Table F.3 Data set 1 calculations

Target Properties				Projectile Properties						Penetration (mm)		Model Error
Identifier	Thickness (mm)	Grade (MPa)	Yield Strength (MPa)	Calibre (mm)	No.	Identifier	Mass (kg)	Radius (mm)	Estimated Impact Velocity (m/s)	Predicted	Observed	
A	20	250	658	5.56	1	A.5.1	0.0040	2.78	824.50	16.82	6.14	0.37
A	20	250	658	5.56	2	A.5.2	0.0040	2.78	821.15	16.68	7.23	0.43
A	20	250	658	5.56	3	A.5.3	0.0040	2.78	818.10	16.56	7.03	0.42
A	20	250	658	5.56	4	A.5.4	0.0040	2.78			5.28	
A	20	250	658	5.56	5	A.5.5	0.0040	2.78			7.26	
A	20	250	658	5.56	6	A.5.6	0.0040	2.78	822.06	16.72	6.08	0.36
A	20	250	658	5.56	7	A.5.7	0.0040	2.78	815.66	16.46	7.51	0.46
A	20	250	658	5.56	8	A.5.8	0.0040	2.78			7.05	
A	20	250	658	5.56	9	A.5.9	0.0040	2.78			7.25	
A	20	250	658	5.56	10	A.5.10	0.0040	2.78			6.27	
B	20	250	658	5.56	1	B.5.1	0.0040	2.78	813.53	16.38		
B	20	250	658	5.56	2	B.5.2	0.0040	2.78	829.98	17.04	7.31	0.43
B	20	250	658	5.56	3	B.5.3	0.0040	2.78	826.33	16.89	7.35	0.44
B	20	250	658	5.56	4	B.5.4	0.0040	2.78	814.74	16.42		
B	20	250	658	5.56	5	B.5.5	0.0040	2.78	813.22	16.36		
B	20	250	658	5.56	6	B.5.6	0.0040	2.78	824.50	16.82	6.51	0.39
B	20	250	658	5.56	7	B.5.7	0.0040	2.78	816.88	16.51	7.54	0.46
B	20	250	658	5.56	8	B.5.8	0.0040	2.78	810.17	16.24	6.60	0.41
B	20	250	658	5.56	9	B.5.9	0.0040	2.78	818.71	16.58	7.21	0.43
B	20	250	658	5.56	10	B.5.10	0.0040	2.78	811.39	16.29		

Observed variability	mean	6.85	std. dev.	0.64	COV	0.093	**COUNT**	**11**
Model error	mean	0.417	std. dev.	0.033	COV	0.079		

