

Emori
 Speed mph 1.1 * c
 c = Maximum Crush in inches
 Crush Factor
 Speed mph SQR(30*CF*MID)
 MID = Maximum Crush in Feet (at primary contact level)
 CF = Crush Factor (G's)

Noon
 v in fps = SQR(2*k*c/m)
 k = lb-ft/in
 c inches = avg crush depth - inches
 m = vehicle mass = wt / 32.2

CRASH 3
 E = (A*C + (B*C*C/2) + G) * L (in/lbs)
 A = Spring pre-lading value (lbs/inch)
 B = Energy absorbed in permanent deformation (lb/(in*in))
 G = Energy absorbed in elastic deformation ((A*A)/(2*B))
 C = Avg Crush (inches)
 L = Damage Length (in)

KEES / BEV / EBS
 KEES = (360/528)* SQR[((2*E*gamma)/12) / (w/g)] (mph)
 E = Crush Energy (inch/lbs)
 gamma = constant coming from Yaw Moment of Inertia and Moment arm - ignored for these illustrations
 w = weight (lbs)
 g = gravity (ft/s/s)

Side Impact Test Summary
 Report Filter Settings
 Year Range: 2015 - 2021
 Make: DODGE
 Model: CHARGER

Test Number	Year	Make	Model	Body Style	No Damage Speed (mph)	Average Crush (inch)	KEES	A	B	G	Kv	Crush Factor	b_sub_1	Crush Length	Vehicle Weight (pounds)	Noon-KE	Noon - k	
9502	2016	DODGE	CHARGER	FOUR DOOR SEDAN	2	5.5	20	375.5	615.2	114.6	759.3	29.2	57.7	58.5	4179.1	25957.14	1297.86	
9504	2016	DODGE	CHARGER	FOUR DOOR SEDAN	2	14.3	24.3	124.1	96.7	79.6	114.8	16.5	27.4	87.6	4348.8	39874.58	1640.93	
							Average (AVG)	249.8	355.9	97.1	437	22.8			65831.72	1469.39		
							Minimum (MIN)	124.1	96.7	79.6	114.8	16.5						
							Maximum (MAX)	375.5	615.2	114.6	759.3	29.2						
							Standard Deviation (STDev-sample)	177.8	366.6	24.8	455.7	8.9						
							Number of Tests (n)	2										

Front Impact Test Summary
 Report Filter Settings
 Year Range: 2013 - 2019
 Make: FORD
 Model: TAURUS

Test Number	Year	Make	Model	Body Style	No Damage Speed (mph)	Average Crush (inch)	KEES	A	B	G	Kv	Crush Factor	b_sub_1	Crush Length	Vehicle Weight (pounds)	Noon-KE	Noon - k	
7872	2013	FORD	TAURUS	FOUR DOOR SEDAN	5	15.4	34.8	474.2	183.1	614	249.8	31.4	34	75.8	4646.4	87375.41	2510.79	
9125	2013	FORD	TAURUS	FOUR DOOR SEDAN	5	8.9	41.1	1001.2	815.9	614.3	1057.4	76.3	71.7	76.3	4679.4	122740.52	2986.39	
							Average (AVG)	737.7	499.5	614.1	653.6	53.8			210115.92	2748.59		
							Minimum (MIN)	474.2	183.1	614	249.8	31.4						
							Maximum (MAX)	1001.2	815.9	614.3	1057.4	76.3						
							Standard Deviation (STDev-sample)	372.6	447.4	0.2	571.1	31.8						
							Number of Tests (n)	2										

Front Impact Test Summary
 Report Filter Settings
 Year Range: 2007 - 2012
 Make: LINCOLN
 Model: MKZ

