*** * * A T T E N T I O N * * ***

Individual Vehicle dimensions were obtained through the use of the Expert AutoStats(R) program.

The Expert AutoStats(R) program contains a multitude of vehicle dimensions and specifications on over 42,000 different vehicles and 203 different manufacturers spanning more than 70 years.

While every attempt has been made to ensure accurate data,these dimensions are meant to be used as first approximations. Some measurements are dependant on such factors as tire and rim sizes, tire inflation pressure and wear, suspension system condition, bumper type and style, and other manufacturing variations from vehicle to vehicle.

Whenever feasible, the vehicle in question or an exemplar vehicle should be measured to verify data important to your case.

Individual Vehicle Data Search Service (R)

Provided by:
4N6XPRT SYSTEMS (R)
Forensic Expert Software
La Mesa, CA 91942-9342

(619) 464-3478 / (800) 266-9778 / FAX: (619) 464-2206
http://www.4n6xprt.com

Through the use of

E X P E R T A U T O S T A T S (R)

DEVELOPED BY:
Daniel W. Vomhof III & Daniel W. Vomhof, Ph.D.

VEHICLE DATA RESEARCH BY:
Sheryl Cozby, Marion Vomhof, Muriel Vomhof, & Cindy Christensen

Expert VIN DeCoder®

Version Number 3.1.0.3

DeCoded VIN: 2T1BB02E9TC173960

Model:	1996 Toyota Corolla 4-Door Sedan
Engine Size:	1.8L / 107 cu.in.
Engine Description:	Inline 4 Cylinder with Dual Overhead Cam
Horse Power:	115 @ 5600 rpm
Torque:	115lb-ft @ 2800 rpm
Injection System:	Electronic Fuel Injection
PSI:	38-44psi
Ignition:	electronic
Manufacturer:	Toyota
Assembly Plant:	Cambridge, Ontario, Canada
Drive Wheels:	This is a Front Wheel Drive vehicle w/ Dual Front Air Bags

The First through Third characters (2T1) indicate a Toyota Car made in Canada

The Fourth character (B) indicates a 4-Door Sedan

The Fifth character (B) indicates the OEM engine: 1.8L / 107 cu.in., L4,DOHC

The Sixth and Eighth characters (0E) indicate a Corolla

The Seventh character (2) indicates Dual Front Air Bags

The Ninth character (the check digit) is entered as 9.
The VIN appears Valid, the calculated value is 9.

The Tenth character (T) indicates the model year 1996

The Eleventh character (C) indicates the vehicle was made in the assembly plant in Cambridge, Ontario, Canada

The Twelfth through Seventeenth characters (173960) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.2.0.2

PROVIDED BY:
4N6XPRT Systems
8387 University Avenue
La Mesa CA 91941

7/24/2012

1996 TOYOTA COROLLA 4 DOOR SEDAN

Curb Weight:	2315 lbs.		1050	kg.
Curb Weight Distribution - Front:	60 %	Rear:	40	%
Gross Vehicle Weight Rating:	3505 lbs.		1590	kg.
Number of Tires on Vehicle:	4			
Drive Wheels:	FRONT			

Horizontal Dimensions	Inches	Feet	Meters
Total Length	172	14.33	4.37
Wheelbase:	97	8.08	2.46
Front Bumper to Front Axle:	33	2.75	0.84
Front Bumper to Front of Front Well:	20	1.67	0.51
Front Bumper to Front of Hood:	6	0.50	0.15
Front Bumper to Base of Windshield:	46	3.83	1.17
Front Bumper to Top of Windshield:	73	6.08	1.85
Rear Bumper to Rear Axle:	42	3.50	1.07
Rear Bumper to Rear of Rear Well:	27	2.25	0.69
Rear Bumper to Rear of Trunk:	6	0.50	0.15
Rear Bumper to Base of Rear Window:	23	1.92	0.58
Width Dimensions			
Maximum Width:	66	5.50	1.68
Front Track:	58	4.83	1.47
Rear Track:	57	4.75	1.45
Vertical Dimensions			
Height:	54	4.50	1.37
Ground to -			
Front Bumper (Top)	21	1.75	0.53
Headlight - center	25	2.08	0.64
Hood - top front:	29	2.42	0.74
Base of Windshield	36	3.00	0.91
Rear Bumper - top:	21	1.75	0.53
Trunk - top rear:	37	3.08	0.94
Base of Rear Window:	39	3.25	0.99

1996 TOYOTA COROLLA 4 DOOR SEDAN

Interior Dimensions	Inches	Feet	Meters
Front Seat Shoulder Width	54	4.50	1.37
Front Seat to Headliner	39	3.25	0.99
Front Leg Room - seatback to floor (max)	42	3.50	1.07
Rear Seat Shoulder Width	54	4.50	1.37
Rear Seat to Headliner	37	3.08	0.94
Front Leg Room - seatback to floor (min)	33	2.75	0.84

Seatbelts: 3pt - front and rear
Airbags: FRONT SEAT AIRBAGS

Steering Data

Turning Circle (Diameter)	384	32.00	9.75
Steering Ratio: 22.70:1			
Wheel Radius:	12	1.00	0.30
Tire Size (OEM): 175-65R14			

Acceleration & Braking Information

Brake Type: FRONT DISC - REAR DRUM
ABS System: ABS UNKNOWN

Braking, 60 mph to 0 (Hard pedal, no skid, dry pavement):
d = 186.0 ft t = 4.2 sec a = -20.8 ft/sec² G-force = -0.65

Acceleration:

0 to 30mph	t =	3.5	sec	a =	12.6	ft/sec²	G-force = 0.39
0 to 60mph	t =	10.2	sec	a =	8.6	ft/sec²	G-force = 0.27
45 to 65mph	t =		sec	a =		ft/sec²	G-force =

Transmission Type: 5spd MANUAL

Notes:
Federal Bumper Standard Requirements: 2.5 mph
This vehicles Rated Bumper Strength: 5 mph

N.S.D.C = 1995 - 1997

1996 TOYOTA COROLLA 4 DOOR SEDAN

Other Information

Tip-Over Stability Ratio =	1.36	Stable
NHTSA Star Rating (calculated)		****

Center of Gravity (No Load):

Inches behind front axle	=	38.80
Inches in front of rear axle	=	58.20
Inches from side of vehicle	=	33.00
Inches from ground	=	21.20
Inches from front corner	=	79.02
Inches from rear corner	=	105.49
Inches from front bumper	=	71.80
Inches from rear bumper	=	100.20

Moments of Inertia Approximations (No Load):

Yaw Moment of Inertia	=	1178.45	lb*ft*sec²
Pitch Moment of Inertia	=	1142.85	lb*ft*sec²
Roll Moment of Inertia	=	266.70	lb*ft*sec²

Front Profile Information

Angle Front Bumper to Hood Front	=	53.1	deg
Angle Front of Hood to Windshield Base	=	9.9	deg
Angle Front of Hood to Windshield Top	=	18.9	deg
Angle of Windshield	=	30.7	deg
Angle of Steering Tires at Max Turn	=	28.9	deg

First Approximation Crush Factors:

Speed Equivalent (mph) of Kinetic Energy (KE) used in causing crush of indentation may be evaluated using the following formula, the appropriated Crush Factor (CF), and Maximum Indentation Depth (MID), in feet:

$$V(mph) = \sqrt{(30 * CF * MID)}$$

KE Equivalent Speed (Front/Rear/Side)	=	21	CF
Bullet vehicle IMPACT SPEED estimation based on TARGET VEHICLE damage ONLY (Tested for Rear/Side Impact only)	=	27	CF

These CF values are based upon analysis of NHTSA Barrier Crash data, and from over 1000 vehicle accidents where independant evaluation of speed was possible. (These are NOT 'A', 'B', 'C', or 'G' values)

The rear Impact data with more then 2-3 inches of crush damage should be looked at carefully, since some vehicles have very weak trunk & fender strength. Therefore, on some cars, especially GM, you estimate from the rear crush data may be high by as much as 4-5 mph (on a crush of 18 inches).

Stiffness Values and Test Data

Derived from

NHTSA Crash Test

#1763

1993 TOYOTA COROLLA

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS
8387 UNIVERSITY AVENUE
LA MESA CA 91941-3842
11R-030201SC02301

4N6XPRT Systems | 8387 University Avenue | La Mesa, CA 91942 | USA
(800) 266-9778 | (619) 464-3478 | FAX: (619) 464-2206 | Email: 4n6@4n6xprt.com

Sister/Clone database reader

You entered: **1996 TOYOTA COROLLA**

The Sister/Clone Vehicle Year/Model Interchange list indicates the following are Similar Models

Year Range	Make	Model	Body Styles	Wheelbase
1993 - 1997	GEO	PRIZM		97.1
Remarks:				
1993 - 1997	TOYOTA	COROLLA	2D, 3D, 4D, SW	102.4
Remarks:				

If you have suggestions, corrections, etc., you should contact Greg Anderson at Scalia Safety Engineering,
521 East Washington Avenue, Suite 200, Madison, WI 53703-2914, (608) 256-0820, FAX (608) 256-0212, E-mail: greganderson@cs.com.

Test Information

Test #	1763	NHTSA Test Reference Guide Version #	2			
Test Date	1992-09-30	Contract #	DTNH22-90-C-01003			
Contract/Study Title	FY93 VEHICLE SAFETY COMPLIANCE FRONTAL BARRIER IMPACT TEST PROGRAM					
Test Objective(s)	TO OBTAIN VEHICLE CRASHWORTHINESS AND OCCUPANT RESTRAINT PERFORMANCE					
Test Type	FMVSS 208 OCCUPANT CRASH PROTECTION	Configuration	VEHICLE INTO BARRIER			
Impact Angle	0	Side Impact Point	0	mm	0.0	inches
		Offset Distance	0	mm	0.0	inches
		Closing Speed	47.3	Km/Hr	29.39	MPH
Test Performer	CALSPAN					
Test Reference #	RUN 1218					
Test Track Surface	CONCRETE	Condition	DRY			
Ambient Temperature	11 C	51.8 F	Total Number of Curves	25		
Data Recorder Type	DIGITAL TAPE RECORDER	Data Link	UMBILICAL CABLE			
Test Commentary	NO COMMENTS					

Fixed Barrier Information

Barrier Type	RIGID	Pole Barrier Diameter	0	mm	0	inches
Barrier Shape	FLAT BARRIER					
Barrier Commentary	10*12*5 FT. CONCRETE BARRIER					

1993 TOYOTA COROLLA LEFT FRONT SEAT OCCUPANT

Test #	1763		
Vehicle #	1	Sex	MALE
Location	LEFT FRONT SEAT	Age	0
Position	CENTER POSITION	Height	0 mm 0.0 inches
Type	HYBRID III DUMMY	Weight	0.0 kg 0 pounds
Size	50 PERCENTILE		
Calibration Method	HYBRID III		
Occupant Manufacturer	MFG:HUMANOID S/N:290		
Occupant Modification	NO COMMENTS		
Occupant Description	NO COMMENTS		
Occupant Commentary	CNTRH1,CNTRC1 - AIR BAG.		

Head

Head to -

Windshielder Header	300	mm	11.8	inches	Head Injury Criteria (HIC)	164	
WindShield	475	mm	18.7	inches	HIC Lower Time Interval (ms)	59.4	
Seatback	0	mm	0.0	inches	HIC Upper Time Interval (ms)	95.28	
Side Header	193	mm	7.6	inches			
Side Window	297	mm	11.7	inches			

Neck to Seatback 0 mm 0.0 inches

First Contact Region (Head): OTHER

Second Contact Region (Head):

Chest

Chest to -

Dash	508	mm	20.0	inches	Arm to Door	102	mm	4.0	inches
Steering Wheel	287	mm	11.3	inches	Hip to Door	175	mm	6.9	inches
Seatback	0	mm	0.0	inches					

Chest Severity Index	321	Pelvic Peak Lateral Acceleration (g's)	
Thoracic Trauma Index		Thorax Peak Acceleration (g's)	46.2

Lap Belt Peak Load: Newtons 0.0 pound Force

Shoulder Belt Peak Load: Newtons 0.0 pound Force

First Contact Region (Chest/Abdomen): OTHER

Second Contact Region (Chest/Abdomen): NONE

Legs

Knees to Dash	155	mm	6.1	inches	Knees to Seatback	0	mm	0.0	inches

Left Femur Peak Load	-4933	Newtons	-1109.0	pounds Force
Right Femur Peak Load	-7184	Newtons	-1615.0	pounds Force

First Contact Region (Legs): DASHPANEL

Second Contact Region (Legs):

1993 TOYOTA COROLLA LEFT FRONT SEAT OCCUPANT

Test #	1763					
Vehicle #	1	Sex	MALE			
Location	LEFT FRONT SEAT	Age	0			
Position	CENTER POSITION	Height	0	mm	0.0	inches
Type	HYBRID III DUMMY	Weight	0.0	kg	0	pounds
Size	50 PERCENTILE					

Calibration Method	HYBRID III
Occupant Manufacturer	MFG:HUMANOID S/N:290
Occupant Modification	NO COMMENTS
Occupant Description	NO COMMENTS
Occupant Commentary	CNTRH1,CNTRC1 - AIR BAG.

Restraints

Restraint # 1	FRONTAL AIRBAG
Mounted	
Deployment	DEPLOYED PROPERLY
Restraint Commentary	NO COMMENTS
Restraint # 2	STR. WHEEL - EA
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	NO COMMENTS

1993 TOYOTA COROLLA RIGHT FRONT SEAT OCCUPANT

Test #	1763		
Vehicle #	1	Sex	MALE
Location	RIGHT FRONT SEAT	Age	0
Position	CENTER POSITION	Height	0 mm 0.0 inches
Type	HYBRID III DUMMY	Weight	0.0 kg 0 pounds
Size	50 PERCENTILE		
Calibration Method	HYBRID III		
Occupant Manufacturer	MFG:HUMANOID S/N:313		
Occupant Modification	NO COMMENTS		
Occupant Description	NO COMMENTS		
Occupant Commentary	NO COMMENTS		

Head

Head to -

Windshielder Header	323	mm	12.7	inches	Head Injury Criteria (HIC)	326	
WindShield	508	mm	20.0	inches	HIC Lower Time Interval (ms)	64.92	
Seatback	0	mm	0.0	inches	HIC Upper Time Interval (ms)	100.8	
Side Header	198	mm	7.8	inches			
Side Window	300	mm	11.8	inches			

Neck to Seatback 0 mm 0.0 inches

First Contact Region (Head): NONE

Second Contact Region (Head):

Chest

Chest to -

Dash	538	mm	21.2	inches	Arm to Door	99	mm	3.9	inches
Steering Wheel	0	mm	0.0	inches	Hip to Door	170	mm	6.7	inches
Seatback	0	mm	0.0	inches					

Chest Severity Index: 293 — Pelvic Peak Lateral Acceleration (g's):

Thoracic Trauma Index: — Thorax Peak Acceleration (g's): 41.5

Lap Belt Peak Load: Newtons 0.0 pound Force

Shoulder Belt Peak Load: Newtons 0.0 pound Force

First Contact Region (Chest/Abdomen): NONE

Second Contact Region (Chest/Abdomen): NONE

Legs

Knees to Dash	165	mm	6.5	inches	Knees to Seatback	0	mm	0.0	inches

Left Femur Peak Load: -2793 Newtons -627.9 pounds Force

Right Femur Peak Load: -3932 Newtons -884.0 pounds Force

First Contact Region (Legs): DASHPANEL

Second Contact Region (Legs):

1993 TOYOTA COROLLA RIGHT FRONT SEAT OCCUPANT

Test #	1763					
Vehicle #	1	Sex	MALE			
Location	RIGHT FRONT SEAT	Age	0			
Position	CENTER POSITION	Height	0	mm	0.0	inches
Type	HYBRID III DUMMY	Weight	0.0	kg	0	pounds
Size	50 PERCENTILE					

Calibration Method	HYBRID III
Occupant Manufacturer	MFG:HUMANOID S/N:313
Occupant Modification	NO COMMENTS
Occupant Description	NO COMMENTS
Occupant Commentary	NO COMMENTS

Restraints

Restraint # 1	3 POINT BELT
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	NO COMMENTS
Restraint # 2	DASHPANEL
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	NO COMMENTS

Vehicle 1 1993 TOYOTA COROLLA

Test #	1763		
VIN	JT2AE04E9P0003607	NHTSA Test Vehicle Number	1
Year	1993	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	TOYOTA	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	COROLLA	Steering Column Collapse Mechanism	UNKNOWN
Body	FOUR DOOR SEDAN		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	1.6 Liter	Transmission	MANUAL - FRONT WHEEL DRIVE
Vehicle Modification(s) Description	NO COMMENTS		
Vehicle Commentary	NO COMMENTS		

Vehicle Length	4384	mm	172.6	inches	CG behind Front Axle	1074	mm	42.3	inches
Vehicle Width	1656	mm	65.2	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Wheelbase	2454	mm	96.6	inches	Total Length of Indentation	1656	mm	65.2	inches
Vehicle Test Weight	1233	KG	2718	pounds	Maximum Static Crush Depth	409	mm	16.1	inches
					Pre-Impact Speed	47	kph	29.4	mph

Vehicle Damage Index: 9999999

Principal Direction of Force: 0

Damage Profile Distance Measurements

(Measured Left-to-Right, Rear-to-Front)

DPD 1	0	mm	0.0	inches
DPD 2	0	mm	0.0	inches
DPD 3	0	mm	0.0	inches
DPD 4	0	mm	0.0	inches
DPD 5	0	mm	0.0	inches
DPD 6	0	mm	0.0	inches

Crush from Pre & Post Test Damage Measurements

	Pre-Test		Post-Test		Crush Depth	
Left Bumper Corner	170.2	inches	155.9	inches	14.3	inches
	4323	mm	3960	mm	363	mm
Centerline	172.6	inches	156.8	inches	15.8	inches
	4384	mm	3983	mm	401	mm
Right Bumper Corner	170.0	inches	153.9	inches	16.1	inches
	4318	mm	3909	mm	409	mm

Bumper Engagement (Inline Impact Only)	Sill Engagement (Side Impact Only)	A-pillar Engagement (Side Impact Only)
0.0	NOT APPLICABLE	0.0

Moving Test Cart Angle	Moving Test Cart/Vehicle Crabbed Angle	Vehicle Orientation on Cart Moving Test Cart
NOT APPLICABLE	0.0	NOT APPLICABLE
Magnitude of the Tilt Angle Measured between surface of a Rollover Test Cart and the Ground	*Magniture of the Crabbed Angle Measure Clockwise from Longitudinal Vector to Velocity Vector of Vehicle*	*Magnitude of the Angle Measured between the Vehicle Orientation and Direction of Test Cart Motion*

Vehicle 1 1993 TOYOTA COROLLA

Test #	1763		
VIN	JT2AE04E9P0003607	NHTSA Test Vehicle Number	1
Year	1993	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	TOYOTA	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	COROLLA	Steering Column Collapse Mechanism	UNKNOWN
Body	FOUR DOOR SEDAN		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	1.6 Liter	Transmission	MANUAL - FRONT WHEEL DRIVE
Vehicle Modification(s) Description	NO COMMENTS		
Vehicle Commentary	NO COMMENTS		

Vehicle Length	4384	mm	172.6	inches	CG behind Front Axle	1074	mm	42.3	inches
Vehicle Width	1656	mm	65.2	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Wheelbase	2454	mm	96.6	inches	Total Length of Indentation	1656	mm	65.2	inches
Vehicle Test Weight	1233	KG	2718	pounds	Maximum Static Crush Depth	409	mm	16.1	inches
					Pre-Impact Speed	47	kph	29.4	mph

Vehicle Damage Index	9999999	Principal Direction of Force	0

Pre & Post Test Damage Measurements

(Measurements are taken in a longitudinaldirection. Except for Engine Block, all measurements are take from the Rear Vehicle Surface forward.)