Table F.4 Data set 2 calculations

Target Properties				Projectile Properties						Penetration (mm)		Model Error
Identifier	Thickness (mm)	Grade (MPa)	Yield Strength (MPa)	Calibre (mm)	No.	Identifier	Mass (kg)	Radius (mm)	Estimated Impact Velocity (m/s)	Predicted	Observed	
A	20	250	658	7.62	1	A.7.1	0.0096	3.91	782.74	18.52	6.14	0.33
A	20	250	658	7.62	2	A.7.2	0.0096	3.91	776.64	18.23	6.45	0.35
A	20	250	658	7.62	3	A.7.3	0.0096	3.91	779.08	18.34	6.26	0.34
A	20	250	658	7.62	4	A.7.4	0.0096	3.91	763.23	17.60	5.86	0.33
A	20	250	658	7.62	5	A.7.5	0.0096	3.91	770.85	17.96	6.07	0.34
A	20	250	658	7.62	6	A.7.6	0.0096	3.91	774.51	18.13	5.63	0.31
A	20	250	658	7.62	7	A.7.7	0.0096	3.91	770.54	17.94	5.99	0.33
A	20	250	658	7.62	8	A.7.8	0.0096	3.91	770.24	17.93	5.62	0.31
A	20	250	658	7.62	9	A.7.9	0.0096	3.91			5.85	
A	20	250	658	7.62	10	A.7.10	0.0096	3.91	774.51	18.13	5.97	0.33
A	20	250	658	7.62	11	A.7.11	0.0096	3.91	766.28	17.75	5.81	0.33
A	20	250	658	7.62	12	A.7.12	0.0096	3.91	780.60	18.41	6.32	0.34
A	20	250	658	7.62	13	A.7.13	0.0096	3.91			5.68	
B	20	250	658	7.62	1	B.7.1	0.0096	3.91	779.08	18.34	6.15	0.34
B	20	250	658	7.62	2	B.7.2	0.0096	3.91	776.03	18.20	6.32	0.35
B	20	250	658	7.62	3	B.7.3	0.0096	3.91	776.95	18.24	6.39	0.35
B	20	250	658	7.62	4	B.7.4	0.0096	3.91	778.16	18.30		
B	20	250	658	7.62	5	B.7.5	0.0096	3.91	772.37	18.03	6.19	0.34
B	20	250	658	7.62	6	B.7.6	0.0096	3.91	781.21	18.44	6.52	0.35
B	20	250	658	7.62	7	B.7.7	0.0096	3.91	771.15	17.97		
B	20	250	658	7.62	8	B.7.8	0.0096	3.91	773.29	18.07		
B	20	250	658	7.62	9	B.7.9	0.0096	3.91	781.21	18.44	6.20	0.34
B	20	250	658	7.62	10	B.7.10	0.0096	3.91	770.54	17.94	6.23	0.35

| B | 20 | 250 | 658 | 7.62 | 11 | B.7.11 | 0.0096 | 3.91 | 755.00 | 17.23 | | |
| B | 20 | 250 | 658 | 7.62 | 12 | B.7.12 | 0.0096 | 3.91 | 755.00 | 17.23 | | |

Observed variability   mean 6.08   std. dev. 0.27   COV 0.045   **COUNT 18**
Model error   mean 0.337   std. dev. 0.012   COV 0.036

Table F.5 Data set 3 calculations

Target Properties				Projectile Properties						Penetration (mm)		Model Error
Identifier	Thickness (mm)	Grade (MPa)	Yield Strength (MPa)	Calibre (mm)	No.	Identifier	Mass (kg)	Radius (mm)	Estimated Impact Velocity (m/s)	Predicted	Observed	
C	20	350	458	5.56	1	C.5.1	0.0040	2.78	821.75	22.46	8.26	0.37
C	20	350	458	5.56	2	C.5.2	0.0040	2.78	815.05	22.10	7.26	0.33
C	20	350	458	5.56	3	C.5.3	0.0040	2.78	807.73	21.70		
C	20	350	458	5.56	4	C.5.4	0.0040	2.78	814.44	22.07	7.04	0.32
C	20	350	458	5.56	5	C.5.5	0.0040	2.78	803.16	21.46	6.39	0.30
C	20	350	458	5.56	6	C.5.6	0.0040	2.78			7.32	
C	20	350	458	5.56	7	C.5.7	0.0040	2.78	806.51	21.64	7.75	0.36
C	20	350	458	5.56	8	C.5.8	0.0040	2.78	822.36	22.50	8.18	0.36
C	20	350	458	5.56	9	C.5.9	0.0040	2.78	811.70	21.92	6.55	0.30
C	20	350	458	5.56	10	C.5.10	0.0040	2.78	812.92	21.98	7.85	0.36
D	20	350	458	5.56	1	D.5.1	0.0040	2.78			11.10	
D	20	350	458	5.56	2	D.5.2	0.0040	2.78			7.35	
D	20	350	458	5.56	3	D.5.3	0.0040	2.78			8.29	
D	20	350	458	5.56	4	D.5.4	0.0040	2.78	815.35	22.12	7.40	0.33
D	20	350	458	5.56	5	D.5.5	0.0040	2.78	820.84	22.41	7.67	0.34

