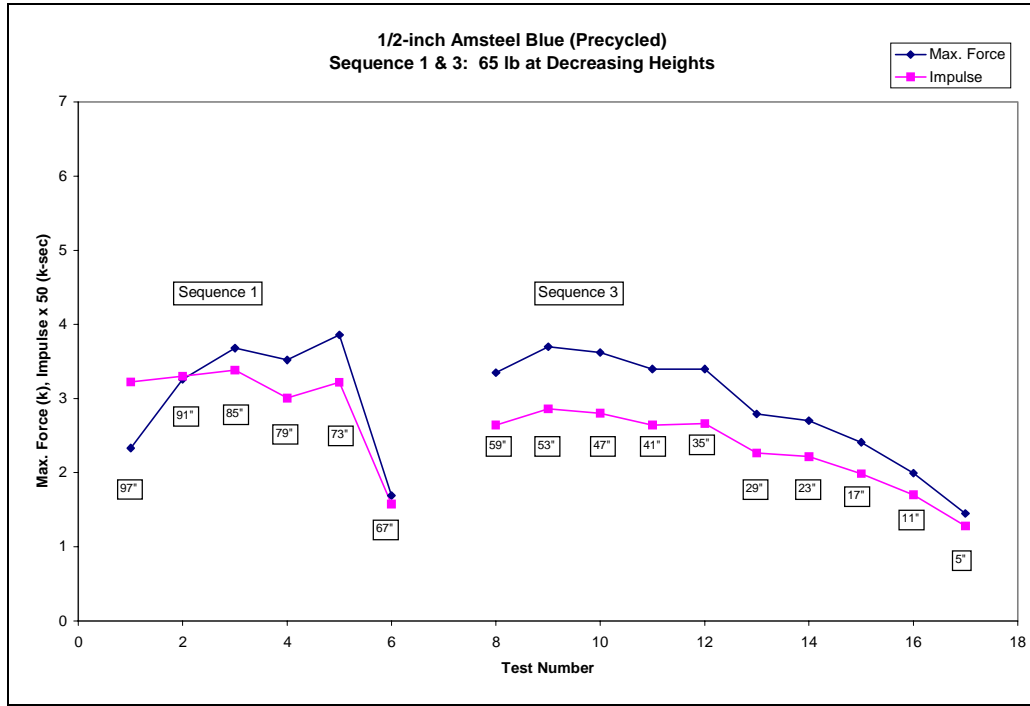


Figure A.18.1: 1/2 in. Amsteel Blue – Precycled – Maximum Force and Impulse

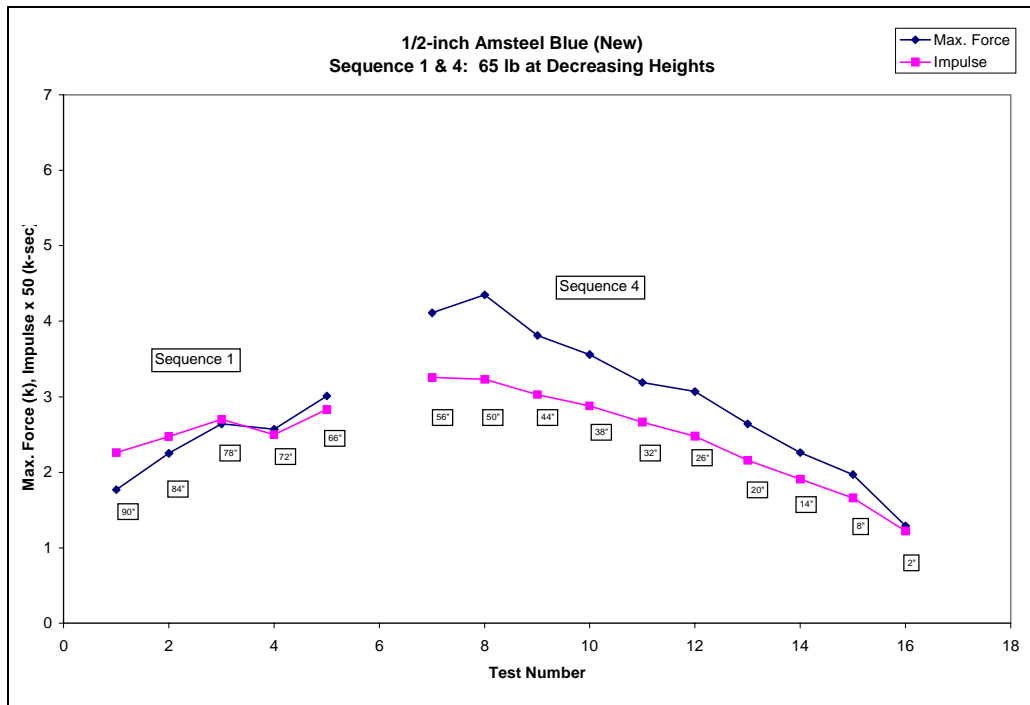


Figure A.18.2: 1/2 in. Amsteel Blue – New – Maximum Force and Impulse

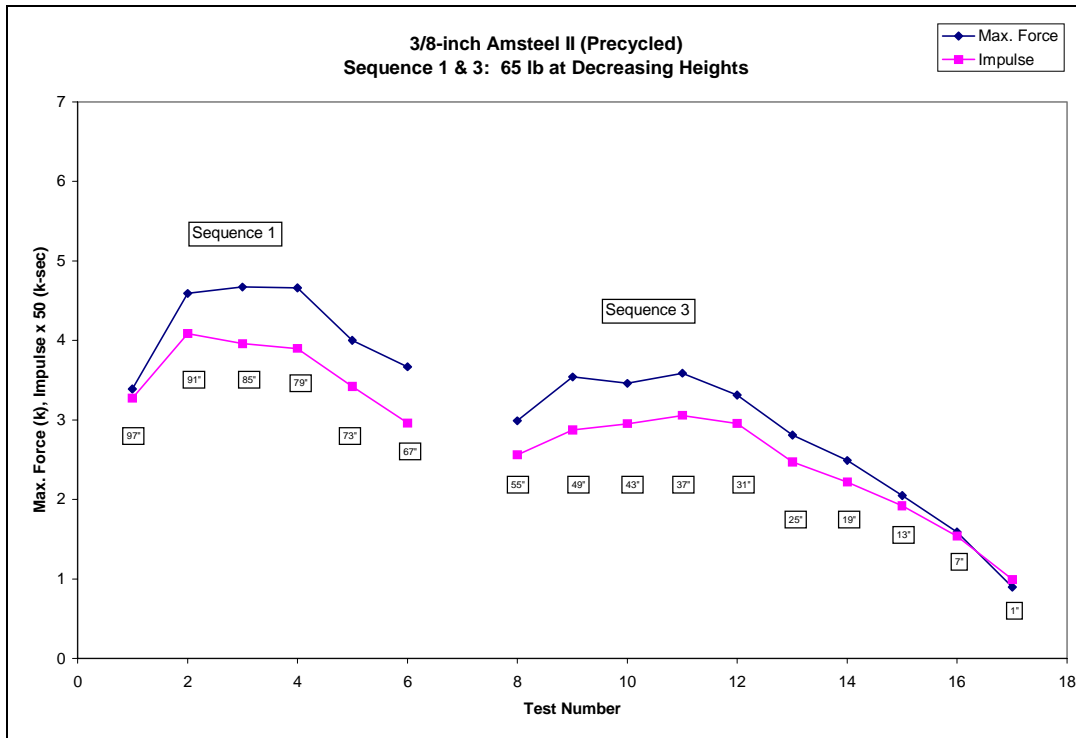


Figure A.18.3: 3/8 in. Amsteel II – Precycled – Maximum Force and Impulse

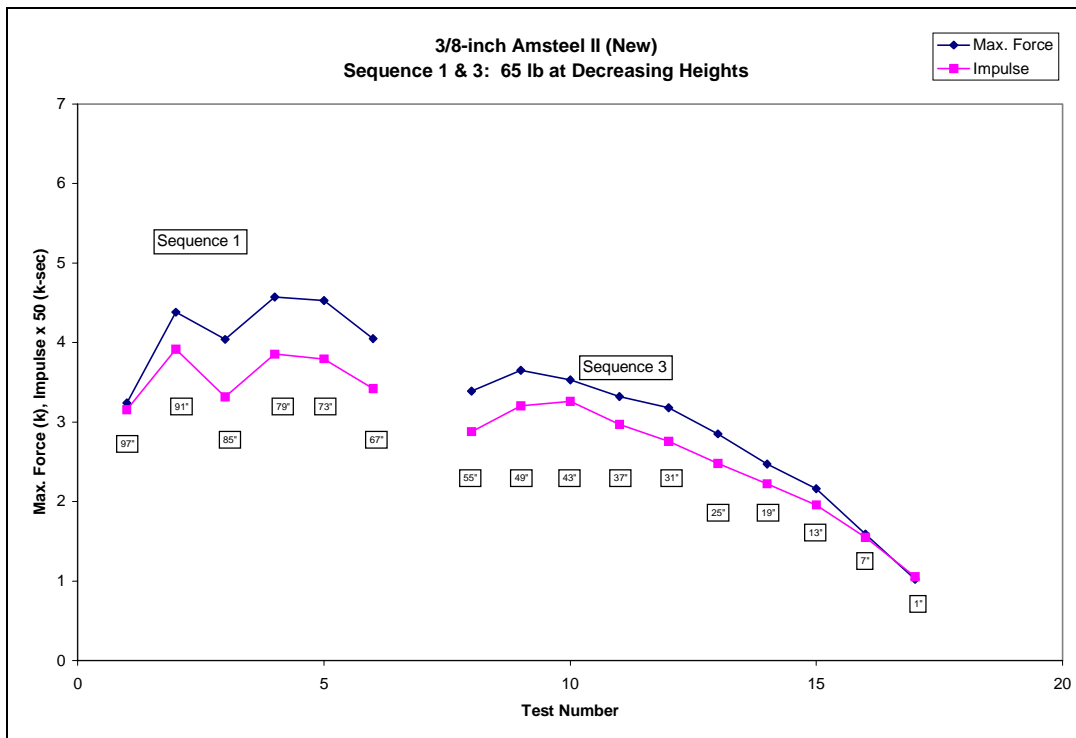


Figure A.18.4: 3/8 in. Amsteel II – New – Maximum Force and Impulse

1/2-inch Amsteel Blue (Recycled)					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Energy Loss (k-in.)
1	59	65	3.35	0.0528	1.93
2	53	65	3.70	0.0572	1.71
3	47	65	3.62	0.0560	1.53