Left Side				Centerline				Right Side			
Pre-Test		Post-Test		Pre-Test		Post-Test		Pre-Test		Post-Test	
mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches
				Length of Vehicle at Centerline							
				4384	172.6	3983	156.8				
				Engine Block							
				414	16.3	414	16.3				
4323	170.2	3960	155.9	Front Bumper Corner				4318	170.0	3909	153.9
				Front of Engine							
				3835	151.0	3696	145.5				
3266	128.6	3241	127.6	Firewall				3266	128.6	3228	127.1
				3320	130.7	3292	129.6				
2997	118.0	2992	117.8	Upper Leading Edge of Door				2987	117.6	2987	117.6
3007	118.4	2997	118.0	Lower Leading Edge of Door				2992	117.8	2982	117.4
3073	121.0	3061	120.5	Bottom of 'A' Post				3053	120.2	3046	119.9
2022	79.6	2019	79.5	Upper Trailing Edge of Door				2014	79.3	2007	79.0
2022	79.6	2014	79.3	Lower Trailing Edge of Door				2007	79.0	2004	78.9
				Steering Column							
				2596	102.2	2667	105.0				
				Center of Seering Column to 'A' Post (Horizontal)							
				396	15.6	404	15.9				
				Center of Steering Column to Headliner (Vertical)							
				401	15.8	376	14.8				

1993 TOYOTA COROLLA

NHTSA Crash Test - #1763 - Front Impact

Pre/Post Depths - Vehicle Width - Closing Speed - Trapezoidal Average

Test Vehicle Weight = 2718 pounds
Vehicle Closing Speed = 29.4 mph
Test Crush Length = 65.2 inches

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	14.3	15.8	16.1	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 14.3 inches					141.2
Using a Rated No Damage Speed of	2.5mph	157.1	118.2	104.4	
Using a Rated No Damage Speed of	5.0mph	285.0	97.2	417.7	
Using a Rated No Damage Speed of	7.5mph	383.7	78.3	939.9	
Using a Rated No Damage Speed of	10.0mph	453.1	61.4	1670.9	
Average Crush = 15.5 inches					120.2
Using a Rated No Damage Speed of	2.5mph	144.9	100.6	104.4	
Using a Rated No Damage Speed of	5.0mph	262.9	82.7	417.7	
Using a Rated No Damage Speed of	7.5mph	354.0	66.7	939.9	
Using a Rated No Damage Speed of	10.0mph	418.1	52.3	1670.9	
Maximum Crush = 16.1 inches					111.4
Using a Rated No Damage Speed of	2.5mph	139.5	93.2	104.4	
Using a Rated No Damage Speed of	5.0mph	253.1	76.7	417.7	
Using a Rated No Damage Speed of	7.5mph	340.8	61.8	939.9	
Using a Rated No Damage Speed of	10.0mph	402.5	48.5	1670.9	

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

****

4N6XPRT System's First Approximation Crush Factor (CF)

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

KE Speed (mph) = SQRT(30 * CF * max crush in feet)

Crush Factor	Maximum Crush (inches)	Calculated KE Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	16.1	29.1	-0.3	-1.1

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 21.5

CF = (mph * mph) / (30 * max crush in feet), dimensionless

4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test

1993 TOYOTA COROLLA

NHTSA Crash Test - #1763 - Front Impact

Pre/Post Depths - Indention Length - Closing Speed - Trapezoidal Average

Test Vehicle Weight = 2718 pounds
Vehicle Closing Speed = 29.4 mph
Test Crush Length = 65.2 inches

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	14.3	15.8	16.1	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 14.3 inches					141.2
Using a Rated No Damage Speed of	2.5mph	157.1	118.2	104.4	
Using a Rated No Damage Speed of	5.0mph	285.0	97.2	417.7	
Using a Rated No Damage Speed of	7.5mph	383.7	78.3	939.9	
Using a Rated No Damage Speed of	10.0mph	453.1	61.4	1670.9	
Average Crush = 15.5 inches					120.2
Using a Rated No Damage Speed of	2.5mph	144.9	100.6	104.4	
Using a Rated No Damage Speed of	5.0mph	262.9	82.7	417.7	
Using a Rated No Damage Speed of	7.5mph	354.0	66.7	939.9	
Using a Rated No Damage Speed of	10.0mph	418.1	52.3	1670.9	
Maximum Crush = 16.1 inches					111.4
Using a Rated No Damage Speed of	2.5mph	139.5	93.2	104.4	
Using a Rated No Damage Speed of	5.0mph	253.1	76.7	417.7	
Using a Rated No Damage Speed of	7.5mph	340.8	61.8	939.9	
Using a Rated No Damage Speed of	10.0mph	402.5	48.5	1670.9	

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

****

4N6XPRT System's First Approximation Crush Factor (CF)

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

KE Speed (mph) = SQRT(30 * CF * max crush in feet)

Crush Factor	Maximum Crush (inches)	Calculated KE Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	16.1	29.1	-0.3	-1.1

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 21.5

CF = (mph * mph) / (30 * max crush in feet), dimensionless

4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test

Available Test Results
Front Impact Test Summary

Report Filter Settings

Year Range: 1993 - 1997
Make: TOYOTA
Model: COROLLA

Test Number	Vehicle Info	No Damage Speed (mph)	Average Crush (inch)	Closing Speed (mph)	Vehicle Stiffness A	Vehicle Stiffness B	Vehicle Width Values G	Vehicle Width Values Kv	Crush Factor
1771	1993 TOYOTA COROLLA FOUR DOOR SEDAN	5.0	19.4	35.0	252.8	78.0	409.4	106.2	25.2
1763	1993 TOYOTA COROLLA FOUR DOOR SEDAN	5.0	15.5	29.4	263.1	82.8	417.7	120.3	22.3
2019	1994 TOYOTA COROLLA FOUR DOOR SEDAN	5.0	15.1	29.6	274.3	89.1	422.2	129.1	23.1
2034	1994 TOYOTA COROLLA FOUR DOOR SEDAN	5.0	19.4	34.9	276.4	85.4	447.5	116.3	25.2
	Average (AVG)				**266.7**	**83.8**	**424.2**	**118.0**	**24.0**
	Minimum (MIN)				**252.8**	**78.0**	**409.4**	**106.2**	**22.3**
	Maximum (MAX)				**276.4**	**89.1**	**447.5**	**129.1**	**25.2**
	Standard Deviation (STDev-sample)				**10.9**	**4.7**	**16.4**	**9.5**	**1.5**
	Number of Tests (n)			**4**					

Available Test Results
Front Impact Test Summary

Report Filter Settings

Year Range: 1993 - 1997
Make: TOYOTA
Model: COROLLA

Test Number	Vehicle Info	No Damage Speed (mph)	Max Crush (inch)	Closing Speed (mph)	Vehicle Stiffness A	Vehicle Stiffness B	Vehicle Width Values G	Vehicle Width Values Kv	Crush Factor
1771	1993 TOYOTA COROLLA FOUR DOOR SEDAN	5.0	20.4	35.0	240.3	70.5	409.4	96.0	24.0
2034	1994 TOYOTA COROLLA FOUR DOOR SEDAN	5.0	21.3	34.9	251.9	70.9	447.5	96.6	22.9
1763	1993 TOYOTA COROLLA FOUR DOOR SEDAN	5.0	16.1	29.4	253.1	76.7	417.7	111.3	21.5
2019	1994 TOYOTA COROLLA FOUR DOOR SEDAN	5.0	15.8	29.6	262.9	81.9	422.2	118.5	22.2
	Average (AVG)				**252.1**	**75.0**	**424.2**	**105.6**	**22.7**
	Minimum (MIN)				**240.3**	**70.5**	**409.4**	**96.0**	**21.5**
	Maximum (MAX)				**262.9**	**81.9**	**447.5**	**118.5**	**24.0**
	Standard Deviation (STDev-sample)				**9.3**	**5.4**	**16.4**	**11.1**	**1.1**
	Number of Tests (n)			**4**					

Expert VIN DeCoder®

Version Number 3.1.0.3

DeCoded VIN:	1YVGE22C2V5678269
Model:	1997 Mazda 626 ES 4 Door Sedan
Engine Size:	2.5 L/152 cu.in.
Engine Description:	V6 cylinder with Dual Overhead Cam
Horse Power:	164 @ 5600 rpm
Torque:	160 lb-ft at 4800 rpm
Injection System:	Electronic Fuel Injection (EFI)
PSI:	64-85 psi
Ignition:	electronic
Manufacturer:	Mazda
Assembly Plant:	Flat Rock, MI
Drive Wheels:	This is a Front Wheel Drive vehicle w/ Manual Belts w/ Airbags

The First through Third characters (1YV) indicate a Mazda Car made in U.S.A.

The Fourth and Fifth characters (GE) indicate a 626 ES

The Sixth and Seventh characters (22) indicate a 4 Door Sedan

The Eighth character (C) indicates the OEM engine: 2.5 L/152 cu.in., V6, DOHC

The Ninth character (the check digit) is entered as 2.
The VIN appears Valid, the calculated value is 2.

The Tenth character (V) indicates the model year 1997

The Eleventh character (5) indicates the vehicle was made in the assembly plant in Flat Rock, MI

The Twelfth through Seventeenth characters (678269) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.2.0.4

PROVIDED BY:
4N6XPRT Systems
8387 University Avenue
La Mesa CA 91942

7/19/2012

1997 MAZDA 626 ES (V6) 4 DOOR SEDAN

Curb Weight:		2626	lbs.	1191	kg.
Curb Weight Distribution -	Front:	63	% Rear:	37	%
Gross Vehicle Weight Rating:		3795	lbs.	1721	kg.
Number of Tires on Vehicle:		4			
Drive Wheels:		FRONT			

Horizontal Dimensions	Inches	Feet	Meters
Total Length	184	15.33	4.67
Wheelbase:	103	8.58	2.62
Front Bumper to Front Axle:	39	3.25	0.99
Front Bumper to Front of Front Well:	19	1.58	0.48
Front Bumper to Front of Hood:	2	0.17	0.05
Front Bumper to Base of Windshield:	50	4.17	1.27
Front Bumper to Top of Windshield:	77	6.42	1.96
Rear Bumper to Rear Axle:	42	3.50	1.07
Rear Bumper to Rear of Rear Well:	30	2.50	0.76
Rear Bumper to Rear of Trunk:	4	0.33	0.10
Rear Bumper to Base of Rear Window:	24	2.00	0.61
Width Dimensions			
Maximum Width:	69	5.75	1.75
Front Track:	59	4.92	1.50
Rear Track:	59	4.92	1.50
Vertical Dimensions			
Height:	55	4.58	1.40
Ground to -			
Front Bumper (Top)	23	1.92	0.58
Headlight - center	25	2.08	0.64
Hood - top front:	29	2.42	0.74
Base of Windshield	36	3.00	0.91
Rear Bumper - top:	27	2.25	0.69
Trunk - top rear:	38	3.17	0.97
Base of Rear Window:	40	3.33	1.02

1997 MAZDA 626 ES (V6) 4 DOOR SEDAN

Interior Dimensions	Inches	Feet	Meters
Front Seat Shoulder Width	55	4.58	1.40
Front Seat to Headliner	39	3.25	0.99
Front Leg Room - seatback to floor (max)	44	3.67	1.12
Rear Seat Shoulder Width	55	4.58	1.40
Rear Seat to Headliner	38	3.17	0.97
Front Leg Room - seatback to floor (min)	36	3.00	0.91

Seatbelts: 3pt - front and rear
Airbags: FRONT SEAT AIRBAGS

Steering Data

Turning Circle (Diameter)	420	35.00	10.67
Steering Ratio: 17.79:1			
Wheel Radius:	12	1.00	0.30
Tire Size (OEM): P195/65R15			

Acceleration & Braking Information

Brake Type: FRONT DISC - REAR DRUM
ABS System: ABS UNKNOWN

Braking, 60 mph to 0 (Hard pedal, no skid, dry pavement):
d = 156.0 ft t = 3.6 sec a = -24.8 ft/sec² G-force = -0.77

Acceleration:

0 to 30mph	t =	3.6	sec	a =	12.2	ft/sec²	G-force = 0.38
0 to 60mph	t =	9.5	sec	a =	9.3	ft/sec²	G-force = 0.29
45 to 65mph	t =		sec	a =		ft/sec²	G-force =

Transmission Type: 5spd MANUAL

Notes:
Federal Bumper Standard Requirements: 2.5 mph
This vehicles Rated Bumper Strength: 5 mph

N.S.D.C = 1995 - 1997

1997 MAZDA 626 ES (V6) 4 DOOR SEDAN

Other Information

Tip-Over Stability Ratio =	1.37	Stable
NHTSA Star Rating (calculated)		****

Center of Gravity (No Load):

Inches behind front axle	=	38.11
Inches in front of rear axle	=	64.89
Inches from side of vehicle	=	34.50
Inches from ground	=	21.59
Inches from front corner	=	84.48
Inches from rear corner	=	112.32
Inches from front bumper	=	77.11
Inches from rear bumper	=	106.89

Moments of Inertia Approximations (No Load):

Yaw Moment of Inertia	=	1498.78	lb*ft*sec²
Pitch Moment of Inertia	=	1450.74	lb*ft*sec²
Roll Moment of Inertia	=	322.68	lb*ft*sec²

Front Profile Information

Angle Front Bumper to Hood Front	=	71.6	deg
Angle Front of Hood to Windshield Base	=	8.3	deg
Angle Front of Hood to Windshield Top	=	17.7	deg
Angle of Windshield	=	32.2	deg
Angle of Steering Tires at Max Turn	=	28.1	deg

First Approximation Crush Factors:

Speed Equivalent (mph) of Kinetic Energy (KE) used in causing crush of indentation may be evaluated using the following formula, the appropriated Crush Factor (CF), and Maximum Indentation Depth (MID), in feet:

$$V(mph) = v(30 * CF * MID)$$

KE Equivalent Speed (Front/Rear/Side)	=	21 CF
Bullet vehicle IMPACT SPEED estimation based on TARGET VEHICLE damage ONLY (Tested for Rear/Side Impact only)	=	27 CF

These CF values are based upon analysis of NHTSA Barrier Crash data, and from over 1000 vehicle accidents where independant evaluation of speed was possible. (These are NOT 'A', 'B', 'C', or 'G' values)

The rear Impact data with more then 2-3 inches of crush damage should be looked at carefully, since some vehicles have very weak trunk & fender strength. Therefore, on some cars, especially GM, you estimate from the rear crush data may be high by as much as 4-5 mph (on a crush of 18 inches).

Stiffness Values and Test Data

Derived from

NHTSA Crash Test

#1981

1994 MAZDA 626

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS
8387 UNIVERSITY AVENUE
LA MESA CA 91941-3842
11R-030201SC02301

4N6XPRT Systems | 8387 University Avenue | La Mesa, CA 91942 | USA
(800) 266-9778 | (619) 464-3478 | FAX: (619) 464-2206 | Email: 4n6@4n6xprt.com

Sister/Clone database reader

You entered: **1997 MAZDA 626**

The Sister/Clone Vehicle Year/Model Interchange list indicates the following are Similar Models

Year Range	Make	Model	Body Styles	Wheelbase
1993 - 1997	MAZDA	626	2D, 4D, 5D	105.1

Remarks:

If you have suggestions, corrections, etc., you should contact Greg Anderson at Scalia Safety Engineering,
521 East Washington Avenue, Suite 200, Madison, WI 53703-2914, (608) 256-0820, FAX (608) 256-0212, E-mail: greganderson@cs.com.

Test Information

Test #	1981	NHTSA Test Reference Guide Version #	2			
Test Date	1993-09-30	Contract #	DTNH22-90-D-02121			
Contract/Study Title	FY91 VEHICLE SAFETY COMPLIANCE FRONTAL BARRIER IMPACT TEST PROGRAM					
Test Objective(s)	TO OBTAIN VEHICLE CRASHWORTHINESS AND OCCUPANT RESTRAINT PERFORMANCE					
Test Type	FMVSS 208 OCCUPANT CRASH PROTECTION	Configuration	VEHICLE INTO BARRIER			
Impact Angle	0	Side Impact Point	0	mm	0.0	inches
		Offset Distance	0	mm	0.0	inches
		Closing Speed	47.5	Km/Hr	29.52	MPH
Test Performer	CALSPAN					
Test Reference #	RUN1322					
Test Track Surface	CONCRETE	Condition	DRY			
Ambient Temperature	14 C	57.2 F	Total Number of Curves	23		
Data Recorder Type	FM TAPE RECORDER	Data Link	UMBILICAL CABLE			
Test Commentary	NO COMMENTS					

Fixed Barrier Information

Barrier Type	RIGID	Pole Barrier Diameter	0	mm	0	inches
Barrier Shape	FLAT BARRIER					
Barrier Commentary	10*12*5 FT. CONCRETE BARRIER					

1994 MAZDA 626 LEFT FRONT SEAT OCCUPANT

Test #	1981		
Vehicle #	1	Sex	MALE
Location	LEFT FRONT SEAT	Age	0
Position	CENTER POSITION	Height	0 mm 0.0 inches
Type	PART 572 DUMMY	Weight	0.0 kg 0 pounds
Size	50 PERCENTILE		
Calibration Method	PART 572		
Occupant Manufacturer	MFG:ALDERSON S/N:1019		
Occupant Modification	NO COMMENTS		
Occupant Description	NO COMMENTS		
Occupant Commentary	NO COMMENTS		

Head

Head to -

Windshielder Header	439	mm	17.3	inches	Head Injury Criteria (HIC)	347	
WindShield	587	mm	23.1	inches	HIC Lower Time Interval (ms)	69.6	
Seatback	0	mm	0.0	inches	HIC Upper Time Interval (ms)	105.48	
Side Header	198	mm	7.8	inches			
Side Window	302	mm	11.9	inches			

Neck to Seatback 0 mm 0.0 inches

First Contact Region (Head): AIR BAG

Second Contact Region (Head):

Chest

Chest to -

Dash	650	mm	25.6	inches	Arm to Door	99	mm	3.9	inches
Steering Wheel	379	mm	14.9	inches	Hip to Door	137	mm	5.4	inches
Seatback	0	mm	0.0	inches					

Chest Severity Index	472	Pelvic Peak Lateral Acceleration (g's)	
Thoracic Trauma Index		Thorax Peak Acceleration (g's)	53.91

Lap Belt Peak Load: -10 Newtons -2.2 pound Force

Shoulder Belt Peak Load: -10 Newtons -2.2 pound Force

First Contact Region (Chest/Abdomen): AIR BAG

Second Contact Region (Chest/Abdomen): STEERING WHEEL

Legs

Knees to Dash	193	mm	7.6	inches	Knees to Seatback	0	mm	0.0	inches

Left Femur Peak Load	-5298 Newtons	-1191.0	pounds Force
Right Femur Peak Load	-6410 Newtons	-1441.0	pounds Force

First Contact Region (Legs): DASHPANEL

Second Contact Region (Legs):

1994 MAZDA 626 LEFT FRONT SEAT OCCUPANT

Test #	1981					
Vehicle #	1	Sex	MALE			
Location	LEFT FRONT SEAT	Age	0			
Position	CENTER POSITION	Height	0	mm	0.0	inches
Type	PART 572 DUMMY	Weight	0.0	kg	0	pounds
Size	50 PERCENTILE					