Identifier	Thickness (mm)	Grade (MPa)	Yield Strength (MPa)	Calibre (mm)	No.	Identifier	Mass (kg)	Radius (mm)	Estimated Impact Velocity (m/s)	Predicted	Observed	Model Error
D	20	350	458	5.56	6	D.5.6	0.0040	2.78			7.58	
D	20	350	458	5.56	7	D.5.7	0.0040	2.78			7.22	
D	20	350	458	5.56	8	D.5.8	0.0040	2.78	751.65	18.79	6.86	0.37
D	20	350	458	5.56	9	D.5.9	0.0040	2.78	819.32	22.33	8.11	0.36
D	20	350	458	5.56	10	D.5.10	0.0040	2.78	817.49	22.23		

Observed variability	mean	7.68	std. dev.	1.02	COV	0.133	**COUNT**	**12**
Model error	mean	0.341	std. dev.	0.026	COV	0.075		

Table F.6 Data set 4 calculations

Target Properties				Projectile Properties						Penetration (mm)		Model Error
Identifier	Thickness (mm)	Grade (MPa)	Yield Strength (MPa)	Calibre (mm)	No.	Identifier	Mass (kg)	Radius (mm)	Estimated Impact Velocity (m/s)	Predicted	Observed	
C	20	350	458	7.62	1	C.7.1	0.0096	3.91			6.45	
C	20	350	458	7.62	2	C.7.2	0.0096	3.91			5.98	
C	20	350	458	7.62	3	C.7.3	0.0096	3.91	761.71	23.57	6.18	0.26
C	20	350	458	7.62	4	C.7.4	0.0096	3.91	766.28	23.86		
C	20	350	458	7.62	5	C.7.5	0.0096	3.91	764.14	23.73	6.33	0.27
C	20	350	458	7.62	6	C.7.6	0.0096	3.91	769.93	24.09	6.37	0.26
C	20	350	458	7.62	7	C.7.7	0.0096	3.91	771.76	24.20	6.33	0.26
C	20	350	458	7.62	8	C.7.8	0.0096	3.91	771.76	24.20	6.32	0.26
C	20	350	458	7.62	9	C.7.9	0.0096	3.91	775.42	24.43	6.11	0.25
C	20	350	458	7.62	10	C.7.10	0.0096	3.91	781.82	24.84	6.14	0.25
C	20	350	458	7.62	11	C.7.11	0.0096	3.91	781.82	24.84	6.17	0.25
C	20	350	458	7.62	12	C.7.12	0.0096	3.91	781.82	24.84	6.02	0.24

Identifier	Thickness	Grade	Yield Strength	Calibre	No.	Identifier	Mass	Radius	Impact Velocity	Predicted	Observed	Model Error
D	20	350	458	7.62	1	D.7.1	0.0096	3.91	772.37	24.24		
D	20	350	458	7.62	2	D.7.2	0.0096	3.91	762.62	23.63	6.04	0.26
D	20	350	458	7.62	3	D.7.3	0.0096	3.91	771.46	24.18	6.37	0.26
D	20	350	458	7.62	4	D.7.4	0.0096	3.91	771.46	24.18	6.43	0.27
D	20	350	458	7.62	5	D.7.5	0.0096	3.91	763.23	23.67	5.78	0.24
D	20	350	458	7.62	6	D.7.6	0.0096	3.91	773.59	24.32	6.47	0.27
D	20	350	458	7.62	7	D.7.7	0.0096	3.91	773.90	24.33	6.18	0.25
D	20	350	458	7.62	8	D.7.8	0.0096	3.91	707.76	20.35	6.23	0.31
D	20	350	458	7.62	9	D.7.9	0.0096	3.91	777.55	24.57	6.19	0.25
D	20	350	458	7.62	10	D.7.10	0.0096	3.91	770.54	24.12	5.91	0.24
D	20	350	458	7.62	11	D.7.11	0.0096	3.91	773.59	24.32	5.84	0.24
D	20	350	458	7.62	12	D.7.12	0.0096	3.91	777.25	24.55	6.03	0.25