4	41	65	3.40	0.0528	1.42
5	35	65	3.40	0.0532	1.55
6	29	65	2.79	0.0453	1.05
7	23	65	2.70	0.0443	0.84
8	17	65	2.41	0.0397	0.71
9	11	65	1.99	0.0340	0.45
10	5	65	1.45	0.0256	0.22

1/2-inch Amsteel Blue (New)					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Energy Loss (k-in.)
1	56	65	3.35	0.0528	1.93
2	50	65	3.70	0.0572	1.71
3	44	65	3.62	0.0560	1.53
4	38	65	3.40	0.0528	1.42
5	32	65	3.40	0.0532	1.55
6	26	65	2.79	0.0453	1.05
7	20	65	2.70	0.0443	0.84
8	14	65	2.41	0.0397	0.71
9	8	65	1.99	0.0340	0.45
10	2	65	1.45	0.0256	0.22

3/8-inch Amsteel II (Recycled)					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Energy Loss (k-in.)
1	55	65	2.99	0.0512	1.71
2	49	65	3.54	0.0575	1.71
3	43	65	3.46	0.0590	1.50
4	37	65	3.59	0.0611	1.50
5	31	65	3.31	0.0591	1.18
6	25	65	2.81	0.0494	0.94
7	19	65	2.49	0.0444	0.81
8	13	65	2.05	0.0384	0.54
9	7	65	1.59	0.0308	0.33
10	1	65	0.90	0.0199	0.09

3/8-inch Amsteel II (New)					
Drop Number	Drop Height (in.)	Weight (lb)	Max. Force (k)	Impulse (k-sec)	Energy Loss (k-in.)
1	55	65	3.39	0.0576	1.82
2	49	65	3.65	0.0641	1.53
3	43	65	3.53	0.0652	1.61
4	37	65	3.32	0.0594	1.50
5	31	65	3.18	0.0551	1.14
6	25	65	2.85	0.0496	1.03
7	19	65	2.47	0.0445	0.72
8	13	65	2.16	0.0392	0.56
9	7	65	1.59	0.0310	0.38
10	1	65	1.02	0.0211	0.14