Calibration Method	PART 572
Occupant Manufacturer	MFG:ALDERSON S/N:1019
Occupant Modification	NO COMMENTS
Occupant Description	NO COMMENTS
Occupant Commentary	NO COMMENTS

Restraints

Restraint # 1	FRONTAL AIRBAG
Mounted	
Deployment	DEPLOYED PROPERLY
Restraint Commentary	NO COMMENTS
Restraint # 2	STR. WHEEL - EA
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	NO COMMENTS

1994 MAZDA 626 RIGHT FRONT SEAT OCCUPANT

Test #	1981		
Vehicle #	1	Sex	MALE
Location	RIGHT FRONT SEAT	Age	0
Position	CENTER POSITION	Height	0 mm 0.0 inches
Type	PART 572 DUMMY	Weight	0.0 kg 0 pounds
Size	50 PERCENTILE		
Calibration Method	PART 572		
Occupant Manufacturer	MFG:ALDERSON S/N:1022		
Occupant Modification	NO COMMENTS		
Occupant Description	NO COMMENTS		
Occupant Commentary	NO COMMENTS		

Head

Head to -

Windshielder Header	447	mm	17.6	inches	Head Injury Criteria (HIC)	186	
WindShield	594	mm	23.4	inches	HIC Lower Time Interval (ms)	75.84	
Seatback	0	mm	0.0	inches	HIC Upper Time Interval (ms)	104.88	
Side Header	173	mm	6.8	inches			
Side Window	305	mm	12.0	inches			

Neck to Seatback 0 mm 0.0 inches

First Contact Region (Head): AIR BAG

Second Contact Region (Head):

Chest

Chest to -

Dash	617	mm	24.3	inches	Arm to Door	107	mm	4.2	inches
Steering Wheel	0	mm	0.0	inches	Hip to Door	135	mm	5.3	inches
Seatback	0	mm	0.0	inches					

Chest Severity Index	212	Pelvic Peak Lateral Acceleration (g's)	
Thoracic Trauma Index		Thorax Peak Acceleration (g's)	34.77

Lap Belt Peak Load	-10	Newtons	-2.2	pound Force
Shoulder Belt Peak Load	-10	Newtons	-2.2	pound Force

First Contact Region (Chest/Abdomen): AIR BAG

Second Contact Region (Chest/Abdomen): NONE

Legs

Knees to Dash	185	mm	7.3	inches	Knees to Seatback	0	mm	0.0	inches

Left Femur Peak Load	-5970	Newtons	-1342.1	pounds Force
Right Femur Peak Load	-6752	Newtons	-1517.9	pounds Force

First Contact Region (Legs): DASHPANEL

Second Contact Region (Legs):

1994 MAZDA 626 RIGHT FRONT SEAT OCCUPANT

Test #	1981					
Vehicle #	1	Sex	MALE			
Location	RIGHT FRONT SEAT	Age	0			
Position	CENTER POSITION	Height	0	mm	0.0	inches
Type	PART 572 DUMMY	Weight	0.0	kg	0	pounds
Size	50 PERCENTILE					

Calibration Method	PART 572
Occupant Manufacturer	MFG:ALDERSON S/N:1022
Occupant Modification	NO COMMENTS
Occupant Description	NO COMMENTS
Occupant Commentary	NO COMMENTS

Restraints

Restraint # 1	FRONTAL AIRBAG
Mounted	
Deployment	UNKNOWN
Restraint Commentary	NO COMMENTS
Restraint # 2	DASHPANEL
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	NO COMMENTS

Vehicle 1 1994 MAZDA 626

Test #	1981		
VIN	1YVGE22C3R5103507	NHTSA Test Vehicle Number	1
Year	1994	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	MAZDA	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	626	Steering Column Collapse Mechanism	UNKNOWN
Body	FOUR DOOR SEDAN		
Engine	4 CYLINDER INLINE FRONT		
Displacement	2 Liter	Transmission	MANUAL - FRONT WHEEL DRIVE
Vehicle Modification(s) Description	NO COMMENTS		
Vehicle Commentary	94 MAZDA 626		

Vehicle Length	4691	mm	184.7	inches	CG behind Front Axle	1115	mm	43.9	inches
Vehicle Width	1750	mm	68.9	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Wheelbase	2611	mm	102.8	inches	Total Length of Indentation	0	mm	0.0	inches
Vehicle Test Weight	1406	KG	3099	pounds	Maximum Static Crush Depth	450	mm	17.7	inches
					Pre-Impact Speed	48	kph	29.5	mph

Vehicle Damage Index: 9999999

Principal Direction of Force: 0

Damage Profile Distance Measurements

(Measured Left-to-Right, Rear-to-Front)

DPD 1	0	mm	0.0	inches
DPD 2	0	mm	0.0	inches
DPD 3	0	mm	0.0	inches
DPD 4	0	mm	0.0	inches
DPD 5	0	mm	0.0	inches
DPD 6	0	mm	0.0	inches

Crush from Pre & Post Test Damage Measurements

	Pre-Test		Post-Test		Crush Depth	
Left Bumper Corner	180.0	inches	165.5	inches	14.5	inches
	4572	mm	4204	mm	368	mm
Centerline	184.7	inches	167.0	inches	17.7	inches
	4691	mm	4242	mm	449	mm
Right Bumper Corner	179.7	inches	164.3	inches	15.4	inches
	4564	mm	4173	mm	391	mm

Bumper Engagement (Inline Impact Only): 0.0

Sill Engagement (Side Impact Only): NOT APPLICABLE

A-pillar Engagement (Side Impact Only): 0.0

Moving Test Cart Angle: DIRECT ENGAGEMENT

Magnitude of the Tilt Angle Measured between surface of a Rollover Test Cart and the Ground

Moving Test Cart/Vehicle Crabbed Angle: 0.0

Magniture of the Crabbed Angle Measure Clockwise from Longitudinal Vector to Velocity Vector of Vehicle

Vehicle Orientation on Cart Moving Test Cart: NOT APPLICABLE

Magnitude of the Angle Measured between the Vehicle Orientation and Direction of Test Cart Motion

Vehicle 1 1994 MAZDA 626

Test #	1981		
VIN	1YVGE22C3R5103507	NHTSA Test Vehicle Number	1
Year	1994	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	MAZDA	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	626	Steering Column Collapse Mechanism	UNKNOWN
Body	FOUR DOOR SEDAN		
Engine	4 CYLINDER INLINE FRONT		
Displacement	2 Liter	Transmission	MANUAL - FRONT WHEEL DRIVE
Vehicle Modification(s) Description	NO COMMENTS		
Vehicle Commentary	94 MAZDA 626		

Vehicle Length	4691	mm	184.7	inches	CG behind Front Axle	1115	mm	43.9	inches
Vehicle Width	1750	mm	68.9	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Wheelbase	2611	mm	102.8	inches	Total Length of Indentation	0	mm	0.0	inches
Vehicle Test Weight	1406	KG	3099	pounds	Maximum Static Crush Depth	450	mm	17.7	inches
					Pre-Impact Speed	48	kph	29.5	mph

Vehicle Damage Index	9999999	Principal Direction of Force	0

Pre & Post Test Damage Measurements

(Measurements are taken in a longitudinaldirection. Except for Engine Block, all measurements are take from the Rear Vehicle Surface forward.)

Left Side				Centerline				Right Side			
Pre-Test		Post-Test		Pre-Test		Post-Test		Pre-Test		Post-Test	
mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches
				Length of Vehicle at Centerline							
				4691	184.7	4242	167.0				
				Engine Block							
				432	17.0	432	17.0				
4572	180.0	4204	165.5	Front Bumper Corner				4564	179.7	4173	164.3
				Front of Engine							
				4026	158.5	3904	153.7				
3465	136.4	3460	136.2	Firewall				3444	135.6	3460	136.2
				3531	139.0	3518	138.5				
3114	122.6	3109	122.4	Upper Leading Edge of Door				3109	122.4	3106	122.3
3150	124.0	3139	123.6	Lower Leading Edge of Door				3145	123.8	3114	122.6
3183	125.3	3175	125.0	Bottom of 'A' Post				3178	125.1	3157	124.3
2144	84.4	2141	84.3	Upper Trailing Edge of Door				2134	84.0	2129	83.8
2149	84.6	2144	84.4	Lower Trailing Edge of Door				2141	84.3	2131	83.9
				Steering Column							
				2718	107.0	2794	110.0				
				Center of Seering Column to 'A' Post (Horizontal)							
				401	15.8	432	17.0				
				Center of Steering Column to Headliner (Vertical)							
				442	17.4	368	14.5				

1994 MAZDA 626

NHTSA Crash Test - #1981 - Front Impact

Pre/Post Depths - Vehicle Width - Closing Speed - Trapezoidal Average

Test Vehicle Weight = 3099 pounds
Vehicle Closing Speed = 29.5 mph
Test Crush Length = 68.9 inches

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	14.5	17.7	15.4	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 14.5 inches					149.4
Using a Rated No Damage Speed of	2.5mph	168.0	125.2	112.7	
Using a Rated No Damage Speed of	5.0mph	304.8	103.1	450.7	
Using a Rated No Damage Speed of	7.5mph	410.6	83.1	1014.2	
Using a Rated No Damage Speed of	10.0mph	485.3	65.3	1802.9	
Average Crush = 16.3 inches					118.2
Using a Rated No Damage Speed of	2.5mph	149.4	99.0	112.7	
Using a Rated No Damage Speed of	5.0mph	271.2	81.6	450.7	
Using a Rated No Damage Speed of	7.5mph	365.3	65.8	1014.2	
Using a Rated No Damage Speed of	10.0mph	431.7	51.7	1802.9	
Maximum Crush = 17.7 inches					100.3
Using a Rated No Damage Speed of	2.5mph	137.6	84.0	112.7	
Using a Rated No Damage Speed of	5.0mph	249.7	69.2	450.7	
Using a Rated No Damage Speed of	7.5mph	336.4	55.8	1014.2	
Using a Rated No Damage Speed of	10.0mph	397.6	43.8	1802.9	

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

****

4N6XPRT System's First Approximation Crush Factor (CF)

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

KE Speed (mph) = SQRT(30 * CF * max crush in feet)

Crush Factor	Maximum Crush (inches)	Calculated KE Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	17.7	30.5	1.0	3.2

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 19.7

CF = (mph * mph) / (30 * max crush in feet), dimensionless

4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test

Available Test Results
Front Impact Test Summary

Report Filter Settings

Year Range: 1993 - 1997
Make: MAZDA
Model: 626

Test Number	Vehicle Info	No Damage Speed (mph)	Average Crush (inch)	Closing Speed (mph)	Vehicle Stiffness A	Vehicle Stiffness B	Vehicle Width Values G	Vehicle Width Values Kv	Crush Factor
1742	1993 MAZDA 626 FOUR DOOR SEDAN	5.0	20.0	35.0	276.5	82.9	461.2	112.8	24.5
1981	1994 MAZDA 626 FOUR DOOR SEDAN	5.0	16.3	29.5	271.0	81.5	450.7	118.1	21.4
	Average (AVG)				**273.8**	**82.2**	**456.0**	**115.5**	**23.0**
	Minimum (MIN)				**271.0**	**81.5**	**450.7**	**112.8**	**21.4**
	Maximum (MAX)				**276.5**	**82.9**	**461.2**	**118.1**	**24.5**
	Standard Deviation (STDev-sample)				**3.9**	**1.0**	**7.4**	**3.7**	**2.2**
	Number of Tests (n)			**2**					

Available Test Results
Front Impact Test Summary

Report Filter Settings

Year Range: 1993 - 1997
Make: MAZDA
Model: 626

Test Number	Vehicle Info	No Damage Speed (mph)	Max Crush (inch)	Closing Speed (mph)	Vehicle Stiffness A	Vehicle Stiffness B	Vehicle Width Values G	Vehicle Width Values Kv	Crush Factor
1981	1994 MAZDA 626 FOUR DOOR SEDAN	5.0	17.7	29.5	249.5	69.0	450.7	100.1	19.7
1742	1993 MAZDA 626 FOUR DOOR SEDAN	5.0	21.8	35.0	253.6	69.7	461.2	94.9	22.4
	Average (AVG)				**251.6**	**69.4**	**456.0**	**97.5**	**21.1**
	Minimum (MIN)				**249.5**	**69.0**	**450.7**	**94.9**	**19.7**
	Maximum (MAX)				**253.6**	**69.7**	**461.2**	**100.1**	**22.4**
	Standard Deviation (STDev-sample)				**2.9**	**0.5**	**7.4**	**3.7**	**1.9**
	Number of Tests (n)			**2**					

Expert VIN DeCoder®

Version Number 3.1.0.3

DeCoded VIN: 1G8ZG5285TZ323134

Model:	1996 Saturn Saturn SL1 4 Door Sedan
Engine Size:	1.9 L/ 116 cu.in.
Engine Description:	In-Line cylinder with Overhead Cam
Horse Power:	85 @ 5000 rpm
Torque:	107 lb-ft at 2400 rpm
Injection System:	Throttle Body Fuel Injection (TBFI)
PSI:	26-31 psi
Ignition:	Electronic
Manufacturer:	Saturn
Assembly Plant:	Spring Hill, TN.
Drive Wheels:	This is a Front Wheel Drive vehicle w/ Active (Manual) Seatbelts + Driver & Passenger Air Bags

The First through Third characters (1G8) indicate a Saturn Car made in the U.S.A.

The Fourth and Fifth characters (ZG) indicate a Saturn SL1

The Sixth character (5) indicates a 4 Door Sedan

The Seventh character (2) indicates Active (Manual) Seatbelts + Driver & Passenger Air Bags

The Eighth character (8) indicates the OEM engine: 1.9 L/ 116 cu.in., L4, OHC

The Ninth character (the check digit) is entered as 5.
The VIN appears Valid, the calculated value is 5.

The Tenth character (T) indicates the model year 1996

The Eleventh character (Z) indicates the vehicle was made in the assembly plant in Spring Hill, TN.

The Twelfth through Seventeenth characters (323134) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.2.0.4

PROVIDED BY:

4N6XPRT Systems

8387 University Avenue

La Mesa CA 91942

7/19/2012

1996 SATURN SL1 4 DOOR SEDAN

Curb Weight:		2348	lbs.	1065	kg.
Curb Weight Distribution -	Front:	61	%	Rear: 39	%
Gross Vehicle Weight Rating:		3244	lbs.	1471	kg.
Number of Tires on Vehicle:		4			
Drive Wheels:		FRONT			

Horizontal Dimensions	Inches	Feet	Meters
Total Length	177	14.75	4.50
Wheelbase:	102	8.50	2.59
Front Bumper to Front Axle:	37	3.08	0.94
Front Bumper to Front of Front Well:	23	1.92	0.58
Front Bumper to Front of Hood:	6	0.50	0.15
Front Bumper to Base of Windshield:	46	3.83	1.17
Front Bumper to Top of Windshield:	77	6.42	1.96
Rear Bumper to Rear Axle:	38	3.17	0.97
Rear Bumper to Rear of Rear Well:	20	1.67	0.51
Rear Bumper to Rear of Trunk:	5	0.42	0.13
Rear Bumper to Base of Rear Window:	19	1.58	0.48
Width Dimensions			
Maximum Width:	67	5.58	1.70
Front Track:	57	4.75	1.45
Rear Track:	56	4.67	1.42
Vertical Dimensions			
Height:	55	4.58	1.40
Ground to -			
Front Bumper (Top)	20	1.67	0.51
Headlight - center	23	1.92	0.58
Hood - top front:	26	2.17	0.66
Base of Windshield	35	2.92	0.89
Rear Bumper - top:	23	1.92	0.58
Trunk - top rear:	38	3.17	0.97
Base of Rear Window:	41	3.42	1.04

1996 SATURN SL1 4 DOOR SEDAN

Interior Dimensions	Inches	Feet	Meters
Front Seat Shoulder Width	53	4.42	1.35
Front Seat to Headliner	39	3.25	0.99
Front Leg Room - seatback to floor (max)	41	3.42	1.04
Rear Seat Shoulder Width	53	4.42	1.35
Rear Seat to Headliner	39	3.25	0.99
Front Leg Room - seatback to floor (min)	26	2.17	0.66

Seatbelts: 3pt - front and rear
Airbags: FRONT SEAT AIRBAGS

Steering Data

Turning Circle (Diameter)	480	40.00	12.19
Steering Ratio:	:1		
Wheel Radius:	12	1.00	0.30
Tire Size (OEM):	175/70R14		

Acceleration & Braking Information

Brake Type: FRONT DISC - REAR DRUM
ABS System: ALL WHEEL ABS - OPTIONAL

Braking, 60 mph to 0 (Hard pedal, no skid, dry pavement):
d = 142.0 ft t = 3.2 sec a = -27.2 ft/sec² G-force = -0.85

Acceleration:

0 to 30mph	t =	3.5	sec	a =	12.6	ft/sec²	G-force = 0.39
0 to 60mph	t =	9.7	sec	a =	9.1	ft/sec²	G-force = 0.28
45 to 65mph	t =	6.6	sec	a =	4.4	ft/sec²	G-force = 0.14

Transmission Type: 4spd AUTOMATIC

Notes:
Federal Bumper Standard Requirements: 2.5 mph
This vehicles Rated Bumper Strength: 5 mph

N.S.D.C = 1996 - 1999

1996 SATURN SL1 4 DOOR SEDAN

Other Information

Tip-Over Stability Ratio =	1.31	Stable
NHTSA Star Rating (calculated)		****

Center of Gravity (No Load):

Inches behind front axle	=	39.78
Inches in front of rear axle	=	62.22
Inches from side of vehicle	=	33.50
Inches from ground	=	21.59
Inches from front corner	=	83.77
Inches from rear corner	=	105.67
Inches from front bumper	=	76.78
Inches from rear bumper	=	100.22

Moments of Inertia Approximations (No Load):

Yaw Moment of Inertia	=	1212.44	lb*ft*sec²
Pitch Moment of Inertia	=	1175.52	lb*ft*sec²
Roll Moment of Inertia	=	272.64	lb*ft*sec²

Front Profile Information

Angle Front Bumper to Hood Front	=	45.0	deg
Angle Front of Hood to Windshield Base	=	12.7	deg
Angle Front of Hood to Windshield Top	=	20.8	deg
Angle of Windshield	=	30.1	deg
Angle of Steering Tires at Max Turn	=	24.4	deg

First Approximation Crush Factors:

Speed Equivalent (mph) of Kinetic Energy (KE) used in causing crush of indentation may be evaluated using the following formula, the appropriated Crush Factor (CF), and Maximum Indentation Depth (MID), in feet:

$$V(mph) = v(30 * CF * MID)$$

KE Equivalent Speed (Front/Rear/Side)	=	21	CF
Bullet vehicle IMPACT SPEED estimation based on TARGET VEHICLE damage ONLY (Tested for Rear/Side Impact only)	=	27	CF

These CF values are based upon analysis of NHTSA Barrier Crash data, and from over 1000 vehicle accidents where independant evaluation of speed was possible. (These are NOT 'A', 'B', 'C', or 'G' values)

The rear Impact data with more then 2-3 inches of crush damage should be looked at carefully, since some vehicles have very weak trunk & fender strength. Therefore, on some cars, especially GM, you estimate from the rear crush data may be high by as much as 4-5 mph (on a crush of 18 inches).