Observed variability	mean	6.17	std. dev.	0.20	COV	0.032	**COUNT**	**20**
Model error	mean	0.257	std. dev.	0.015	COV	0.057

Table F.7 Data set 5 calculations

Target Properties				Projectile Properties						Penetration (mm)		Model Error
Identifier	Thickness (mm)	Grade (MPa)	Yield Strength (MPa)	Calibre (mm)	No.	Identifier	Mass (kg)	Radius (mm)	Estimated Impact Velocity (m/s)	Predicted	Observed	
E	25	250	658	5.56	1	E.5.1	0.0040	2.78	826.33	16.89	8.12	0.48
E	25	250	658	5.56	2	E.5.2	0.0040	2.78	811.39	16.29		
E	25	250	658	5.56	3	E.5.3	0.0040	2.78	824.80	16.83	7.76	0.46
E	25	250	658	5.56	4	E.5.4	0.0040	2.78	803.47	15.97	8.12	0.51
E	25	250	658	5.56	5	E.5.5	0.0040	2.78			7.75	

Identifier	Thickness	Grade	Yield	Calibre	No.	Identifier	Mass	Radius	Estimated Impact Velocity	Predicted	Observed	Model Error
E	25	250	658	5.56	6	E.5.6	0.0040	2.78	823.58	16.78	7.59	0.45
E	25	250	658	5.56	7	E.5.7	0.0040	2.78			8.98	
E	25	250	658	5.56	8	E.5.8	0.0040	2.78			8.14	
E	25	250	658	5.56	9	E.5.9	0.0040	2.78			8.08	
E	25	250	658	5.56	10	E.5.10	0.0040	2.78			8.81	
F	25	250	658	5.56	1	F.5.1	0.0040	2.78				
F	25	250	658	5.56	2	F.5.2	0.0040	2.78	804.08	16.00		
F	25	250	658	5.56	3	F.5.3	0.0040	2.78	824.50	16.82	6.43	0.38
F	25	250	658	5.56	4	F.5.4	0.0040	2.78	826.63	16.91	8.21	0.49
F	25	250	658	5.56	5	F.5.5	0.0040	2.78	822.97	16.76	8.23	0.49
F	25	250	658	5.56	6	F.5.6	0.0040	2.78	809.26	16.20	8.16	0.50
F	25	250	658	5.56	7	F.5.7	0.0040	2.78	800.42	15.85	10.07	0.64
F	25	250	658	5.56	8	F.5.8	0.0040	2.78	817.49	16.54	8.13	0.49
F	25	250	658	5.56	9	F.5.9	0.0040	2.78	809.87	16.23	8.71	0.54
F	25	250	658	5.56	10	F.5.10	0.0040	2.78	828.16	16.97	7.63	0.45

Observed variability   mean 8.17   std. dev. 0.75   COV   0.092   **COUNT** **12**

Model error   mean 0.490   std. dev. 0.060   COV   0.122

Table F.8 Data set 6 calculations

Target Properties				Projectile Properties						Penetration (mm)		Model Error
Identifier	Thickness (mm)	Grade (MPa)	Yield Strength (MPa)	Calibre (mm)	No.	Identifier	Mass (kg)	Radius (mm)	Estimated Impact Velocity (m/s)	Predicted	Observed	
E	25	250	658	7.62	1	E.7.1	0.0096	3.91			6.47	
E	25	250	658	7.62	2	E.7.2	0.0096	3.91	767.50	17.80	6.76	0.38