Table A.18.1: Energy Losses for Follow-Up Dynamic Tests

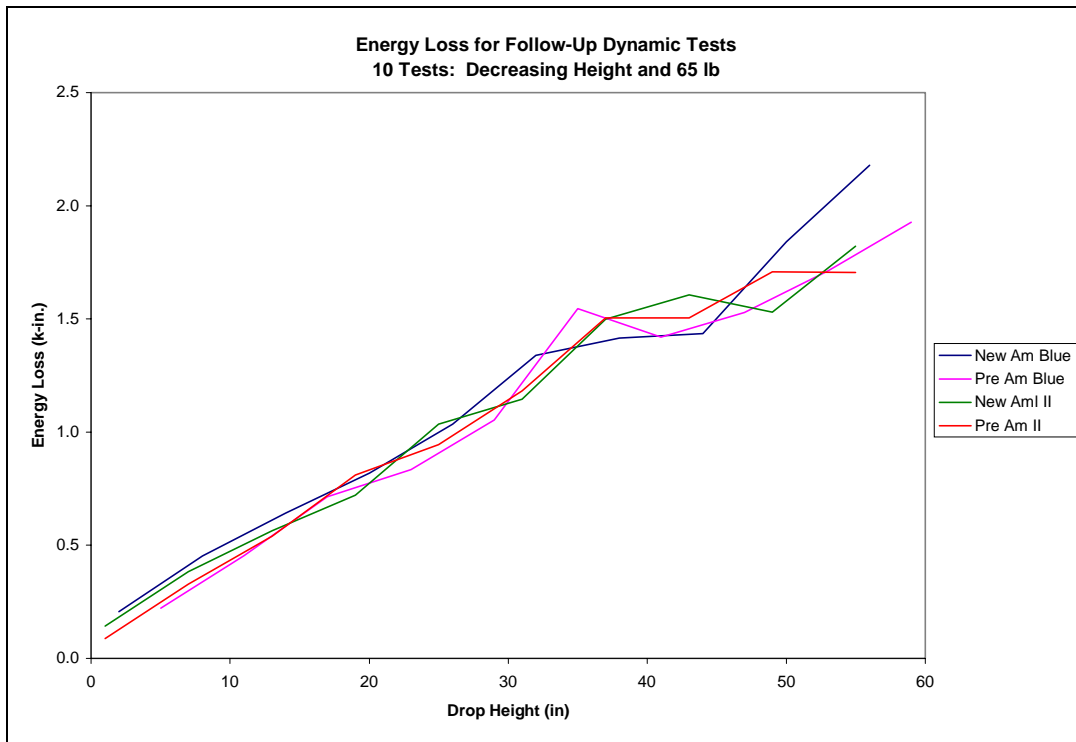


Figure A.18.5: Energy Loss vs. Drop Height – Follow-Up Dynamic Tests

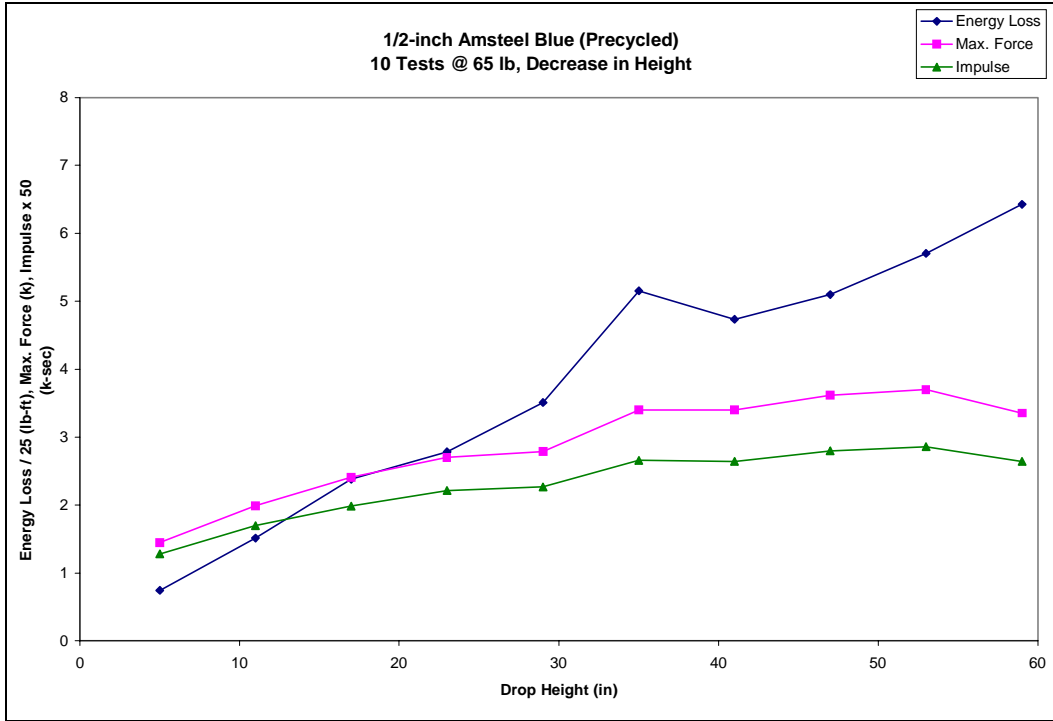


Figure A.18.6: 1/2 in. Am. Blue Follow-Up – Precycled – Max. Force, Impulse, and Energy Loss