Stiffness Values and Test Data

Derived from

NHTSA Crash Test

#3199

1999 SATURN SL1

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS
8387 UNIVERSITY AVENUE
LA MESA CA 91941-3842
11R-030201SC02301

4N6XPRT Systems | 8387 University Avenue | La Mesa, CA 91942 | USA
(800) 266-9778 | (619) 464-3478 | FAX: (619) 464-2206 | Email: 4n6@4n6xprt.com

Sister/Clone database reader

You entered: **1996 SATURN SL**

The Sister/Clone Vehicle Year/Model Interchange list indicates the following are Similar Models

Year Range	Make	Model	Body Styles	Wheelbase
1996 - 2002	SATURN	SL		102.4
Remarks: SL, SL1, SL2 - new body panels in 97				
1996 - 2001	SATURN	SW		102.4
Remarks: SW1, SW2				
1997 - 2002	SATURN	SC	2D	102.4
Remarks: SC1, SC2				

If you have suggestions, corrections, etc., you should contact Greg Anderson at Scalia Safety Engineering,
521 East Washington Avenue, Suite 200, Madison, WI 53703-2914, (608) 256-0820, FAX (608) 256-0212, E-mail: greganderson@cs.com.

Test Information

Test #	3199	NHTSA Test Reference Guide Version #	V3			
Test Date	1999-08-16	Contract #	DTNH22-95-D-08168			
Contract/Study Title	EVALUATION OF AIRBAG PERFORMANCE					
Test Objective(s)	1999 SATURN SL1 INTO A FLAT FRONTAL BARRIER AT 30 MPH					
Test Type	BASELINE TEST	Configuration	VEHICLE INTO BARRIER			
Impact Angle	0	Side Impact Point	99999	mm	0.0	inches
		Offset Distance	99999	mm	0.0	inches
		Closing Speed	50.2	Km/Hr	31.19	MPH
Test Performer	TRC OF OHIO					
Test Reference #	990816-1					
Test Track Surface	CONCRETE	Condition	DRY			
Ambient Temperature	22 C	71.6 F	Total Number of Curves	54		
Data Recorder Type	OTHER	Data Link	UMBILICAL CABLE			
Test Commentary	RECTYP IS ONBOARD DIGITAL. CONFORMS TO SAE J211 MAR95 POLARITIES.					

Fixed Barrier Information

Barrier Type	RIGID	Pole Barrier Diameter	9999	mm	9999	inches
Barrier Shape	FLAT BARRIER					
Barrier Commentary	NO COMMENTS					

1999 SATURN SL1 LEFT FRONT SEAT OCCUPANT

Test #	3199		
Vehicle #	1	Sex	FEMALE
Location	LEFT FRONT SEAT	Age	99
Position	FORWARD OF CENTER POSITION	Height	999 mm 39.3 inches
Type	HYBRID III DUMMY	Weight	999.0 kg 2202 pounds
Size	5 PERCENTILE		
Calibration Method	HYBRID III		
Occupant Manufacturer	MFG: FIRST TECHNOLOGY SAFETY SYSTEMS, S/N: 289		
Occupant Modification	NO COMMENTS		
Occupant Description	NO COMMENTS		
Occupant Commentary	NO COMMENTS		

Head

Head to -

Windshielder Header	279	mm	11.0	inches	Head Injury Criteria (HIC)	323	
WindShield	603	mm	23.7	inches	HIC Lower Time Interval (ms)	43.36	
Seatback	9999	mm	0.0	inches	HIC Upper Time Interval (ms)	79.36	
Side Header	250	mm	9.8	inches			
Side Window	345	mm	13.6	inches			

Neck to Seatback 9999 mm 0.0 inches

First Contact Region (Head): AIR BAG

Second Contact Region (Head):

Chest

Chest to -

Dash	424	mm	16.7	inches	Arm to Door	155	mm	6.1	inches
Steering Wheel	223	mm	8.8	inches	Hip to Door	160	mm	6.3	inches
Seatback	9999	mm	0.0	inches					

Chest Severity Index: 221

Pelvic Peak Lateral Acceleration (g's):

Thoracic Trauma Index:

Thorax Peak Acceleration (g's): 33.7

Lap Belt Peak Load: 9999 Newtons 2247.9 pound Force

Shoulder Belt Peak Load: 9999 Newtons 2247.9 pound Force

First Contact Region (Chest/Abdomen): AIR BAG

Second Contact Region (Chest/Abdomen): NONE

Legs

Knees to Dash 127 mm 5.0 inches Knees to Seatback 9999 mm 0.0 inches

Left Femur Peak Load -3266 Newtons -734.2 pounds Force

Right Femur Peak Load -632 Newtons -142.1 pounds Force

First Contact Region (Legs): DASHPANEL

Second Contact Region (Legs):

1999 SATURN SL1 LEFT FRONT SEAT OCCUPANT

Test #	3199					
Vehicle #	1	Sex	FEMALE			
Location	LEFT FRONT SEAT	Age	99			
Position	FORWARD OF CENTER POSITION	Height	999	mm	39.3	inches
Type	HYBRID III DUMMY	Weight	999.0	kg	2202	pounds
Size	5 PERCENTILE					

Calibration Method	HYBRID III
Occupant Manufacturer	MFG: FIRST TECHNOLOGY SAFETY SYSTEMS, S/N: 289
Occupant Modification	NO COMMENTS
Occupant Description	NO COMMENTS
Occupant Commentary	NO COMMENTS

Restraints

Restraint # 1	3 POINT BELT
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	NO COMMENTS
Restraint # 2	FRONTAL AIRBAG
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	NO COMMENTS

1999 SATURN SL1 RIGHT FRONT SEAT OCCUPANT

Test #	3199		
Vehicle #	1	Sex	FEMALE
Location	RIGHT FRONT SEAT	Age	99
Position	FORWARD OF CENTER POSITION	Height	999 mm 39.3 inches
Type	HYBRID III DUMMY	Weight	999.0 kg 2202 pounds
Size	5 PERCENTILE		
Calibration Method	HYBRID III		
Occupant Manufacturer	MFG: FIRST TECHNOLOGY SAFETY SYSTEMS, S/N: 369		
Occupant Modification	NO COMMENTS		
Occupant Description	NO COMMENTS		
Occupant Commentary	CLIP3M & CSI CALCULATED USING CHEST X & Z DATA CHANNELS ONLY.		

Head

Head to -

Windshielder Header	268	mm	10.6	inches	Head Injury Criteria (HIC)	462	
WindShield	618	mm	24.3	inches	HIC Lower Time Interval (ms)	58.96	
Seatback	9999	mm	0.0	inches	HIC Upper Time Interval (ms)	94.96	
Side Header	252	mm	9.9	inches			
Side Window	344	mm	13.5	inches			
Neck to Seatback	9999	mm	0.0	inches			
First Contact Region (Head)	AIR BAG						
Second Contact Region (Head)							

Chest

Chest to -

Dash	383	mm	15.1	inches	Arm to Door	155	mm	6.1	inches
Steering Wheel	9999	mm	0.0	inches	Hip to Door	172	mm	6.8	inches
Seatback	9999	mm	0.0	inches					
Chest Severity Index	267				Pelvic Peak Lateral Acceleration (g's)				
Thoracic Trauma Index					Thorax Peak Acceleration (g's)	34			
Lap Belt Peak Load	9999	Newtons	2247.9	pound Force					
Shoulder Belt Peak Load	9999	Newtons	2247.9	pound Force					
First Contact Region (Chest/Abdomen)	AIR BAG								
Second Contact Region (Chest/Abdomen)	NONE								

Legs

Knees to Dash	134	mm	5.3	inches	Knees to Seatback	9999	mm	0.0	inches
Left Femur Peak Load	-1806	Newtons	-406.0	pounds Force					
Right Femur Peak Load	-705	Newtons	-158.5	pounds Force					
First Contact Region (Legs)	DASHPANEL								
Second Contact Region (Legs)									

1999 SATURN SL1 RIGHT FRONT SEAT OCCUPANT

Test #	3199					
Vehicle #	1	Sex	FEMALE			
Location	RIGHT FRONT SEAT	Age	99			
Position	FORWARD OF CENTER POSITION	Height	999	mm	39.3	inches
Type	HYBRID III DUMMY	Weight	999.0	kg	2202	pounds
Size	5 PERCENTILE					

Calibration Method	HYBRID III
Occupant Manufacturer	MFG: FIRST TECHNOLOGY SAFETY SYSTEMS, S/N: 369
Occupant Modification	NO COMMENTS
Occupant Description	NO COMMENTS
Occupant Commentary	CLIP3M & CSI CALCULATED USING CHEST X & Z DATA CHANNELS ONLY.

Restraints

Restraint # 1	3 POINT BELT
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	NO COMMENTS
Restraint # 2	FRONTAL AIRBAG
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	NO COMMENTS

Vehicle 1 1999 SATURN SL1

Test #	3199		
VIN	1G8ZG5289XZ208090	NHTSA Test Vehicle Number	1
Year	1999	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	SATURN	Post-test Steering Column Shear Capsule Seperation	NOT APPLICABLE
Model	SL1	Steering Column Collapse Mechanism	UNKNOWN
Body	FOUR DOOR SEDAN		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	1.9 Liter	Transmission	MANUAL - FRONT WHEEL DRIVE
Vehicle Modification(s) Description	MODEL IS SL1		
Vehicle Commentary	NO COMMENTS		

Vehicle Length	4700	mm	185.0	inches	CG behind Front Axle	1126	mm	44.3	inches
Vehicle Width	1688	mm	66.5	inches	Center of Damage to CG Axis	1584	mm	62.4	inches
Vehicle Wheelbase	2600	mm	102.4	inches	Total Length of Indentation	1525	mm	60.0	inches
Vehicle Test Weight	1186	KG	2614	pounds	Maximum Static Crush Depth	488	mm	19.2	inches
					Pre-Impact Speed	50	kph	31.2	mph

Vehicle Damage Index 12FDEW3 — Principal Direction of Force 0

Damage Profile Distance Measurements

(Measured Left-to-Right, Rear-to-Front)

DPD 1	245	mm	9.6	inches
DPD 2	355	mm	14.0	inches
DPD 3	439	mm	17.3	inches
DPD 4	430	mm	16.9	inches
DPD 5	399	mm	15.7	inches
DPD 6	303	mm	11.9	inches

Crush from Pre & Post Test Damage Measurements

	Pre-Test		Post-Test		Crush Depth	
Left Bumper Corner	179.3	inches	173.2	inches	6.1	inches
	4555	mm	4400	mm	155	mm
Centerline	185.0	inches	165.8	inches	19.2	inches
	4700	mm	4212	mm	488	mm
Right Bumper Corner	179.3	inches	167.4	inches	11.9	inches
	4555	mm	4252	mm	303	mm

Bumper Engagement (Inline Impact Only)	Sill Engagement (Side Impact Only)	A-pillar Engagement (Side Impact Only)
999.0	NOT APPLICABLE	999.0

Moving Test Cart Angle	Moving Test Cart/Vehicle Crabbed Angle	Vehicle Orientation on Cart Moving Test Cart
NOT APPLICABLE	0.0	NOT APPLICABLE
Magnitude of the Tilt Angle Measured between surface of a Rollover Test Cart and the Ground	*Magniture of the Crabbed Angle Measure Clockwise from Longitudinal Vector to Velocity Vector of Vehicle*	*Magnitude of the Angle Measured between the Vehicle Orientation and Direction of Test Cart Motion*

Vehicle 1 1999 SATURN SL1

Test #	3199		
VIN	1G8ZG5289XZ208090	NHTSA Test Vehicle Number	1
Year	1999	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	SATURN	Post-test Steering Column Shear Capsule Seperation	NOT APPLICABLE
Model	SL1	Steering Column Collapse Mechanism	UNKNOWN
Body	FOUR DOOR SEDAN		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	1.9 Liter	Transmission	MANUAL - FRONT WHEEL DRIVE
Vehicle Modification(s) Description	MODEL IS SL1		
Vehicle Commentary	NO COMMENTS		

Vehicle Length	4700	mm	185.0	inches	CG behind Front Axle	1126	mm	44.3	inches
Vehicle Width	1688	mm	66.5	inches	Center of Damage to CG Axis	1584	mm	62.4	inches
Vehicle Wheelbase	2600	mm	102.4	inches	Total Length of Indentation	1525	mm	60.0	inches
Vehicle Test Weight	1186	KG	2614	pounds	Maximum Static Crush Depth	488	mm	19.2	inches
					Pre-Impact Speed	50	kph	31.2	mph

Vehicle Damage Index: 12FDEW3 — Principal Direction of Force: 0

Pre & Post Test Damage Measurements

(Measurements are taken in a longitudinaldirection. Except for Engine Block, all measurements are take from the Rear Vehicle Surface forward.)

Left Side Pre-Test mm	Left Side Pre-Test inches	Left Side Post-Test mm	Left Side Post-Test inches	Centerline	Centerline Pre-Test mm	Centerline Pre-Test inches	Centerline Post-Test mm	Centerline Post-Test inches	Right Side Pre-Test mm	Right Side Pre-Test inches	Right Side Post-Test mm	Right Side Post-Test inches
				Length of Vehicle at Centerline	4700	185.0	4212	165.8				
				Engine Block	410	16.1	410	16.1				
4555	179.3	4400	173.2	Front Bumper Corner					4555	179.3	4252	167.4
				Front of Engine	3994	157.2	3773	148.5				
3565	140.4	3503	137.9	Firewall					3555	140.0	3541	139.4
					3610	142.1	3545	139.6				
3184	125.4	3186	125.4	Upper Leading Edge of Door					3178	125.1	3174	125.0
3171	124.8	3169	124.8	Lower Leading Edge of Door					3161	124.4	3156	124.3
3180	125.2	3163	124.5	Bottom of 'A' Post					3180	125.2	3150	124.0
2225	87.6	2228	87.7	Upper Trailing Edge of Door					2221	87.4	2219	87.4
2246	88.4	2244	88.3	Lower Trailing Edge of Door					2235	88.0	2232	87.9
				Steering Column	2760	108.7	2765	108.9				
				Center of Seering Column to 'A' Post (Horizontal)	280	11.0	298	11.7				
				Center of Steering Column to Headliner (Vertical)	460	18.1	440	17.3				

1999 SATURN SL1

NHTSA Crash Test - #3199 - Front Impact

Pre/Post Depths - Vehicle Width - Closing Speed - Trapezoidal Average

Test Vehicle Weight = 2614 pounds
Vehicle Closing Speed = 31.2 mph
Test Crush Length = 66.5 inches

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	6.1	19.2	11.9	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 6.1 inches					824.6
Using a Rated No Damage Speed of	2.5mph	370.8	697.7	98.5	
Using a Rated No Damage Speed of	5.0mph	677.0	581.4	394.2	
Using a Rated No Damage Speed of	7.5mph	918.6	475.7	886.9	
Using a Rated No Damage Speed of	10.0mph	1095.6	380.6	1576.7	
Average Crush = 14.1 inches					154.3
Using a Rated No Damage Speed of	2.5mph	160.4	130.6	98.5	
Using a Rated No Damage Speed of	5.0mph	292.9	108.8	394.2	
Using a Rated No Damage Speed of	7.5mph	397.4	89.0	886.9	
Using a Rated No Damage Speed of	10.0mph	474.0	71.2	1576.7	
Maximum Crush = 19.2 inches					83.2
Using a Rated No Damage Speed of	2.5mph	117.8	70.4	98.5	
Using a Rated No Damage Speed of	5.0mph	215.1	58.7	394.2	
Using a Rated No Damage Speed of	7.5mph	291.8	48.0	886.9	
Using a Rated No Damage Speed of	10.0mph	348.1	38.4	1576.7	

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

****

4N6XPRT System's First Approximation Crush Factor (CF)

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

KE Speed (mph) = SQRT(30 * CF * max crush in feet)

Crush Factor	Maximum Crush (inches)	Calculated KE Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	19.2	31.7	0.6	1.8

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 20.3

CF = (mph * mph) / (30 * max crush in feet), dimensionless

4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test

1999 SATURN SL1

NHTSA Crash Test - #3199 - Front Impact

Pre/Post Depths - Indention Length - Closing Speed - Trapezoidal Average

Test Vehicle Weight = 2614 pounds
Vehicle Closing Speed = 31.2 mph
Test Crush Length = 60.0 inches

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	6.1	19.2	11.9	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 6.1 inches					912.7
Using a Rated No Damage Speed of	2.5mph	410.5	772.3	109.1	
Using a Rated No Damage Speed of	5.0mph	749.4	643.6	436.3	
Using a Rated No Damage Speed of	7.5mph	1016.8	526.6	981.7	
Using a Rated No Damage Speed of	10.0mph	1212.7	421.3	1745.2	
Average Crush = 14.1 inches					170.8
Using a Rated No Damage Speed of	2.5mph	177.6	144.5	109.1	
Using a Rated No Damage Speed of	5.0mph	324.2	120.5	436.3	
Using a Rated No Damage Speed of	7.5mph	439.9	98.6	981.7	
Using a Rated No Damage Speed of	10.0mph	524.6	78.9	1745.2	
Maximum Crush = 19.2 inches					92.1
Using a Rated No Damage Speed of	2.5mph	130.4	78.0	109.1	
Using a Rated No Damage Speed of	5.0mph	238.1	65.0	436.3	
Using a Rated No Damage Speed of	7.5mph	323.0	53.2	981.7	
Using a Rated No Damage Speed of	10.0mph	385.3	42.5	1745.2	

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

****

4N6XPRT System's First Approximation Crush Factor (CF)

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

KE Speed (mph) = SQRT(30 * CF * max crush in feet)

Crush Factor	Maximum Crush (inches)	Calculated KE Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	19.2	31.7	0.6	1.8

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 20.3

CF = (mph * mph) / (30 * max crush in feet), dimensionless

4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test

Available Test Results
Front Impact Test Summary

Report Filter Settings

Year Range: 1996 - 2002
Make: SATURN
Model: SL

Test Number	Vehicle Info	No Damage Speed (mph)	Average Crush (inch)	Closing Speed (mph)	Vehicle Stiffness A	Vehicle Stiffness B	Vehicle Width Values G	Vehicle Width Values Kv	Crush Factor
3127	1999 SATURN SL1 FOUR DOOR SEDAN	5.0	18.8	29.9	218.8	57.9	413.5	83.5	19.0
2765	1998 SATURN SL2 FOUR DOOR SEDAN	5.0	22.3	35.2	219.9	59.5	406.0	80.9	22.2
3250	2000 SATURN SL2 FOUR DOOR SEDAN	5.0	20.8	35.2	241.1	69.9	415.9	95.0	23.8
2468	1997 SATURN SL1 FOUR DOOR SEDAN	5.0	15.3	29.4	263.8	84.2	413.3	122.2	22.6
3113	1999 SATURN SL1 FOUR DOOR SEDAN	5.0	14.3	30.0	274.7	95.8	393.9	137.9	25.1
3199	1999 SATURN SL1 FOUR DOOR SEDAN	5.0	14.9	31.2	276.5	97.0	394.2	137.5	26.1
3109	1999 SATURN SC1 TWO DOOR COUPE	5.0	15.7	29.3	296.8	92.2	477.8	134.0	22.0
3195	1999 SATURN SL1 FOUR DOOR SEDAN	5.0	11.5	35.0	410.1	213.2	394.3	290.3	42.5
3191	1999 SATURN SL1 FOUR DOOR SEDAN	5.0	11.0	35.0	431.5	235.9	394.6	321.1	44.6
3082	1999 SATURN SC1 TWO DOOR COUPE	5.0	6.1	22.1	464.2	259.6	415.0	433.4	32.0
	Average (AVG)				**309.7**	**126.5**	**411.9**	**183.6**	**28.0**
	Minimum (MIN)				**218.8**	**57.9**	**393.9**	**80.9**	**19.0**
	Maximum (MAX)				**464.2**	**259.6**	**477.8**	**433.4**	**44.6**
	Standard Deviation (STDev-sample)				**90.9**	**77.7**	**25.1**	**120.9**	**8.9**
	Number of Tests (n)			**10**					