Test Number	Year	Make	Model	Body Style	No Damage Speed (mph)	Average Crush (inch)	KEES	A	B	G	Kv	Crush Factor	b_sub_1	Crush Length	Vehicle Weight (pounds)	Noon-KE	Noon - k	
6225	2008	FORD	FUSION	FOUR DOOR SEDAN	5	23.4	35	268.9	68.9	524.3	93.8	20.9	22.6	71.7	3749.3	71318.21	2037.66	
6755	2010	FORD	FUSION	FOUR DOOR SEDAN	5	21.9	35	278.5	76.1	509.5	103.7	22.3	24.1	71.6	3639.1	69222.01	1977.77	
5546	2006	FORD	FUSION	FOUR DOOR SEDAN	5	22	35.1	300.2	82.1	549	111.6	22.4	24.1	71.7	3925.6	75099.04	2139.57	
5804	2006	FORD	FUSION	FOUR DOOR SEDAN	5	12.5	25.1	344.7	111	535.3	173.2	20.2	28.3	72.2	3859.5	37756.58	1504.25	
7339	2011	FORD	FUSION HYBRID	FOUR DOOR SEDAN	5	19.6	35.1	354.2	108.7	577.4	147.7	25.1	27	71.5	4121.8	78852.47	2246.51	
7132	2011	FORD	FUSION	FOUR DOOR SEDAN	5	7.9	20	368.9	139.9	486.4	248.6	20.2	33.4	71.6	3476	21590.06	1079.50	
7139	2011	FORD	FUSION	FOUR DOOR SEDAN	5	17.7	35.2	401.1	136.9	587.3	186	28	30	71.4	4185.7	80531.83	2287.84	
5821	2006	FORD	FUSION	FOUR DOOR SEDAN	5	9.2	24.7	420.8	179.9	492.2	282.6	26.5	37.6	71.3	3502.4	33179.80	1343.31	
6728	2010	FORD	FUSION HYBRID	FOUR DOOR SEDAN	5	14.8	35	473.1	192.2	582.3	261.6	33.2	35.8	71.7	4163.7	79200.82	2262.88	
								Average (AVG)	356.7	121.7	538.2	178.7	24.3			60750.09	1875.48	
								Minimum (MIN)	268.9	68.9	486.4	93.8	20.2					
								Maximum (MAX)	473.1	192.2	587.3	282.6	33.2					
								Standard Deviation (STDev-sample)	68	44.2	38.5	71.5	4.3					
								Number of Tests (n)	9									

Front Impact Test Summary
 Report Filter Settings
 Year Range: 1965 - 2021
 Make: NA
 Model: 626

Test Number	Year	Make	Model	Body Style	No Damage Speed (mph)	Average Crush (inch)	KEES	A	B	G	Kv	Crush Factor	b_sub_1	Crush Length	Vehicle Weight (pounds)	Noon-KE	Noon - k	
599	1983	MAZDA	626	FOUR DOOR SEDAN	5	24.4	35.3	216.8	53.8	436.8	73	20.4	21.8	66.5	2898.5	56083.72	1588.77	
1055	1987	MAZDA	626	FOUR DOOR SEDAN	5	20.3	29.5	217.2	52.4	450.5	75.9	17.1	21.2	66.2	2975.6	40209.87	1363.05	
118	1980	MAZDA	626	TWO DOOR COUPE	5	22.5	35.2	253	67.7	472.7	92	21.9	23.5	65	3066	58989.08	1675.83	
1015	1987	MAZDA	626	FOUR DOOR SEDAN	5	24	35	262.6	65.6	525.9	89.3	20.4	22	57.9	3039.5	57816.58	1651.90	
1742	1993	MAZDA	626	FOUR DOOR SEDAN	5	20	35	276.5	82.9	461.2	112.8	24.5	26.4	69	3176.2	60416.85	1726.20	
2866	1998	MAZDA	626	FOUR DOOR SEDAN	5	11.4	29.6	496.7	213.5	577.8	309.2	30.6	37.8	55.1	3178.4	43242.03	1460.88	
								Average (AVG)	287.1	89.3	487.5	125.4	22.5			52793.02	1577.77	
								Minimum (MIN)	216.8	52.4	436.8	73	17.1					
								Maximum (MAX)	496.7	213.5	577.8	309.2	30.6					
								Standard Deviation (STDev-sample)	105.5	61.8	53.8	91.2	4.6					
								Number of Tests (n)	6									