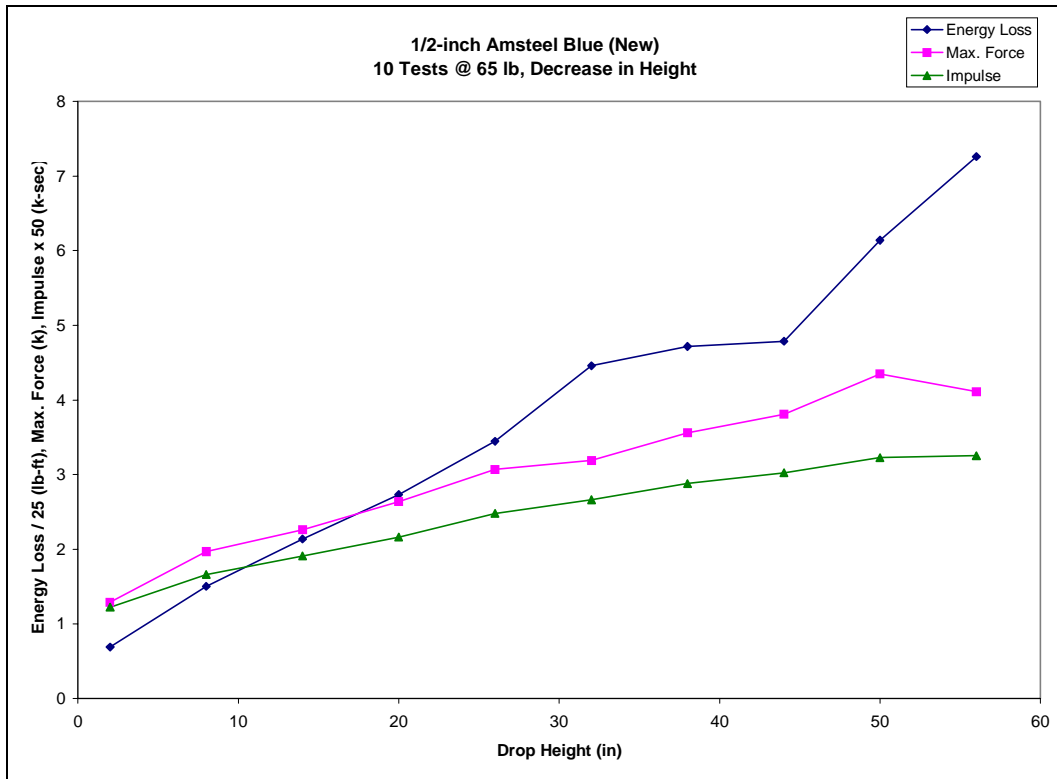


Figure A.18.7: 1/2 in. Am. Blue Follow-Up – New – Max. Force, Impulse, and Energy Loss