Available Test Results
Front Impact Test Summary

Report Filter Settings

Year Range: 1996 - 2002
Make: SATURN
Model: SL

Test Number	Vehicle Info	No Damage Speed (mph)	Max Crush (inch)	Closing Speed (mph)	Vehicle Stiffness A	Vehicle Stiffness B	Vehicle Width Values G	Vehicle Width Values Kv	Crush Factor
3082	1999 SATURN SC1 TWO DOOR COUPE	5.0	27.0	22.1	105.1	13.3	415.0	22.2	7.2
3127	1999 SATURN SL1 FOUR DOOR SEDAN	5.0	20.7	29.9	199.2	48.0	413.5	69.2	17.3
3195	1999 SATURN SL1 FOUR DOOR SEDAN	5.0	23.1	35.0	204.6	53.1	394.3	72.3	21.2
2765	1998 SATURN SL2 FOUR DOOR SEDAN	5.0	23.6	35.2	207.4	53.0	406.0	72.0	20.9
3199	1999 SATURN SL1 FOUR DOOR SEDAN	5.0	19.2	31.2	215.0	58.6	394.2	83.1	20.3
3250	2000 SATURN SL2 FOUR DOOR SEDAN	5.0	23.3	35.2	215.4	55.8	415.9	75.8	21.2
3113	1999 SATURN SL1 FOUR DOOR SEDAN	5.0	17.4	30.0	226.0	64.8	393.9	93.3	20.7
2468	1997 SATURN SL1 FOUR DOOR SEDAN	5.0	17.1	29.4	236.0	67.4	413.3	97.8	20.2
3109	1999 SATURN SC1 TWO DOOR COUPE	5.0	18.9	29.3	246.6	63.6	477.8	92.5	18.2
3191	1999 SATURN SL1 FOUR DOOR SEDAN	5.0	18.6	35.0	254.1	81.8	394.6	111.4	26.3
	Average (AVG)				**210.9**	**55.9**	**411.9**	**79.0**	**19.4**
	Minimum (MIN)				**105.1**	**13.3**	**393.9**	**22.2**	**7.2**
	Maximum (MAX)				**254.1**	**81.8**	**477.8**	**111.4**	**26.3**
	Standard Deviation (STDev-sample)				**41.4**	**17.8**	**25.1**	**24.1**	**4.9**
	Number of Tests (n)			**10**					

Expert VIN DeCoder®

Version Number 3.1.0.3

DeCoded VIN: 1P3BP46D0JC183227

Model:	1988 Plymouth Reliant America 4-Door Sedan
Engine Size:	2.2 L/ 135 cu.in.
Engine Description:	In-line 4 cylinder with Overhead Cam
Horse Power:	99 @ 5600 rpm
Torque:	121 lb-ft @ 3200 rpm
Injection System:	Electronic Fuel Injection (EFI)
PSI:	15 psi
Ignition:	Electronic
Manufacturer:	Chrysler
Assembly Plant:	Jefferson (Detroit, MI)
Drive Wheels:	This is a Front Wheel Drive vehicle w/ Manual Seatbelts

The First through Third characters (1P3) indicate a Plymouth Passenger Car made in the U.S.A.

The Fourth character (B) indicates Manual Seatbelts

The Fifth and Sixth characters (P4) indicate a Reliant America

The Seventh character (6) indicates a 4-Door Sedan

The Eighth character (D) indicates the OEM engine: 2.2 L/ 135 cu.in., L4, OHC

The Ninth character (the check digit) is entered as 0.
The VIN appears Valid, the calculated value is 0.

The Tenth character (J) indicates the model year 1988

The Eleventh character (C) indicates the vehicle was made in the assembly plant in Jefferson (Detroit, MI)

The Twelfth through Seventeenth characters (183227) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.2.0.2

PROVIDED BY:
4N6XPRT Systems
8387 University Avenue
La Mesa CA 91941

7/24/2012

1988 PLYMOUTH RELIANT 4 DOOR SEDAN

Curb Weight:	2323	lbs.	1054	kg.
Curb Weight Distribution - Front:	63	% Rear:	37	%
Gross Vehicle Weight Rating:		lbs.		kg.
Number of Tires on Vehicle:	4			
Drive Wheels:	FRONT			

Horizontal Dimensions	Inches	Feet	Meters
Total Length	176	14.67	4.47
Wheelbase:	100	8.33	2.54
Front Bumper to Front Axle:	38	3.17	0.97
Front Bumper to Front of Front Well:	21	1.75	0.53
Front Bumper to Front of Hood:	5	0.42	0.13
Front Bumper to Base of Windshield:	50	4.17	1.27
Front Bumper to Top of Windshield:	71	5.92	1.80
Rear Bumper to Rear Axle:	38	3.17	0.97
Rear Bumper to Rear of Rear Well:	27	2.25	0.69
Rear Bumper to Rear of Trunk:	5	0.42	0.13
Rear Bumper to Base of Rear Window:	35	2.92	0.89
Width Dimensions			
Maximum Width:	68	5.67	1.73
Front Track:	58	4.83	1.47
Rear Track:	57	4.75	1.45
Vertical Dimensions			
Height:	52	4.33	1.32
Ground to -			
Front Bumper (Top)	18	1.50	0.46
Headlight - center	27	2.25	0.69
Hood - top front:	32	2.67	0.81
Base of Windshield	36	3.00	0.91
Rear Bumper - top:	21	1.75	0.53
Trunk - top rear:	34	2.83	0.86
Base of Rear Window:	39	3.25	0.99

1988 PLYMOUTH RELIANT 4 DOOR SEDAN

Interior Dimensions	Inches	Feet	Meters
Front Seat Shoulder Width	55	4.58	1.40
Front Seat to Headliner	39	3.25	0.99
Front Leg Room - seatback to floor (max)	43	3.58	1.09
Rear Seat Shoulder Width	59	4.92	1.50
Rear Seat to Headliner	38	3.17	0.97
Front Leg Room - seatback to floor (min)	36	3.00	0.91

Seatbelts: 3pt - front and rear
Airbags: NO AIRBAGS

Steering Data

Turning Circle (Diameter)	444	37.00	11.28
Steering Ratio:	21.26:1		
Wheel Radius:	11	0.92	0.28
Tire Size (OEM):	P175=75R13		

Acceleration & Braking Information

Brake Type: ALL DRUM - POWER
ABS System: ABS UNKNOWN

Braking, 60 mph to 0 (Hard pedal, no skid, dry pavement):
d = 180.0 ft t = 4.1 sec a = -21.5 ft/sec² G-force = -0.67

Acceleration:

0 to 30mph	t =	5.7	sec	a =	7.7	ft/sec²	G-force = 0.24
0 to 60mph	t =	15.7	sec	a =	5.6	ft/sec²	G-force = 0.17
45 to 65mph	t =	10.4	sec	a =	2.8	ft/sec²	G-force = 0.09

Transmission Type: 4spd MANUAL

Notes:
Federal Bumper Standard Requirements: 2.5 mph
This vehicles Rated Bumper Strength: 5 mph

N.S.D.C = 1981 - 1989

1988 PLYMOUTH RELIANT 4 DOOR SEDAN

Other Information

Tip-Over Stability Ratio =	1.41	Stable
NHTSA Star Rating (calculated)		****

Center of Gravity (No Load):

Inches behind front axle	=	37.00
Inches in front of rear axle	=	63.00
Inches from side of vehicle	=	34.00
Inches from ground	=	20.41
Inches from front corner	=	82.35
Inches from rear corner	=	106.57
Inches from front bumper	=	75.00
Inches from rear bumper	=	101.00

Moments of Inertia Approximations (No Load):

Yaw Moment of Inertia	=	1186.69	lb*ft*sec²
Pitch Moment of Inertia	=	1150.77	lb*ft*sec²
Roll Moment of Inertia	=	268.14	lb*ft*sec²

Front Profile Information

Angle Front Bumper to Hood Front	=	70.3	deg
Angle Front of Hood to Windshield Base	=	5.1	deg
Angle Front of Hood to Windshield Top	=	15.3	deg
Angle of Windshield	=	33.7	deg
Angle of Steering Tires at Max Turn	=	25.8	deg

First Approximation Crush Factors:

Speed Equivalent (mph) of Kinetic Energy (KE) used in causing crush of indentation may be evaluated using the following formula, the appropriated Crush Factor (CF), and Maximum Indentation Depth (MID), in feet:

$$V(mph) = \sqrt{(30 * CF * MID)}$$

KE Equivalent Speed (Front/Rear/Side)	=	21	CF
Bullet vehicle IMPACT SPEED estimation based on TARGET VEHICLE damage ONLY (Tested for Rear/Side Impact only)	=	27	CF

These CF values are based upon analysis of NHTSA Barrier Crash data, and from over 1000 vehicle accidents where independant evaluation of speed was possible. (These are NOT 'A', 'B', 'C', or 'G' values)

The rear Impact data with more then 2-3 inches of crush damage should be looked at carefully, since some vehicles have very weak trunk & fender strength. Therefore, on some cars, especially GM, you estimate from the rear crush data may be high by as much as 4-5 mph (on a crush of 18 inches).

Stiffness Values and Test Data

Derived from

NHTSA Crash Test

#567

1983 PLYMOUTH RELIANT

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS
8387 UNIVERSITY AVENUE
LA MESA CA 91941-3842
11R-030201SC02301

4N6XPRT Systems | 8387 University Avenue | La Mesa, CA 91942 | USA
(800) 266-9778 | (619) 464-3478 | FAX: (619) 464-2206 | Email: 4n6@4n6xprt.com

Sister/Clone database reader

You entered: **1988 PLYMOUTH RELIANT**

The Sister/Clone Vehicle Year/Model Interchange list indicates the following are Similar Models

Year Range	Make	Model	Body Styles	Wheelbase
1981 - 1989	DODGE	ARIES	2D, 4D, SW	99.6
Remarks: NEW K-CAR CHASSIS. SW discontinued after 88.				
1981 - 1989	PLYMOUTH	RELIANT	2D, 4D, SW	99.6
Remarks: SW discontinued after 88.				

If you have suggestions, corrections, etc., you should contact Greg Anderson at Scalia Safety Engineering,
521 East Washington Avenue, Suite 200, Madison, WI 53703-2914, (608) 256-0820, FAX (608) 256-0212, E-mail: greganderson@cs.com.

Test Information

Test #	567	NHTSA Test Reference Guide Version #	1				
Test Date	1983-04-27	Contract #	DTNH2282C01140				
Contract/Study Title	FY-83 VEHICLE IMPACT TEST						
Test Objective(s)	FY-83 VEH.BARRIER TESTS TO REQUIREMENTS OF FMVSS NOS.208/212/219/301-7						
Test Type	NEW CAR ASSESSMENT TEST	Configuration	VEHICLE INTO BARRIER				
Impact Angle	0	Side Impact Point	0	mm	0.0	inches	
		Offset Distance	0	mm	0.0	inches	
		Closing Speed	56.0	Km/Hr	34.80	MPH	
Test Performer	CALSPAN						
Test Reference #	CD0307						
Test Track Surface	CONCRETE	Condition	DRY				
Ambient Temperature	22 C	71.6 F	Total Number of Curves	71			
Data Recorder Type	FM TAPE RECORDER	Data Link	UMBILICAL CABLE				
Test Commentary	NO COMMENTS						

Fixed Barrier Information

Barrier Type	RIGID	Pole Barrier Diameter	0	mm	0	inches
Barrier Shape	LOAD CELL BARRIER					
Barrier Commentary	NO COMMENTS					

1983 PLYMOUTH RELIANT LEFT FRONT SEAT OCCUPANT

Test #	567		
Vehicle #	1	Sex	MALE
Location	LEFT FRONT SEAT	Age	0
Position	CENTER POSITION	Height	0 mm 0.0 inches
Type	PART 572 DUMMY	Weight	0.0 kg 0 pounds
Size	50 PERCENTILE		
Calibration Method	OTHER		
Occupant Manufacturer	HUMANOID 819		
Occupant Modification			
Occupant Description	NO COMMENTS		
Occupant Commentary	NO COMMENTS		

Head

Head to -

Windshielder Header	419	mm	16.5	inches	Head Injury Criteria (HIC)	546	
WindShield	572	mm	22.5	inches	HIC Lower Time Interval (ms)	69.08	
Seatback	0	mm	0.0	inches	HIC Upper Time Interval (ms)	115.28	
Side Header	157	mm	6.2	inches			
Side Window	241	mm	9.5	inches			
Neck to Seatback	0	mm	0.0	inches			
First Contact Region (Head)	STEERING WHEEL RIM						
Second Contact Region (Head)							

Chest

Chest to -

Dash	589	mm	23.2	inches	Arm to Door	140	mm	5.5	inches
Steering Wheel	432	mm	17.0	inches	Hip to Door	203	mm	8.0	inches
Seatback	0	mm	0.0	inches					
Chest Severity Index	414				Pelvic Peak Lateral Acceleration (g's)				
Thoracic Trauma Index					Thorax Peak Acceleration (g's)	55.05			
Lap Belt Peak Load	0	Newtons	0.0	pound Force					
Shoulder Belt Peak Load	0	Newtons	0.0	pound Force					
First Contact Region (Chest/Abdomen)	NONE								
Second Contact Region (Chest/Abdomen)	UNKNOWN								

Legs

Knees to Dash	218	mm	8.6	inches	Knees to Seatback	0	mm	0.0	inches
Left Femur Peak Load	0	Newtons	0.0	pounds Force					
Right Femur Peak Load	0	Newtons	0.0	pounds Force					
First Contact Region (Legs)	DASHPANEL								
Second Contact Region (Legs)									

1983 PLYMOUTH RELIANT LEFT FRONT SEAT OCCUPANT

Test #	567					
Vehicle #	1	Sex	MALE			
Location	LEFT FRONT SEAT	Age	0			
Position	CENTER POSITION	Height	0	mm	0.0	inches
Type	PART 572 DUMMY	Weight	0.0	kg	0	pounds
Size	50 PERCENTILE					

Calibration Method	OTHER
Occupant Manufacturer	HUMANOID 819
Occupant Modification	
Occupant Description	NO COMMENTS
Occupant Commentary	NO COMMENTS

Restraints

Restraint # 1	3 POINT BELT
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	
Restraint # 2	DASHPANEL
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	

1983 PLYMOUTH RELIANT RIGHT FRONT SEAT OCCUPANT

Test #	567		
Vehicle #	1	Sex	MALE
Location	RIGHT FRONT SEAT	Age	0
Position	CENTER POSITION	Height	0 mm 0.0 inches
Type	PART 572 DUMMY	Weight	0.0 kg 0 pounds
Size	50 PERCENTILE		
Calibration Method	OTHER		
Occupant Manufacturer	HUMANOID 162		
Occupant Modification			
Occupant Description	NO COMMENTS		
Occupant Commentary	NO COMMENTS		

Head

Head to -

Windshielder Header	404	mm	15.9	inches	Head Injury Criteria (HIC)	641	
WindShield	556	mm	21.9	inches	HIC Lower Time Interval (ms)	80.93	
Seatback	0	mm	0.0	inches	HIC Upper Time Interval (ms)	117.08	
Side Header	157	mm	6.2	inches			
Side Window	241	mm	9.5	inches			

Neck to Seatback 0 mm 0.0 inches

First Contact Region (Head): DASHPANEL

Second Contact Region (Head):

Chest

Chest to -

Dash	584	mm	23.0	inches	Arm to Door	152	mm	6.0	inches
Steering Wheel	0	mm	0.0	inches	Hip to Door	198	mm	7.8	inches
Seatback	0	mm	0.0	inches					

Chest Severity Index	266	Pelvic Peak Lateral Acceleration (g's)	
Thoracic Trauma Index		Thorax Peak Acceleration (g's)	38.77

Lap Belt Peak Load 0 Newtons 0.0 pound Force

Shoulder Belt Peak Load 0 Newtons 0.0 pound Force

First Contact Region (Chest/Abdomen): NONE

Second Contact Region (Chest/Abdomen): UNKNOWN

Legs

Knees to Dash	203	mm	8.0	inches	Knees to Seatback	0	mm	0.0	inches

Left Femur Peak Load	0	Newtons	0.0	pounds Force
Right Femur Peak Load	0	Newtons	0.0	pounds Force

First Contact Region (Legs): DASHPANEL

Second Contact Region (Legs):

1983 PLYMOUTH RELIANT RIGHT FRONT SEAT OCCUPANT

Test #	567					
Vehicle #	1	Sex	MALE			
Location	RIGHT FRONT SEAT	Age	0			
Position	CENTER POSITION	Height	0	mm	0.0	inches
Type	PART 572 DUMMY	Weight	0.0	kg	0	pounds
Size	50 PERCENTILE					

Calibration Method	OTHER
Occupant Manufacturer	HUMANOID 162
Occupant Modification	
Occupant Description	NO COMMENTS
Occupant Commentary	NO COMMENTS

Restraints

Restraint # 1	3 POINT BELT
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	
Restraint # 2	DASHPANEL
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	

Vehicle 1 1983 PLYMOUTH RELIANT

Test #	567		
VIN		NHTSA Test Vehicle Number	1
Year	1983	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	PLYMOUTH	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	RELIANT	Steering Column Collapse Mechanism	OTHER
Body	STATION WAGON		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	2.2 Liter	Transmission	AUTOMATIC - FRONT WHEEL DRIVE
Vehicle Modification(s) Description			
Vehicle Commentary	NO COMMENTS		

Vehicle Length	4458	mm	175.5	inches	CG behind Front Axle	1074 mm	42.3 inches
Vehicle Width	1727	mm	68.0	inches	Center of Damage to CG Axis	864 mm	34.0 inches
Vehicle Wheelbase	2540	mm	100.0	inches	Total Length of Indentation	1588 mm	62.5 inches
Vehicle Test Weight	1329	KG	2929	pounds	Maximum Static Crush Depth	663 mm	26.1 inches
					Pre-Impact Speed	56 kph	34.8 mph

Vehicle Damage Index: 12FDEW3

Principal Direction of Force: 0

Damage Profile Distance Measurements

(Measured Left-to-Right, Rear-to-Front)

DPD 1	594	mm	23.4	inches
DPD 2	650	mm	25.6	inches
DPD 3	660	mm	26.0	inches
DPD 4	671	mm	26.4	inches
DPD 5	673	mm	26.5	inches
DPD 6	612	mm	24.1	inches

Crush from Pre & Post Test Damage Measurements

	Pre-Test		Post-Test		Crush Depth	
Left Bumper Corner	0.0	inches	0.0	inches	0.0	inches
	0	mm	0	mm	0	mm
Centerline	0.0	inches	0.0	inches	0.0	inches
	0	mm	0	mm	0	mm
Right Bumper Corner	0.0	inches	0.0	inches	0.0	inches
	0	mm	0	mm	0	mm

Bumper Engagement (Inline Impact Only)	Sill Engagement (Side Impact Only)	A-pillar Engagement (Side Impact Only)
0.0	NOT APPLICABLE	0.0

Moving Test Cart Angle	Moving Test Cart/Vehicle Crabbed Angle	Vehicle Orientation on Cart Moving Test Cart
NOT APPLICABLE	0.0	NOT APPLICABLE
Magnitude of the Tilt Angle Measured between surface of a Rollover Test Cart and the Ground	*Magniture of the Crabbed Angle Measure Clockwise from Longitudinal Vector to Velocity Vector of Vehicle*	*Magnitude of the Angle Measured between the Vehicle Orientation and Direction of Test Cart Motion*

Vehicle 1 1983 PLYMOUTH RELIANT

Test #	567		
VIN		NHTSA Test Vehicle Number	1
Year	1983	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	PLYMOUTH	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	RELIANT	Steering Column Collapse Mechanism	OTHER
Body	STATION WAGON		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	2.2 Liter	Transmission	AUTOMATIC - FRONT WHEEL DRIVE
Vehicle Modification(s) Description			
Vehicle Commentary	NO COMMENTS		

Vehicle Length	4458	mm	175.5	inches	CG behind Front Axle	1074	mm	42.3	inches
Vehicle Width	1727	mm	68.0	inches	Center of Damage to CG Axis	864	mm	34.0	inches
Vehicle Wheelbase	2540	mm	100.0	inches	Total Length of Indentation	1588	mm	62.5	inches
Vehicle Test Weight	1329	KG	2929	pounds	Maximum Static Crush Depth	663	mm	26.1	inches
					Pre-Impact Speed	56	kph	34.8	mph

Vehicle Damage Index 12FDEW3 Principal Direction of Force 0

Pre & Post Test Damage Measurements

(Measurements are taken in a longitudinaldirection. Except for Engine Block, all measurements are take from the Rear Vehicle Surface forward.)