E	25	250	658	7.62	3	E.7.3	0.0096	3.91	765.67	17.72	6.42	0.36
E	25	250	658	7.62	4	E.7.4	0.0096	3.91	776.95	18.24	6.78	0.37
E	25	250	658	7.62	5	E.7.5	0.0096	3.91	759.88	17.45	6.77	0.39
E	25	250	658	7.62	6	E.7.6	0.0096	3.91	763.53	17.62	6.47	0.37
E	25	250	658	7.62	7	E.7.7	0.0096	3.91	763.53	17.62	6.32	0.36
E	25	250	658	7.62	8	E.7.8	0.0096	3.91	767.80	17.82	6.46	0.36
E	25	250	658	7.62	9	E.7.9	0.0096	3.91	754.39	17.20	6.46	0.38
E	25	250	658	7.62	10	E.7.10	0.0096	3.91	762.92	17.59	6.20	0.35
E	25	250	658	7.62	11	E.7.11	0.0096	3.91	772.68	18.04	6.75	0.37
E	25	250	658	7.62	12	E.7.12	0.0096	3.91	765.36	17.70	6.37	0.36
F	25	250	658	7.62	1	F.7.1	0.0096	3.91			6.94	
F	25	250	658	7.62	2	F.7.2	0.0096	3.91	698.31	14.74	6.93	0.47
F	25	250	658	7.62	3	F.7.3	0.0096	3.91	761.10	17.51	6.59	0.38
F	25	250	658	7.62	4	F.7.4	0.0096	3.91	767.50	17.80	6.54	0.37
F	25	250	658	7.62	5	F.7.5	0.0096	3.91			6.74	
F	25	250	658	7.62	6	F.7.6	0.0096	3.91	709.58	15.22	6.61	0.43
F	25	250	658	7.62	7	F.7.7	0.0096	3.91	756.83	17.31	6.68	0.39
F	25	250	658	7.62	8	F.7.8	0.0096	3.91	762.62	17.58		
F	25	250	658	7.62	9	F.7.9	0.0096	3.91	772.68	18.04	6.79	0.38
F	25	250	658	7.62	10	F.7.10	0.0096	3.91				
F	25	250	658	7.62	11	F.7.11	0.0096	3.91				
F	25	250	658	7.62	12	F.7.12	0.0096	3.91				

Observed variability   mean 6.60   std. dev. 0.20   COV   0.031   **COUNT   17**
Model error   mean 0.380   std. dev. 0.029   COV   0.078

Table F.9 Data set 7 calculations

Target Properties				Projectile Properties						Penetration (mm)		Model Error
Identifier	Thickness (mm)	Grade (MPa)	Yield Strength (MPa)	Calibre (mm)	Number	Identifier	Mass (kg)	Radius (mm)	Estimated Impact Velocity (m/s)	Predicted	Observed	
G	25	350	458	5.56	1	G.5.1	0.0040	2.78	822.36	22.50		
G	25	350	458	5.56	2	G.5.2	0.0040	2.78	815.66	22.13	8.05	0.36
G	25	350	458	5.56	3	G.5.3	0.0040	2.78	804.38	21.52	6.71	0.31
G	25	350	458	5.56	4	G.5.4	0.0040	2.78	808.95	21.77	7.22	0.33
G	25	350	458	5.56	5	G.5.5	0.0040	2.78	810.78	21.87	8.39	0.38
G	25	350	458	5.56	6	G.5.6	0.0040	2.78	804.08	21.51	7.19	0.33
G	25	350	458	5.56	7	G.5.7	0.0040	2.78	815.05	22.10	7.35	0.33
G	25	350	458	5.56	8	G.5.8	0.0040	2.78			8.39	
G	25	350	458	5.56	9	G.5.9	0.0040	2.78	817.18	22.21	7.52	0.34
G	25	350	458	5.56	10	G.5.10	0.0040	2.78	829.37	22.88	8.34	0.36
H	25	350	458	5.56	1	H.5.1	0.0040	2.78				
H	25	350	458	5.56	2	H.5.2	0.0040	2.78				
H	25	350	458	5.56	3	H.5.3	0.0040	2.78			6.38	
H	25	350	458	5.56	4	H.5.4	0.0040	2.78			7.92	
H	25	350	458	5.56	5	H.5.5	0.0040	2.78			7.32	
H	25	350	458	5.56	6	H.5.6	0.0040	2.78			6.02	
H	25	350	458	5.56	7	H.5.7	0.0040	2.78			6.90	
H	25	350	458	5.56	8	H.5.8	0.0040	2.78	821.45	22.45	6.71	0.30
H	25	350	458	5.56	9	H.5.9	0.0040	2.78	822.36	22.50	8.12	0.36
H	25	350	458	5.56	10	H.5.10	0.0040	2.78			8.52	