SCARS

Crash Test #1

		Weight	Crush Length	Avg Crush	Max Crush	A	B	G	CRASH 3	Noon's
									E	k
Bullet	2013 Ford Taurus AWD	4296	65	15	23	348.4	116.2	522.3	1223352.0	2748.59
Target	2015 Dodge Charger	3950	84	8.04	13	249.8	355.9	97.1	1143111.0	1469.39
		Emori		Crush Factor		Noon		CRASH 3		
		Damage Speed		Damage Speed		Damage Speed		Damage Speed		
		v = fps	v = mph	v = fps	v = mph	v = fps	v = mph	v = fps	v = mph	
Bullet	2013 Ford Taurus AWD	37.1	25.3	51.0	34.7	24.9	17.0	39.1	26.7	
Target	2015 Dodge Charger	21.0	14.3	38.3	26.1	13.9	9.5	39.4	26.9	
Combined Speed			29.1		43.5		19.4		37.8	
Instrumented Closing Speed			~47		~47		~47		~47	
Instrumented delta-v Bullet			22-23		22-23		22-23		22-23	
Instrumented delta-v Target			~26-27		~26-27		~26-27		~26-27	
Combined Crush + Rollout Speed			45.8		56.1		40.4		51.8	

SCARS

Crash Test #2

		Weight	Crush Length	Avg Crush	Max Crush	A	B	G	CRASH 3 E	Noon's k
Bullet	2008 Lincoln MKz	3519	62	15	18	356.7	121.7	522.7	1212998.4	1875.48
Target	2015 Dodge Charger	3950	82	3.38	7	249.8	355.9	97.1	243900.5	1469.39
		Emori Damage Speed		Crush Factor Damage Speed		Noon Damage Speed		CRASH 3 Damage Speed		
		v = fps	v = mph	v = fps	v = mph	v = fps	v = mph	v = fps	v = mph	
Bullet	2008 Lincoln MKz	29.0	19.8	45.1	30.7	22.7	15.5	43.0	29.3	
Target	2015 Dodge Charger	11.3	7.7	28.1	19.2	9.0	6.1	18.2	12.4	
Combined Speed			21.2	36.2	16.6	31.8				
Instrumented Closing Speed			~48	~48	~48	~48				
Instrumented delta-v Bullet			22-23	22-23	22-23	22-23				
Instrumented delta-v Target			~26-31	~26-31	~26-31	~26-31				
Combined Crush + Rollout Speed			44.2	53.1	42.2	50.2				

SCARS

Crash Test #3

		Weight	Crush Length	Avg Crush	Max Crush	A	B	G	CRASH 3 E	Noon's k
Bullet	1996 Mazda 626	2626	59	18.4	21	287.1	89.3	461.5	1230790.6	1577.77
Target	2016 Dodge Charger	3950	92	2.72	6	249.8	355.9	97.1	192565.3	1469.39
		Emori Damage Speed		Crush Factor Damage Speed		Noon Damage Speed		CRASH 3 Damage Speed		
		v = fps	v = mph	v = fps	v = mph	v = fps	v = mph	v = fps	v = mph	
Bullet	1996 Mazda 626	33.9	23.1	48.7	33.2	26.7	18.2	50.2	34.2	
Target	2016 Dodge Charger	9.7	6.6	26.0	17.7	8.1	5.5	16.2	11.0	
Combined Crush Speed			24.0		37.6		19.0		35.9	
Instrumented Closing Speed			~50-51		~50-51		~50-51		~50-51	
Instrumented delta-v Bullet			~37-38		~37-38		~37-38		~37-38	
Instrumented delta-v Target			~22-23		~22-23		~22-23		~22-23	
Combined Crush + Rollout Speed			35.2		45.6		31.9		44.2	