Left Side				Centerline				Right Side			
Pre-Test		Post-Test		Pre-Test		Post-Test		Pre-Test		Post-Test	
mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches
				Length of Vehicle at Centerline							
				0	0.0	0	0.0				
				Engine Block							
				0	0.0	0	0.0				
0	0.0	0	0.0	Front Bumper Corner				0	0.0	0	0.0
				Front of Engine							
				0	0.0	0	0.0				
0	0.0	0	0.0	Firewall				0	0.0	0	0.0
				0	0.0	0	0.0				
0	0.0	0	0.0	Upper Leading Edge of Door				0	0.0	0	0.0
0	0.0	0	0.0	Lower Leading Edge of Door				0	0.0	0	0.0
0	0.0	0	0.0	Bottom of 'A' Post				0	0.0	0	0.0
0	0.0	0	0.0	Upper Trailing Edge of Door				0	0.0	0	0.0
0	0.0	0	0.0	Lower Trailing Edge of Door				0	0.0	0	0.0
				Steering Column							
				0	0.0	0	0.0				
				Center of Seering Column to 'A' Post (Horizontal)							
				0	0.0	0	0.0				
				Center of Steering Column to Headliner (Vertical)							
				0	0.0	0	0.0				

1983 PLYMOUTH RELIANT

NHTSA Crash Test - #567 - Front Impact

Damage Profile Distances - Vehicle Width - Closing Speed - Trapezoidal Average

Test Vehicle Weight = 2929 pounds
Vehicle Closing Speed = 34.8 MPH
Test Crush Length = 68.0 inches

Damage Profile Distance Collision Crush Depths (inches)

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	
(Driver Side)	23.4	25.6	26.0	26.4	26.5	24.1	(Pass Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 23.4 inches					76.4
Using a Rated No Damage Speed of	2.5mph	119.2	65.8	107.9	
Using a Rated No Damage Speed of	5.0mph	219.9	56.0	431.7	
Using a Rated No Damage Speed of	7.5mph	302.2	47.0	971.4	
Using a Rated No Damage Speed of	10.0mph	366.0	38.8	1726.9	
Average Crush = 25.6 inches					63.8
Using a Rated No Damage Speed of	2.5mph	108.9	55.0	107.9	
Using a Rated No Damage Speed of	5.0mph	201.0	46.8	431.7	
Using a Rated No Damage Speed of	7.5mph	276.2	39.3	971.4	
Using a Rated No Damage Speed of	10.0mph	334.5	32.4	1196.0	
Maximum Crush = 26.5 inches					59.6
Using a Rated No Damage Speed of	2.5mph	105.2	51.3	107.9	
Using a Rated No Damage Speed of	5.0mph	194.2	43.7	431.7	
Using a Rated No Damage Speed of	7.5mph	266.8	36.6	971.4	
Using a Rated No Damage Speed of	10.0mph	323.2	30.2	1726.9	

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

****

4N6XPRT System's First Approximation Crush Factor (CF)

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

KE Speed (mph) = SQRT(30 * CF * max crush in feet)

Crush Factor	Maximum Crush (inches)	Calculated KE Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	26.5	37.3	2.5	6.7

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 18.3

CF = (mph * mph) / (30 * max crush in feet), dimensionless

4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test

1983 PLYMOUTH RELIANT

NHTSA Crash Test - #567 - Front Impact

Damage Profile Distances - Indention Length - Closing Speed - Trapezoidal Average

Test Vehicle Weight = 2929 pounds
Vehicle Closing Speed = 34.8 MPH
Test Crush Length = 62.5 inches

Damage Profile Distance Collision Crush Depths (inches)

	DPD1	DPD2	DPD3	DPD4	DPD5	DPD6	
(Driver Side)	23.4	25.6	26.0	26.4	26.5	24.1	(Pass Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 23.4 inches					83.1
Using a Rated No Damage Speed of	2.5mph	129.6	71.6	117.4	
Using a Rated No Damage Speed of	5.0mph	239.1	60.9	469.5	
Using a Rated No Damage Speed of	7.5mph	328.6	51.1	1056.4	
Using a Rated No Damage Speed of	10.0mph	398.0	42.2	1878.1	
Average Crush = 25.6 inches					69.4
Using a Rated No Damage Speed of	2.5mph	118.5	59.8	117.4	
Using a Rated No Damage Speed of	5.0mph	218.6	50.9	469.5	
Using a Rated No Damage Speed of	7.5mph	300.4	42.7	1056.4	
Using a Rated No Damage Speed of	10.0mph	363.8	35.2	1300.7	
Maximum Crush = 26.5 inches					64.8
Using a Rated No Damage Speed of	2.5mph	114.4	55.8	117.4	
Using a Rated No Damage Speed of	5.0mph	211.2	47.5	469.5	
Using a Rated No Damage Speed of	7.5mph	290.2	39.9	1056.4	
Using a Rated No Damage Speed of	10.0mph	351.5	32.9	1878.1	

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

****

4N6XPRT System's First Approximation Crush Factor (CF)

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

KE Speed (mph) = SQRT(30 * CF * max crush in feet)

Crush Factor	Maximum Crush (inches)	Calculated KE Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	26.5	37.3	2.5	6.7

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 18.3

CF = (mph * mph) / (30 * max crush in feet), dimensionless

4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test

Available Test Results
Front Impact Test Summary

Report Filter Settings

Year Range: 1981 - 1989
Make: PLYMOUTH
Model: RELIANT

Test Number	Vehicle Info	No Damage Speed (mph)	Average Crush (inch)	Closing Speed (mph)	Vehicle Stiffness A	Vehicle Stiffness B	Vehicle Width Values G	Vehicle Width Values Kv	Crush Factor
957	1985 PLYMOUTH RELIANT FOUR DOOR SEDAN	5.0	30.7	34.5	170.7	32.8	444.1	44.9	15.5
502	1982 PLYMOUTH RELIANT TWO DOOR SEDAN	5.0	17.5	29.5	199.5	55.9	356.0	81.0	19.9
567	1983 PLYMOUTH RELIANT STATION WAGON	5.0	25.6	34.8	200.6	46.6	431.7	63.6	18.9
593	1983 PLYMOUTH RELIANT STATION WAGON	5.0	24.9	35.1	206.0	49.9	425.1	67.9	19.8
794	1985 PLYMOUTH RELIANT FOUR DOOR SEDAN	5.0	25.1	35.0	213.5	51.0	447.0	69.4	19.5
941	1981 DODGE ARIES FOUR DOOR SEDAN	5.0	20.5	30.3	216.9	53.6	439.0	76.8	17.9
	Average (AVG)				**201.2**	**48.3**	**423.8**	**67.3**	**18.6**
	Minimum (MIN)				**170.7**	**32.8**	**356.0**	**44.9**	**15.5**
	Maximum (MAX)				**216.9**	**55.9**	**447.0**	**81.0**	**19.9**
	Standard Deviation (STDev-sample)				**16.5**	**8.2**	**34.2**	**12.6**	**1.7**
	Number of Tests (n)			**6**					

Available Test Results
Front Impact Test Summary

Report Filter Settings

Year Range: 1981 - 1989
Make: PLYMOUTH
Model: RELIANT

Test Number	Vehicle Info	No Damage Speed (mph)	Max Crush (inch)	Closing Speed (mph)	Vehicle Stiffness A	Vehicle Stiffness B	Vehicle Width Values G	Vehicle Width Values Kv	Crush Factor
957	1985 PLYMOUTH RELIANT FOUR DOOR SEDAN	5.0	33.9	34.5	154.5	26.9	444.1	36.8	14.0
593	1983 PLYMOUTH RELIANT STATION WAGON	5.0	26.7	35.1	191.8	43.3	425.1	58.8	18.5
502	1982 PLYMOUTH RELIANT TWO DOOR SEDAN	5.0	18.0	29.5	194.0	52.9	356.0	76.6	19.4
567	1983 PLYMOUTH RELIANT STATION WAGON	5.0	26.5	34.8	194.2	43.7	431.7	59.6	18.3
405	1981 PLYMOUTH RELIANT TWO DOOR SEDAN	5.0	25.8	35.3	199.8	46.9	425.1	63.7	19.3
794	1985 PLYMOUTH RELIANT FOUR DOOR SEDAN	5.0	26.6	35.0	201.7	45.5	447.0	62.0	18.4
941	1981 DODGE ARIES FOUR DOOR SEDAN	5.0	21.1	30.3	210.7	50.6	439.0	72.5	17.4
207	1981 PLYMOUTH RELIANT TWO DOOR SEDAN	5.0	23.6	34.9	221.3	56.1	436.7	76.4	20.6
	Average (AVG)				**196.0**	**45.7**	**425.6**	**63.3**	**18.2**
	Minimum (MIN)				**154.5**	**26.9**	**356.0**	**36.8**	**14.0**
	Maximum (MAX)				**221.3**	**56.1**	**447.0**	**76.6**	**20.6**
	Standard Deviation (STDev-sample)				**19.5**	**8.9**	**29.2**	**12.9**	**2.0**
	Number of Tests (n)			**8**					

4N6XPRT Systems
Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942

Phone: (619) 464-3478
Fax: (619) 464-2206
Toll Free: 1- 800-266-9778

Web Site: http://www.4n6xprt.com

E-Mail: 4n6@4n6xprt.com

To compare stiffness values between a Force-Balance approach and calculation from NHTSA Crash Tests, Force Balance calculations have been made on this crash test.

A FORCE-BALANCE approach for calculating stiffness values for the side of the Nissan Stanza was used, with the Stiffness Values from the range of tests for the Plymouth Reliant as the “Known Good” values.

The critical criteria in this analysis is -

A-B values based on AVERAGE crush

Bumper Line Crush Damage to Stanza

1988 PLYMOUTH RELIANT - Front Impact

Curb Weight (pounds):	2323
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2323
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	5.0
Energy Crush Depth (inches):	4.65
Damage Length (inches):	57.0
Crush Profile Measurements:	4

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1186.69

"Known" Stifness Values

	A	B
Average	201.2	48.3
Minimum	170.7	32.8
Maximum	216.9	55.9
Std. Devation	16.5	8.2

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	0.00						
C2 (inches)	4.50	31.00	69.75	1.50	104.63	20.67	1441.50
C3 (inches)	10.00	22.00	159.50	3.80	605.92	34.39	5485.33
C4 (inches)	8.00	4.00	36.00	4.52	162.67	9.93	357.33
C5 (inches)							
C6 (inches)							
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 4.65

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	Closing Speed (MPH)
Minimum	170.7	32.8	9215.05	8269.83	10.3	12.5	22.9
Avg - 2 Std. Deviations	168.2	31.9	9024.44	8145.52	10.3	12.4	22.7
Avg - 1 Std. Deviations	184.7	40.1	10582.21	9021.08	10.8	13.3	24.2
Average	201.2	48.3	12139.99	9952.57	11.3	14.1	25.7
Avg + 1 Std. Deviations	217.7	56.5	13697.76	10915.63	11.9	14.9	27.1
Avg + 2 Std. Deviations	234.2	64.7	15255.54	11898.26	12.4	15.6	28.5
Maximum	216.9	55.9	13595.39	10860.90	11.8	14.8	27.1

Damage Centroid Depth (x) (inches)	3.29	k^2	2368.68
Damage Centroid Depth (y) (inches)	27.46	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	265.25		

1992 NISSAN STANZA XE - Side Impact

Curb Weight (pounds):	2809
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2809
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	2.0
Energy Crush Depth (inches):	11.55
Damage Length (inches):	96.0
Crush Profile Measurements:	6

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1687.27

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	1.00	22.00	198.00	5.69	1125.67	14.26	2823.33
C2 (inches)	17.00	7.00	154.00	11.19	1723.17	10.77	1657.83
C3 (inches)	27.00	41.00	656.00	9.26	6074.83	97.80	64158.17
C4 (inches)	5.00	11.50	57.50	2.50	143.75	40.25	2314.38
C5 (inches)	5.00	14.50	43.50	1.72	74.92	63.64	2768.29
C6 (inches)	1.00						
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 11.55

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	bsub1
Minimum	35.7	13.5	9215.05	13982.32	12.2	10.4	13.4
Avg - 2 Std. Deviations	35.2	13.2	9024.44	13709.57	12.1	10.3	13.2
Avg - 1 Std. Deviations	38.5	15.8	10582.21	15935.58	13.0	11.0	14.4
Average	41.5	18.3	12139.99	18155.56	13.9	11.6	15.5
Avg + 1 Std. Deviations	44.3	20.9	13697.76	20370.64	14.7	12.3	16.6
Avg + 2 Std. Deviations	46.9	23.5	15255.54	22581.63	15.5	12.9	17.6
Maximum	44.1	20.7	13595.39	20225.20	14.7	12.2	16.5

Damage Centroid Depth (x) (inches)	8.24	k^2	2785.17
Damage Centroid Depth (y) (inches)	66.48	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	1109.00		

4N6XPRT Systems
Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942

Phone: (619) 464-3478
Fax: (619) 464-2206
Toll Free: 1- 800-266-9778

Web Site: http://www.4n6xprt.com

E-Mail: 4n6@4n6xprt.com

To compare stiffness values between a Force-Balance approach and calculation from NHTSA Crash Tests, Force Balance calculations have been made on this crash test.

A FORCE-BALANCE approach for calculating stiffness values for the side of the Nissan Stanza was used, with the Stiffness Values from the range of tests for the Plymouth Reliant as the “Known Good” values.

The critical criteria in this analysis is -

A-B values based on MAXIMUM crush

Bumper Line Crush Damage to Stanza

1988 PLYMOUTH RELIANT - Front Impact

Curb Weight (pounds):	2323
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2323
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	5.0
Energy Crush Depth (inches):	4.65
Damage Length (inches):	57.0
Crush Profile Measurements:	4

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1186.69

"Known" Stifness Values

	A	B
Average	196.0	45.7
Minimum	154.5	26.9
Maximum	221.3	56.1
Std. Devation	19.5	8.9

	Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches) 0.00	31.00	69.75	1.50	104.63	20.67	1441.50
C2 (inches) 4.50	22.00	159.50	3.80	605.92	34.39	5485.33
C3 (inches) 10.00	4.00	36.00	4.52	162.67	9.93	357.33
C4 (inches) 8.00						
C5 (inches)						
C6 (inches)						
C7 (inches)						
C8 (inches)						
C9 (inches)						
C10 (inches)						

Average Crush (inches): 4.65

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	Closing Speed (MPH)
Minimum	154.5	26.9	7970.86	7480.04	9.8	11.8	21.5
Avg - 2 Std. Deviations	157.0	27.9	8174.74	7598.82	9.9	11.9	21.7
Avg - 1 Std. Deviations	176.5	36.8	9910.85	8589.73	10.5	12.9	23.6
Average	196.0	45.7	11646.96	9654.34	11.2	13.8	25.3
Avg + 1 Std. Deviations	215.5	54.6	13383.08	10756.61	11.8	14.7	26.9
Avg + 2 Std. Deviations	235.0	63.5	15119.19	11880.71	12.4	15.5	28.4
Maximum	221.3	56.1	13747.31	11047.21	11.9	14.9	27.2

Damage Centroid Depth (x) (inches)	3.29	k^2	2368.68
Damage Centroid Depth (y) (inches)	27.46	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	265.25		

1992 NISSAN STANZA XE - Side Impact

Curb Weight (pounds):	2809
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2809
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	2.0
Energy Crush Depth (inches):	11.55
Damage Length (inches):	96.0
Crush Profile Measurements:	6

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1687.27

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	1.00	22.00	198.00	5.69	1125.67	14.26	2823.33
C2 (inches)	17.00	7.00	154.00	11.19	1723.17	10.77	1657.83
C3 (inches)	27.00	41.00	656.00	9.26	6074.83	97.80	64158.17
C4 (inches)	5.00	11.50	57.50	2.50	143.75	40.25	2314.38
C5 (inches)	5.00	14.50	43.50	1.72	74.92	63.64	2768.29
C6 (inches)	1.00						
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 11.55

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	bsub1
Minimum	32.9	11.5	7970.86	12199.84	11.4	9.7	12.3
Avg - 2 Std. Deviations	33.4	11.9	8174.74	12492.29	11.6	9.8	12.5
Avg - 1 Std. Deviations	37.1	14.7	9910.85	14977.04	12.6	10.7	13.9
Average	40.5	17.5	11646.96	17453.53	13.7	11.4	15.2
Avg + 1 Std. Deviations	43.7	20.4	13383.08	19923.52	14.6	12.2	16.4
Avg + 2 Std. Deviations	46.7	23.2	15119.19	22388.25	15.5	12.9	17.5
Maximum	44.4	21.0	13747.31	20441.03	14.8	12.3	16.6

Damage Centroid Depth (x) (inches)	8.24	k^2	2785.17
Damage Centroid Depth (y) (inches)	66.48	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	1109.00		

4N6XPRT Systems
Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942

Phone: (619) 464-3478
Fax: (619) 464-2206
Toll Free: 1- 800-266-9778

Web Site: http://www.4n6xprt.com

E-Mail: 4n6@4n6xprt.com

To compare stiffness values between a Force-Balance approach and calculation from NHTSA Crash Tests, Force Balance calculations have been made on this crash test.

A FORCE-BALANCE approach for calculating stiffness values for the side of the Nissan Stanza was used, with the Stiffness Values from the range of tests for the Plymouth Reliant as the “Known Good” values.