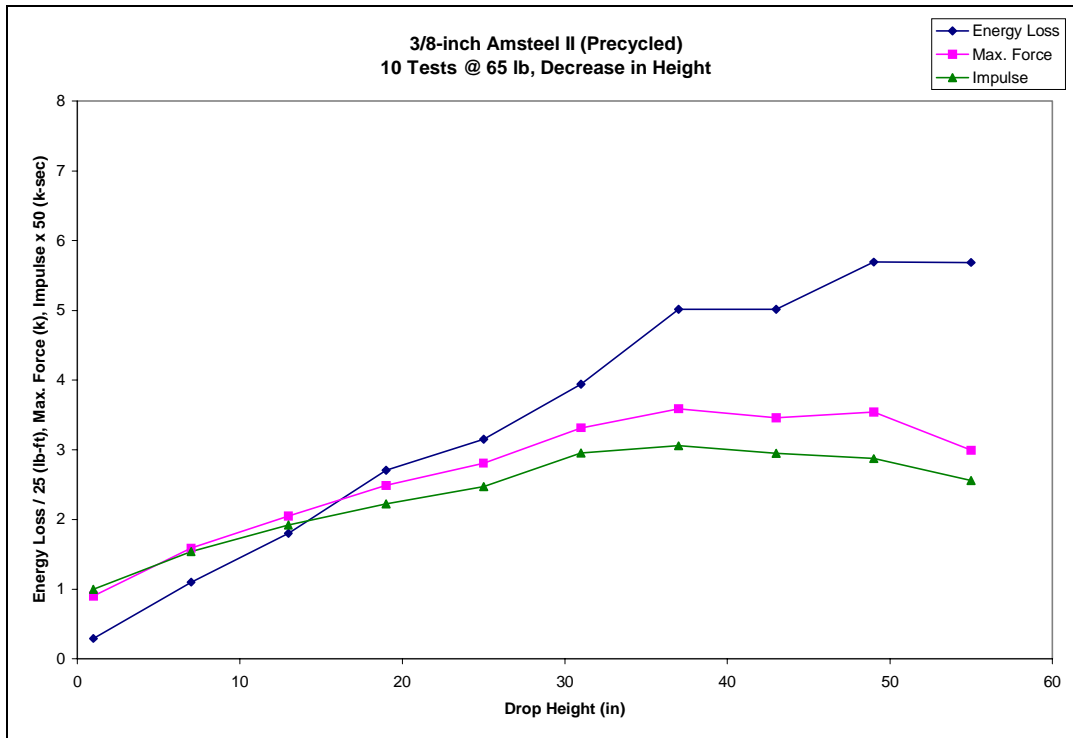


Figure A.18.8: 3/8 in. Am. II Follow-Up – Precycled – Max. Force, Impulse, and Energy Loss

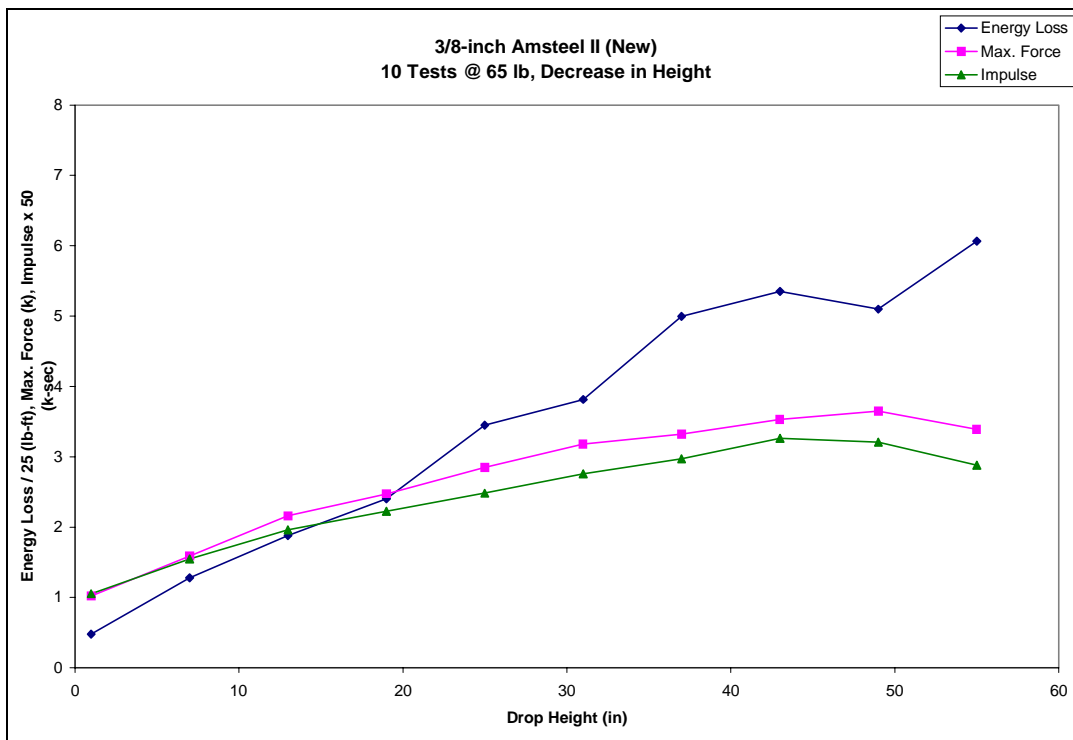


Figure A.18.9: 3/8 in. Am. II Follow-Up – New – Max. Force, Impulse, and Energy Loss