Observed variability   mean   7.47   std. dev.   0.77   COV   0.103   **COUNT**   **10**

Model error   mean   0.342   std. dev.   0.026   COV   0.076

Table F.10 Data set 8 calculations

	Target Properties			Projectile Properties						Penetration (mm)		
Identifier	Thickness (mm)	Grade (MPa)	Yield Strength (MPa)	Calibre (mm)	No.	Identifier	Mass (kg)	Radius (mm)	Estimated Impact Velocity (m/s)	Predicted	Observed	Model Error
G	25	350	458	7.62	1	G.7.1	0.0096	3.91				
G	25	350	458	7.62	2	G.7.2	0.0096	3.91	754.69	23.14	6.17	0.27
G	25	350	458	7.62	3	G.7.3	0.0096	3.91	755.30	23.18	6.15	0.27
G	25	350	458	7.62	4	G.7.4	0.0096	3.91			6.33	
G	25	350	458	7.62	5	G.7.5	0.0096	3.91	698.00	19.80	6.06	0.31
G	25	350	458	7.62	6	G.7.6	0.0096	3.91	768.41	23.99	6.12	0.26
G	25	350	458	7.62	7	G.7.7	0.0096	3.91	773.59	24.32	6.26	0.26
G	25	350	458	7.62	8	G.7.8	0.0096	3.91	767.19	23.91	6.35	0.27
G	25	350	458	7.62	9	G.7.9	0.0096	3.91	767.50	23.93	6.04	0.25
G	25	350	458	7.62	10	G.7.10	0.0096	3.91	771.15	24.16	6.01	0.25
G	25	350	458	7.62	11	G.7.11	0.0096	3.91	768.72	24.01	5.87	0.24
G	25	350	458	7.62	12	G.7.12	0.0096	3.91	768.72	24.01	6.10	0.25
H	25	350	458	7.62	1	H.7.1	0.0096	3.91				
H	25	350	458	7.62	2	H.7.2	0.0096	3.91			6.17	
H	25	350	458	7.62	3	H.7.3	0.0096	3.91	750.12	22.86	5.95	0.26
H	25	350	458	7.62	4	H.7.4	0.0096	3.91	778.16	24.60	6.10	0.25
H	25	350	458	7.62	5	H.7.5	0.0096	3.91			5.99	
H	25	350	458	7.62	6	H.7.6	0.0096	3.91	749.21	22.81	5.77	0.25
H	25	350	458	7.62	7	H.7.7	0.0096	3.91	755.00	23.16	5.78	0.25
H	25	350	458	7.62	8	H.7.8	0.0096	3.91	746.77	22.66	5.87	0.26
H	25	350	458	7.62	9	H.7.9	0.0096	3.91	756.52	23.25	5.82	0.25
H	25	350	458	7.62	10	H.7.10	0.0096	3.91	766.28	23.86	5.75	0.24
H	25	350	458	7.62	11	H.7.11	0.0096	3.91	765.06	23.78	6.31	0.27

H	25	350	458	7.62	12	H.7.12	0.0096	3.91				

Observed variability	mean	6.05	std. dev.	0.19	COV	0.031	**COUNT** 18
Model error	mean	0.258	std. dev.	0.014	COV	0.055	