The critical criteria in this analysis is -

A-B values based on AVERAGE crush

Bumper Line Crush AVERAGED with Sill Line Crush Damage to Stanza

1988 PLYMOUTH RELIANT - Front Impact

Curb Weight (pounds):	2323
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2323
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	5.0
Energy Crush Depth (inches):	4.65
Damage Length (inches):	57.0
Crush Profile Measurements:	4

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1186.69

"Known" Stifness Values

	A	B
Average	201.2	48.3
Minimum	170.7	32.8
Maximum	216.9	55.9
Std. Devation	16.5	8.2

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	0.00						
C2 (inches)	4.50	31.00	69.75	1.50	104.63	20.67	1441.50
C3 (inches)	10.00	22.00	159.50	3.80	605.92	34.39	5485.33
C4 (inches)	8.00	4.00	36.00	4.52	162.67	9.93	357.33
C5 (inches)							
C6 (inches)							
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 4.65

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	Closing Speed (MPH)
Minimum	170.7	32.8	9215.05	8269.83	10.3	11.9	21.7
Avg - 2 Std. Deviations	168.2	31.9	9024.44	8145.52	10.3	11.8	21.5
Avg - 1 Std. Deviations	184.7	40.1	10582.21	9021.08	10.8	12.6	23.0
Average	201.2	48.3	12139.99	9952.57	11.3	13.3	24.3
Avg + 1 Std. Deviations	217.7	56.5	13697.76	10915.63	11.9	14.0	25.7
Avg + 2 Std. Deviations	234.2	64.7	15255.54	11898.26	12.4	14.7	26.9
Maximum	216.9	55.9	13595.39	10860.90	11.8	14.0	25.6

Damage Centroid Depth (x) (inches)	3.29	k^2	2368.68
Damage Centroid Depth (y) (inches)	27.46	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	265.25		

1992 NISSAN STANZA XE - Side Impact

Curb Weight (pounds):	2809
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2809
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	2.0
Energy Crush Depth (inches):	9.82
Damage Length (inches):	96.0
Crush Profile Measurements:	6

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1687.27

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	1.00	22.00	154.00	4.36	671.00	14.14	2178.00
C2 (inches)	13.00	7.00	124.25	9.09	1129.04	10.81	1343.42
C3 (inches)	22.50	41.00	563.75	7.80	4398.96	98.15	55332.92
C4 (inches)	5.00	11.50	57.50	2.50	143.75	40.25	2314.38
C5 (inches)	5.00	14.50	43.50	1.72	74.92	63.64	2768.29
C6 (inches)	1.00						
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 9.82

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	bsub1
Minimum	38.3	15.6	9215.05	11755.83	11.2	9.8	14.4
Avg - 2 Std. Deviations	37.9	15.3	9024.44	11528.89	11.1	9.7	14.2
Avg - 1 Std. Deviations	41.4	18.2	10582.21	13380.62	12.0	10.4	15.5
Average	44.6	21.2	12139.99	15226.41	12.8	11.0	16.7
Avg + 1 Std. Deviations	47.7	24.2	13697.76	17067.36	13.5	11.6	17.9
Avg + 2 Std. Deviations	50.6	27.2	15255.54	18904.27	14.2	12.2	18.9
Maximum	47.5	24.0	13595.39	16946.51	13.5	11.6	17.8

Damage Centroid Depth (x) (inches)	6.81	k^2	2785.17
Damage Centroid Depth (y) (inches)	67.80	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	943.00		

4N6XPRT Systems
Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942

Phone: (619) 464-3478
Fax: (619) 464-2206
Toll Free: 1- 800-266-9778

Web Site: http://www.4n6xprt.com

E-Mail: 4n6@4n6xprt.com

To compare stiffness values between a Force-Balance approach and calculation from NHTSA Crash Tests, Force Balance calculations have been made on this crash test.

A FORCE-BALANCE approach for calculating stiffness values for the side of the Nissan Stanza was used, with the Stiffness Values from the range of tests for the Plymouth Reliant as the “Known Good” values.

The critical criteria in this analysis is -

A-B values based on MAXIMUM crush

Bumper Line Crush AVERAGED with Sill Line Crush Damage to Stanza

1988 PLYMOUTH RELIANT - Front Impact

Curb Weight (pounds):	2323
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2323
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	5.0
Energy Crush Depth (inches):	4.65
Damage Length (inches):	57.0
Crush Profile Measurements:	4

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1186.69

"Known" Stifness Values

	A	B
Average	196.0	45.7
Minimum	154.5	26.9
Maximum	221.3	56.1
Std. Devation	19.5	8.9

	Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches) 0.00	31.00	69.75	1.50	104.63	20.67	1441.50
C2 (inches) 4.50	22.00	159.50	3.80	605.92	34.39	5485.33
C3 (inches) 10.00	4.00	36.00	4.52	162.67	9.93	357.33
C4 (inches) 8.00						
C5 (inches)						
C6 (inches)						
C7 (inches)						
C8 (inches)						
C9 (inches)						
C10 (inches)						

Average Crush (inches): 4.65

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	Closing Speed (MPH)
Minimum	154.5	26.9	7970.86	7480.04	9.8	11.2	20.4
Avg - 2 Std. Deviations	157.0	27.9	8174.74	7598.82	9.9	11.3	20.7
Avg - 1 Std. Deviations	176.5	36.8	9910.85	8589.73	10.5	12.2	22.3
Average	196.0	45.7	11646.96	9654.34	11.2	13.1	23.9
Avg + 1 Std. Deviations	215.5	54.6	13383.08	10756.61	11.8	13.9	25.4
Avg + 2 Std. Deviations	235.0	63.5	15119.19	11880.71	12.4	14.7	26.9
Maximum	221.3	56.1	13747.31	11047.21	11.9	14.1	25.8

Damage Centroid Depth (x) (inches)	3.29	k^2	2368.68
Damage Centroid Depth (y) (inches)	27.46	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	265.25		

1992 NISSAN STANZA XE - Side Impact

Curb Weight (pounds):	2809
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2809
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	2.0
Energy Crush Depth (inches):	9.82
Damage Length (inches):	96.0
Crush Profile Measurements:	6

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1687.27

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	1.00	22.00	154.00	4.36	671.00	14.14	2178.00
C2 (inches)	13.00	7.00	124.25	9.09	1129.04	10.81	1343.42
C3 (inches)	22.50	41.00	563.75	7.80	4398.96	98.15	55332.92
C4 (inches)	5.00	11.50	57.50	2.50	143.75	40.25	2314.38
C5 (inches)	5.00	14.50	43.50	1.72	74.92	63.64	2768.29
C6 (inches)	1.00						
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 9.82

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	bsub1
Minimum	35.4	13.3	7970.86	10272.35	10.5	9.3	13.3
Avg - 2 Std. Deviations	35.9	13.7	8174.74	10515.79	10.6	9.3	13.4
Avg - 1 Std. Deviations	39.9	17.0	9910.85	12583.38	11.6	10.1	15.0
Average	43.6	20.3	11646.96	14642.80	12.5	10.8	16.4
Avg + 1 Std. Deviations	47.1	23.6	13383.08	16695.82	13.4	11.5	17.6
Avg + 2 Std. Deviations	50.3	27.0	15119.19	18743.63	14.1	12.2	18.9
Maximum	47.8	24.3	13747.31	17125.85	13.5	11.7	17.9

Damage Centroid Depth (x) (inches)	6.81	k^2	2785.17
Damage Centroid Depth (y) (inches)	67.80	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	943.00		

Expert VIN DeCoder®

Version Number 3.1.0.3

DeCoded VIN: JN1FU21P3NX901774

Model:	1992 Nissan Stanza 4 Door Sedan
Engine Size:	2.4 L/145 cu.in.
Engine Description:	In-line 4 cylinder with Overhead Cam
Horse Power:	138 @ 5600 rpm
Torque:	148 lb-ft at 4400 rpm
Injection System:	Electronic Fuel injection (EFI)
PSI:	36-43 psi
Ignition:	electronic
Manufacturer:	Nissan
Assembly Plant:	Hiratsuka, Japan
Drive Wheels:	This is a Front Wheel Drive vehicle w/ Automatic Belts

The First through Third characters (JN1) indicate a Nissan Car made in Japan

The Fourth character (F) indicates the OEM engine: 2.4 L/145 cu.in., L4, OHC

The Fifth and Sixth characters (U2) indicate a Stanza

The Seventh character (1) indicates a 4 Door Sedan

The Eighth character (P) indicates Automatic Belts

The Ninth character (the check digit) is entered as 3.
The VIN appears Valid, the calculated value is 3.

The Tenth character (N) indicates the model year 1992

The Eleventh character (X) indicates the vehicle was made in the assembly plant in Hiratsuka, Japan

The Twelfth through Seventeenth characters (901774) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.2.0.2

PROVIDED BY:
4N6XPRT Systems
8387 University Avenue
La Mesa CA 91941

7/24/2012

1992 NISSAN STANZA SE 4 DOOR SEDAN

Curb Weight:	2800 lbs.		1270	kg.
Curb Weight Distribution - Front:	65 %	Rear:	35	%
Gross Vehicle Weight Rating:		lbs.		kg.
Number of Tires on Vehicle:	4			
Drive Wheels:	FRONT			

Horizontal Dimensions	Inches	Feet	Meters
Total Length	180	15.00	4.57
Wheelbase:	100	8.33	2.54
Front Bumper to Front Axle:	38	3.17	0.97
Front Bumper to Front of Front Well:	21	1.75	0.53
Front Bumper to Front of Hood:	4	0.33	0.10
Front Bumper to Base of Windshield:	51	4.25	1.30
Front Bumper to Top of Windshield:	76	6.33	1.93
Rear Bumper to Rear Axle:	42	3.50	1.07
Rear Bumper to Rear of Rear Well:	29	2.42	0.74
Rear Bumper to Rear of Trunk:	7	0.58	0.18
Rear Bumper to Base of Rear Window:	28	2.33	0.71
Width Dimensions			
Maximum Width:	67	5.58	1.70
Front Track:	58	4.83	1.47
Rear Track:	57	4.75	1.45
Vertical Dimensions			
Height:	54	4.50	1.37
Ground to -			
Front Bumper (Top)	21	1.75	0.53
Headlight - center	26	2.17	0.66
Hood - top front:	29	2.42	0.74
Base of Windshield	36	3.00	0.91
Rear Bumper - top:	23	1.92	0.58
Trunk - top rear:	36	3.00	0.91
Base of Rear Window:	38	3.17	0.97

1992 NISSAN STANZA SE 4 DOOR SEDAN

Interior Dimensions

	Inches	Feet	Meters
Front Seat Shoulder Width	55	4.58	1.40
Front Seat to Headliner	39	3.25	0.99
Front Leg Room - seatback to floor (max)	43	3.58	1.09
Rear Seat Shoulder Width	54	4.50	1.37
Rear Seat to Headliner	37	3.08	0.94
Front Leg Room - seatback to floor (min)	34	2.83	0.86

Seatbelts: 3pt front, 2pt rear

Airbags: NO AIRBAGS

Steering Data

Turning Circle (Diameter)	468	39.00	11.89
Steering Ratio:	16.74:1		
Wheel Radius:	12	1.00	0.30
Tire Size (OEM):	195-65R14		

Acceleration & Braking Information

Brake Type: FRONT DISC - REAR DRUM

ABS System: ALL WHEEL ABS - OPTIONAL

Braking, 60 mph to 0 (Hard pedal, no skid, dry pavement):

d = _____ ft t = _____ sec a = _____ ft/sec² G-force = _____

Acceleration:

0 to 30mph	t =	sec	a =	ft/sec²	G-force =	
0 to 60mph	t =	sec	a =	ft/sec²	G-force =	
45 to 65mph	t =	sec	a =	ft/sec²	G-force =	

Transmission Type: 5spd MANUAL

Notes:

Federal Bumper Standard Requirements: 2.5 mph

This vehicles Rated Bumper Strength: 5 mph

N.S.D.C = 1992 - 1992

1992 NISSAN STANZA SE 4 DOOR SEDAN

Other Information

Tip-Over Stability Ratio =	1.36	Stable
NHTSA Star Rating (calculated)		****

Center of Gravity (No Load):

Inches behind front axle	=	35.00
Inches in front of rear axle	=	65.00
Inches from side of vehicle	=	33.50
Inches from ground	=	21.20
Inches from front corner	=	80.32
Inches from rear corner	=	112.12
Inches from front bumper	=	73.00
Inches from rear bumper	=	107.00

Moments of Inertia Approximations (No Load):

Yaw Moment of Inertia	=	1678.00	lb*ft*sec²
Pitch Moment of Inertia	=	1623.00	lb*ft*sec²
Roll Moment of Inertia	=	354.00	lb*ft*sec²

Front Profile Information

Angle Front Bumper to Hood Front	=	63.4	deg
Angle Front of Hood to Windshield Base	=	8.5	deg
Angle Front of Hood to Windshield Top	=	17.7	deg
Angle of Windshield	=	32.6	deg
Angle of Steering Tires at Max Turn	=	24.5	deg

First Approximation Crush Factors:

Speed Equivalent (mph) of Kinetic Energy (KE) used in causing crush of indentation may be evaluated using the following formula, the appropriated Crush Factor (CF), and Maximum Indentation Depth (MID), in feet:

$$V(mph) = \sqrt{(30 * CF * MID)}$$

KE Equivalent Speed (Front/Rear/Side)	=	21	CF
Bullet vehicle IMPACT SPEED estimation based on TARGET VEHICLE damage ONLY (Tested for Rear/Side Impact only)	=	27	CF

These CF values are based upon analysis of NHTSA Barrier Crash data, and from over 1000 vehicle accidents where independant evaluation of speed was possible. (These are NOT 'A', 'B', 'C', or 'G' values)

The rear Impact data with more then 2-3 inches of crush damage should be looked at carefully, since some vehicles have very weak trunk & fender strength. Therefore, on some cars, especially GM, you estimate from the rear crush data may be high by as much as 4-5 mph (on a crush of 18 inches).

4N6XPRT Systems
Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942

Phone: (619) 464-3478
Fax: (619) 464-2206
Toll Free: 1- 800-266-9778

Web Site: http://www.4n6xprt.com

E-Mail: 4n6@4n6xprt.com

The NHTSA Crash Test database contains NO SIDE Impact tests for the Nissan Stanza.

To create a SIMILAR class of vehicle, we first looked at the published wheelbase for the Stanza, which is 100 inches..

We then looked at the NHTSA database for FOUR DOOR SEDANS that have SIDE IMPACT TESTS and had a wheelbase of 99-101 inches (+/- ~1 inch of the published wheelbase).

The Test Summary Reports based on the Average and Maximum crush depths follow.

4N6XPRT StifCalcs - Selected Vehicle: 1992 NISSAN STANZA

File Print Reports Settings Help Reg To: 4N6XPRT SYSTEMS

Basic Vehicle Search | NHTSA Test Selection | Advanced Vehicle Search | Force Balance

3.1.0.10

Available Test | Test Information | Occupant Information | Vehicle Information | Stiffness Calcs

Available Tests in the NHTSA database for a 1987 - 1992 NISSAN STANZA

Sister Clone Searched Year Range (1987 - 1992)

Print

Frontal Test(s)

Test No.	Year	Make	Model	Impact Speed	Max Crush	Crush Factor	VDI	PDOF	Test Config	VIN
1379	1990	NISSAN	STANZA	35.0	22.2	22.0	9999999	0	VEHICLE INTO B...	JN1FU21PXLT201...
1384	1990	NISSAN	STANZA	29.6	17.6	19.9	12FDEW2	0	VEHICLE INTO B...	JN1FU21P7LT200...
1592	1991	NISSAN	STANZA	35.1	24.4	20.2	9999999	0	VEHICLE INTO B...	JN1FU21P6MX853...

Rear Test(s)

No Rear Tests: 1987 - 1992

Side Test(s)

No Side Tests: 1987 - 1992

Available Test Results
Side Impact Test Summary

Report Filter Settings

Year Range: 1965 - 2011

Bodystyle: FOUR DOOR SEDAN

Wheelbase Range: 99-101

Test Number	Vehicle Info	No Damage Speed (mph)	Average Crush (inch)	KEES (mph)	Indention Stiffness A	Indention Stiffness B	Length Values G	Length Values Kv	Crush Factor
855	1983 MAZDA 626 FOUR DOOR SEDAN	2.0	18.2	24.0	82.8	49.9	68.7	59.4	12.6
2706	1997 NISSAN SENTRA FOUR DOOR SEDAN	2.0	6.1	20.5	95.4	145.3	31.3	178.5	27.7
2237	1995 SUBARU IMPREZA FOUR DOOR SEDAN	2.0	10.1	23.6	95.7	102.0	44.9	121.7	22.0
2768	1998 NISSAN SENTRA FOUR DOOR SEDAN	2.0	9.4	27.2	102.7	137.8	38.3	160.5	31.5
4199	2002 NISSAN SENTRA FOUR DOOR SEDAN	2.0	8.2	27.4	113.9	177.5	36.5	206.5	36.9
3059	1999 HYUNDAI ELANTRA FOUR DOOR SEDAN	2.0	6.4	23.2	114.2	189.6	34.4	227.2	33.7
3478	2000 KIA SEPHIA FOUR DOOR SEDAN	2.0	8.6	27.4	116.5	172.9	39.2	201.2	35.1
2812	1998 KIA SEPHIA FOUR DOOR SEDAN	2.0	5.7	23.3	122.7	228.2	33.0	273.0	37.9
2535	1997 HYUNDAI ELANTRA FOUR DOOR SEDAN	2.0	5.9	23.3	126.9	231.1	34.9	276.4	37.2
2795	1998 HYUNDAI ELANTRA FOUR DOOR SEDAN	2.0	6.2	26.8	129.2	258.7	32.3	302.0	46.5
2365	1996 NISSAN SENTRA FOUR DOOR SEDAN	2.0	7.3	24.1	132.9	200.4	44.1	238.3	31.7
2147	1994 SUBARU IMPREZA FOUR DOOR SEDAN	2.0	11.1	23.6	136.6	132.7	70.3	158.5	20.0
3559	2001 KIA SPECTRA FOUR DOOR SEDAN	2.0	6.1	23.1	148.7	258.2	42.8	309.5	35.1
4227	2002 TOYOTA PRIUS FOUR DOOR SEDAN	2.0	6.1	26.7	158.7	321.1	39.2	375.3	46.7
5679	2007 TOYOTA YARIS FOUR DOOR SEDAN	2.0	5.6	27.7	160.1	369.7	34.7	429.4	55.2
6583	2009 TOYOTA YARIS FOUR DOOR SEDAN	2.0	4.8	27.6	183.4	486.8	34.5	565.7	63.2
6440	2005 SUBARU FORESTER FOUR DOOR SEDAN	2.0	7.1	20.0	219.7	277.9	86.8	343.0	22.5
5485	2005 SUBARU FORESTER FOUR DOOR SEDAN	2.0	5.4	22.4	285.2	537.4	75.7	648.0	37.1
	Average (AVG)				**140.3**	**237.6**	**45.6**	**281.9**	**35.1**
	Minimum (MIN)				**82.8**	**49.9**	**31.3**	**59.4**	**12.6**
	Maximum (MAX)				**285.2**	**537.4**	**86.8**	**648.0**	**63.2**
	Standard Deviation (STDev-sample)				**49.3**	**126.9**	**17.1**	**150.1**	**12.4**
	Number of Tests (n)			**18**					

Available Test Results
Side Impact Test Summary

Report Filter Settings

Year Range: 1965 - 2011

Bodystyle: FOUR DOOR SEDAN

Wheelbase Range: 99-101

Test Number	Vehicle Info	No Damage Speed (mph)	Max Crush (inch)	KEES (mph)	Indention Stiffness A	Indention Stiffness B	Length Values G	Length Values Kv	Crush Factor
2706	1997 NISSAN SENTRA FOUR DOOR SEDAN	2.0	14.8	20.5	39.0	24.3	31.3	29.8	11.3
3059	1999 HYUNDAI ELANTRA FOUR DOOR SEDAN	2.0	13.7	23.2	52.9	40.8	34.4	48.8	15.6
2795	1998 HYUNDAI ELANTRA FOUR DOOR SEDAN	2.0	14.6	26.8	55.0	46.9	32.3	54.8	19.8
2768	1998 NISSAN SENTRA FOUR DOOR SEDAN	2.0	16.4	27.2	58.9	45.3	38.3	52.7	18.1
2812	1998 KIA SEPHIA FOUR DOOR SEDAN	2.0	11.8	23.3	59.7	54.0	33.0	64.6	18.5
2535	1997 HYUNDAI ELANTRA FOUR DOOR SEDAN	2.0	12.2	23.3	60.7	52.9	34.9	63.3	17.8
4199	2002 NISSAN SENTRA FOUR DOOR SEDAN	2.0	14.3	27.4	64.8	57.5	36.5	66.9	21.0
3478	2000 KIA SEPHIA FOUR DOOR SEDAN	2.0	14.9	27.4	67.0	57.2	39.2	66.6	20.2
855	1983 MAZDA 626 FOUR DOOR SEDAN	2.0	22.3	24.0	67.7	33.3	68.7	39.7	10.3
3559	2001 KIA SPECTRA FOUR DOOR SEDAN	2.0	11.7	23.1	77.0	69.1	42.8	82.9	18.2
4227	2002 TOYOTA PRIUS FOUR DOOR SEDAN	2.0	12.2	26.7	79.6	80.7	39.2	94.3	23.4
2365	1996 NISSAN SENTRA FOUR DOOR SEDAN	2.0	12.1	24.1	80.7	73.9	44.1	87.8	19.3
2237	1995 SUBARU IMPREZA FOUR DOOR SEDAN	2.0	12.0	23.6	80.8	72.7	44.9	86.8	18.6
5679	2007 TOYOTA YARIS FOUR DOOR SEDAN	2.0	9.6	27.7	92.8	124.3	34.7	144.4	32.0
6583	2009 TOYOTA YARIS FOUR DOOR SEDAN	2.0	9.5	27.6	92.9	124.9	34.5	145.2	32.0
6440	2005 SUBARU FORESTER FOUR DOOR SEDAN	2.0	15.0	20.0	104.2	62.6	86.8	77.2	10.7
2147	1994 SUBARU IMPREZA FOUR DOOR SEDAN	2.0	14.5	23.6	104.6	77.8	70.3	92.9	15.3
5485	2005 SUBARU FORESTER FOUR DOOR SEDAN	2.0	7.4	22.4	209.5	290.1	75.7	349.8	27.2
	Average (AVG)				**80.4**	**77.1**	**45.6**	**91.6**	**19.4**
	Minimum (MIN)				**39.0**	**24.3**	**31.3**	**29.8**	**10.3**
	Maximum (MAX)				**209.5**	**290.1**	**86.8**	**349.8**	**32.0**
	Standard Deviation (STDev-sample)				**36.9**	**59.4**	**17.1**	**71.4**	**6.2**
	Number of Tests (n)			**18**					

4N6XPRT Systems
Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942

Phone: (619) 464-3478
Fax: (619) 464-2206
Toll Free: 1- 800-266-9778

Web Site: http://www.4n6xprt.com

E-Mail: 4n6@4n6xprt.com

To compare stiffness values between a Force-Balance approach and calculation from NHTSA Crash Tests, Force Balance calculations have been made on this crash test.

A FORCE-BALANCE approach for calculating stiffness values for the front of the Plymouth Reliant was used, with the Stiffness Values from the range of tests for the Nissan Stanza CLASS as the “Known Good” values.

The critical criteria in this analysis is -

A-B values based on AVERAGE crush

Bumper Line Crush Damage to Stanza

1992 NISSAN STANZA SE - Side Impact

Curb Weight (pounds):	2800
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2800
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	2.0
Energy Crush Depth (inches):	11.48
Damage Length (inches):	96.0
Crush Profile Measurements:	6

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1678.00

"Known" Stifness Values

	A	B
Average	140.3	237.6
Minimum	82.8	49.9
Maximum	285.2	537.4
Std. Devation	49.3	126.9

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	1.00	22.00	198.00	5.69	1125.67	14.26	2823.33
C2 (inches)	17.00	7.00	154.00	11.19	1723.17	10.77	1657.83
C3 (inches)	27.00	41.00	656.00	9.26	6074.83	97.80	64158.17
C4 (inches)	5.00	11.50	57.50	2.50	143.75	40.25	2314.38
C5 (inches)	5.00	14.50	36.25	1.67	60.42	62.83	2277.71
C6 (inches)	0.00						
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 11.48

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	Closing Speed (MPH)
Minimum	82.8	49.9	31463.06	46108.21	22.2	18.1	39.9
Avg - 2 Std. Deviations	41.7	-16.2	N/A	N/A	N/A	N/A	N/A
Avg - 1 Std. Deviations	91.0	110.7	65349.86	92858.42	31.5	25.5	56.3
Average	140.3	237.6	137622.30	193943.78	45.6	36.6	80.8
Avg + 1 Std. Deviations	189.6	364.5	209894.74	295060.08	56.2	45.1	99.4
Avg + 2 Std. Deviations	238.9	491.4	282167.18	396183.36	65.2	52.2	115.0
Maximum	285.2	537.4	309729.83	435565.15	68.3	54.6	120.5

Damage Centroid Depth (x) (inches)	8.28	k^2	2778.77
Damage Centroid Depth (y) (inches)	66.47	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	1101.75		

1988 PLYMOUTH RELIANT - Front Impact

Curb Weight (pounds):	2323
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2323
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	5.0
Energy Crush Depth (inches):	4.65
Damage Length (inches):	57.0
Crush Profile Measurements:	4

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1186.69

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	0.00	31.00	69.75	1.50	104.63	20.67	1441.50
C2 (inches)	4.50	22.00	159.50	3.80	605.92	34.39	5485.33
C3 (inches)	10.00	4.00	36.00	4.52	162.67	9.93	357.33
C4 (inches)	8.00						
C5 (inches)							
C6 (inches)							
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 4.65

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	bsub1
Minimum	361.4	159.7	31463.06	21550.35	16.7	21.8	38.9
Avg - 2 Std. Deviations	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Avg - 1 Std. Deviations	553.1	374.2	65349.86	41394.87	23.1	30.8	59.5
Average	837.7	858.3	137622.30	82915.76	32.7	44.2	90.2
Avg + 1 Std. Deviations	1053.4	1357.3	209894.74	123991.93	40.0	54.3	113.4
Avg + 2 Std. Deviations	1234.4	1863.7	282167.18	164843.87	46.1	62.9	132.9
Maximum	1297.2	2058.2	309729.83	180383.52	48.3	65.9	139.6

Damage Centroid Depth (x) (inches)	3.29	k^2	2368.68
Damage Centroid Depth (y) (inches)	27.46	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	265.25		

4N6XPRT Systems
Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942

Phone: (619) 464-3478
Fax: (619) 464-2206
Toll Free: 1- 800-266-9778

Web Site: http://www.4n6xprt.com

E-Mail: 4n6@4n6xprt.com

To compare stiffness values between a Force-Balance approach and calculation from NHTSA Crash Tests, Force Balance calculations have been made on this crash test.

A FORCE-BALANCE approach for calculating stiffness values for the front of the Plymouth Reliant was used, with the Stiffness Values from the range of tests for the Nissan Stanza CLASS as the “Known Good” values.

The critical criteria in this analysis is -

A-B values based on AVERAGE crush

Bumper Line Crush AVERAGED with Sill Line Crush Damage to Stanza

1992 NISSAN STANZA SE - Side Impact

Curb Weight (pounds):	2800
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2800
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	2.0
Energy Crush Depth (inches):	9.75
Damage Length (inches):	96.0
Crush Profile Measurements:	6

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1678.00

"Known" Stifness Values

	A	B
Average	140.3	237.6
Minimum	82.8	49.9
Maximum	285.2	537.4
Std. Devation	49.3	126.9

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	1.00	22.00	154.00	4.36	671.00	14.14	2178.00
C2 (inches)	13.00	7.00	124.25	9.09	1129.04	10.81	1343.42
C3 (inches)	22.50	41.00	563.75	7.80	4398.96	98.15	55332.92
C4 (inches)	5.00	11.50	57.50	2.50	143.75	40.25	2314.38
C5 (inches)	5.00	14.50	36.25	1.67	60.42	62.83	2277.71
C6 (inches)	0.00						
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 9.75

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	Closing Speed (MPH)
Minimum	82.8	49.9	27321.36	33632.74	19.0	16.5	36.4
Avg - 2 Std. Deviations	41.7	-16.2	N/A	N/A	N/A	N/A	N/A
Avg - 1 Std. Deviations	91.0	110.7	56161.76	66464.54	26.7	23.2	51.1
Average	140.3	237.6	117901.50	138054.56	38.5	33.3	73.4
Avg + 1 Std. Deviations	189.6	364.5	179641.24	209675.53	47.4	41.0	90.4
Avg + 2 Std. Deviations	238.9	491.4	241380.98	281303.47	54.9	47.4	104.6
Maximum	285.2	537.4	265125.63	309600.23	57.6	49.7	109.7

Damage Centroid Depth (x) (inches)	6.84	k^2	2778.77
Damage Centroid Depth (y) (inches)	67.80	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	935.75		

1988 PLYMOUTH RELIANT - Front Impact

Curb Weight (pounds):	2323
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2323
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	5.0
Energy Crush Depth (inches):	3.43
Damage Length (inches):	57.0
Crush Profile Measurements:	4

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1186.69

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	0.00	31.00	69.75	1.50	104.63	20.67	1441.50
C2 (inches)	4.50	22.00	159.50	3.80	605.92	34.39	5485.33
C3 (inches)	10.00	4.00	36.00	4.52	162.67	9.93	357.33
C4 (inches)	8.00						
C5 (inches)							
C6 (inches)							
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 4.65

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	bsub1
Minimum	373.5	170.6	27321.36	22612.20	17.1	19.9	40.2
Avg - 2 Std. Deviations	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Avg - 1 Std. Deviations	576.5	406.5	56161.76	44261.95	23.9	27.9	62.0
Average	881.0	949.3	117901.50	90492.88	34.2	40.1	94.8
Avg + 1 Std. Deviations	1112.4	1513.4	179641.24	136658.87	42.0	49.4	119.7
Avg + 2 Std. Deviations	1306.7	2088.4	241380.98	182791.94	48.6	57.2	140.6
Maximum	1374.7	2311.5	265125.63	200528.41	50.9	59.9	148.0

Damage Centroid Depth (x) (inches)	3.29	k^2	2368.68
Damage Centroid Depth (y) (inches)	27.46	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	265.25		

4N6XPRT Systems
Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942

Phone: (619) 464-3478
Fax: (619) 464-2206
Toll Free: 1- 800-266-9778

Web Site: http://www.4n6xprt.com

E-Mail: 4n6@4n6xprt.com

To compare stiffness values between a Force-Balance approach and calculation from NHTSA Crash Tests, Force Balance calculations have been made on this crash test.

A FORCE-BALANCE approach for calculating stiffness values for the front of the Plymouth Reliant was used, with the Stiffness Values from the range of tests for the Nissan Stanza CLASS as the “Known Good” values.

The critical criteria in this analysis is -

A-B values based on AVERAGE crush

Bumper Line Crush with C2 and C3 measured at Sill Line Crush for Damage to Stanza

1992 NISSAN STANZA SE - Side Impact

Curb Weight (pounds):	2800
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2800
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	2.0
Energy Crush Depth (inches):	8.02
Damage Length (inches):	96.0
Crush Profile Measurements:	6

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1678.00

"Known" Stifness Values

	A	B
Average	140.3	237.6
Minimum	82.8	49.9
Maximum	285.2	537.4
Std. Devation	49.3	126.9

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	1.00						
C2 (inches)	9.00	22.00	110.00	3.03	333.67	13.93	1532.67
C3 (inches)	18.00	7.00	94.50	7.00	661.50	10.89	1029.00
C4 (inches)	5.00	41.00	471.50	6.36	2999.83	98.64	46507.67
C5 (inches)	5.00	11.50	57.50	2.50	143.75	40.25	2314.38
C6 (inches)	0.00	14.50	36.25	1.67	60.42	62.83	2277.71
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 8.02

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	Closing Speed (MPH)
Minimum	82.8	49.9	23179.66	23322.38	15.8	14.4	31.8
Avg - 2 Std. Deviations	41.7	-16.2	N/A	N/A	N/A	N/A	N/A
Avg - 1 Std. Deviations	91.0	110.7	46973.66	44873.81	21.9	20.0	44.0
Average	140.3	237.6	98180.70	92474.54	31.5	28.6	63.0
Avg + 1 Std. Deviations	189.6	364.5	149387.74	140106.23	38.7	35.1	77.4
Avg + 2 Std. Deviations	238.9	491.4	200594.78	187744.89	44.9	40.6	89.5
Maximum	285.2	537.4	220521.43	206952.50	47.1	42.6	93.9

Damage Centroid Depth (x) (inches)	5.46	k^2	2778.77
Damage Centroid Depth (y) (inches)	69.71	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	769.75		

1988 PLYMOUTH RELIANT - Front Impact

Curb Weight (pounds):	2323
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2323
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	5.0
Energy Crush Depth (inches):	3.43
Damage Length (inches):	57.0
Crush Profile Measurements:	4

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1186.69

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	0.00	31.00	69.75	1.50	104.63	20.67	1441.50
C2 (inches)	4.50	22.00	159.50	3.80	605.92	34.39	5485.33
C3 (inches)	10.00	4.00	36.00	4.52	162.67	9.93	357.33
C4 (inches)	8.00						
C5 (inches)							
C6 (inches)							
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 4.65

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	bsub1
Minimum	337.0	138.9	23179.66	19496.60	15.9	17.4	36.3
Avg - 2 Std. Deviations	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Avg - 1 Std. Deviations	518.9	329.3	46973.66	37370.94	22.0	24.1	55.8
Average	794.8	772.7	98180.70	75735.73	31.3	34.4	85.5
Avg + 1 Std. Deviations	1005.0	1235.3	149387.74	114042.06	38.4	42.3	108.2
Avg + 2 Std. Deviations	1181.6	1707.6	200594.78	152318.63	44.4	48.9	127.2
Maximum	1244.2	1893.2	220521.43	167208.05	46.5	51.3	133.9

Damage Centroid Depth (x) (inches)	3.29	k^2	2368.68
Damage Centroid Depth (y) (inches)	27.46	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	265.25		

4N6XPRT Systems
Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942

Phone: (619) 464-3478
Fax: (619) 464-2206
Toll Free: 1- 800-266-9778

Web Site: http://www.4n6xprt.com

E-Mail: 4n6@4n6xprt.com

To compare stiffness values between a Force-Balance approach and calculation from NHTSA Crash Tests, Force Balance calculations have been made on this crash test.

A FORCE-BALANCE approach for calculating stiffness values for the front of the Plymouth Reliant was used, with the Stiffness Values from the range of tests for the Nissan Stanza CLASS as the “Known Good” values.

The critical criteria in this analysis is -

A-B values based on MAXIMUM crush

Bumper Line Crush Damage to Stanza

1992 NISSAN STANZA SE - Side Impact

Curb Weight (pounds):	2800
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2800
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	2.0
Energy Crush Depth (inches):	11.48
Damage Length (inches):	96.0
Crush Profile Measurements:	6

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1678.00

"Known" Stifness Values

	A	B
Average	80.4	77.1
Minimum	39.0	24.3
Maximum	209.5	290.1
Std. Devation	36.9	59.4

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	1.00	22.00	198.00	5.69	1125.67	14.26	2823.33
C2 (inches)	17.00	7.00	154.00	11.19	1723.17	10.77	1657.83
C3 (inches)	27.00	41.00	656.00	9.26	6074.83	97.80	64158.17
C4 (inches)	5.00	11.50	57.50	2.50	143.75	40.25	2314.38
C5 (inches)	5.00	14.50	36.25	1.67	60.42	62.83	2277.71
C6 (inches)	0.00						
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 11.48

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	Closing Speed (MPH)
Minimum	39.0	24.3	15258.26	22314.92	15.5	13.2	29.1
Avg - 2 Std. Deviations	6.6	-41.7	N/A	N/A	N/A	N/A	N/A
Avg - 1 Std. Deviations	43.5	17.7	11838.49	17885.03	13.8	11.8	26.1
Average	80.4	77.1	46331.66	66363.42	26.7	22.4	49.3
Avg + 1 Std. Deviations	117.3	136.5	80824.84	115001.91	35.1	29.4	64.7
Avg + 2 Std. Deviations	154.2	195.9	115318.01	163654.87	41.9	35.0	77.1
Maximum	209.5	290.1	169864.84	240505.26	50.8	42.3	93.4

Damage Centroid Depth (x) (inches)	8.28	k^2	2778.77
Damage Centroid Depth (y) (inches)	66.47	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	1101.75		

1988 PLYMOUTH RELIANT - Front Impact

Curb Weight (pounds):	2323
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2323
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	5.0
Energy Crush Depth (inches):	3.43
Damage Length (inches):	57.0
Crush Profile Measurements:	4

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1186.69

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	0.00	31.00	69.75	1.50	104.63	20.67	1441.50
C2 (inches)	4.50	22.00	159.50	3.80	605.92	34.39	5485.33
C3 (inches)	10.00	4.00	36.00	4.52	162.67	9.93	357.33
C4 (inches)	8.00						
C5 (inches)							
C6 (inches)							
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 4.65

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	bsub1
Minimum	257.4	81.0	15258.26	13529.07	13.2	15.9	27.7
Avg - 2 Std. Deviations	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Avg - 1 Std. Deviations	217.3	57.8	11838.49	10947.68	11.9	14.3	23.4
Average	514.6	323.9	46331.66	36889.27	21.8	27.0	55.4
Avg + 1 Std. Deviations	711.6	619.4	80824.84	62741.73	28.5	35.4	76.6
Avg + 2 Std. Deviations	870.1	926.0	115318.01	88560.02	33.8	42.1	93.7
Maximum	1078.7	1423.2	169864.84	129351.20	40.9	51.0	116.1

Damage Centroid Depth (x) (inches)	3.29	k^2	2368.68
Damage Centroid Depth (y) (inches)	27.46	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	265.25		

4N6XPRT Systems
Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942

Phone: (619) 464-3478
Fax: (619) 464-2206
Toll Free: 1- 800-266-9778

Web Site: http://www.4n6xprt.com

E-Mail: 4n6@4n6xprt.com

To compare stiffness values between a Force-Balance approach and calculation from NHTSA Crash Tests, Force Balance calculations have been made on this crash test.

A FORCE-BALANCE approach for calculating stiffness values for the front of the Plymouth Reliant was used, with the Stiffness Values from the range of tests for the Nissan Stanza CLASS as the “Known Good” values.

The critical criteria in this analysis is -

A-B values based on MAXIMUM crush

Bumper Line Crush AVERAGED with Sill Line Crush Damage to Stanza

1992 NISSAN STANZA SE - Side Impact

Curb Weight (pounds):	2800
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2800
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	2.0
Energy Crush Depth (inches):	9.75
Damage Length (inches):	96.0
Crush Profile Measurements:	6

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1678.00

"Known" Stifness Values

	A	B
Average	80.4	77.1
Minimum	39.0	24.3
Maximum	209.5	290.1
Std. Devation	36.9	59.4

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	1.00	22.00	154.00	4.36	671.00	14.14	2178.00
C2 (inches)	13.00	7.00	124.25	9.09	1129.04	10.81	1343.42
C3 (inches)	22.50	41.00	563.75	7.80	4398.96	98.15	55332.92
C4 (inches)	5.00	11.50	57.50	2.50	143.75	40.25	2314.38
C5 (inches)	5.00	14.50	36.25	1.67	60.42	62.83	2277.71
C6 (inches)	0.00						
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 9.75

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	Closing Speed (MPH)
Minimum	39.0	24.3	13241.36	16257.97	13.2	11.7	25.8
Avg - 2 Std. Deviations	6.6	-41.7	N/A	N/A	N/A	N/A	N/A
Avg - 1 Std. Deviations	43.5	17.7	10369.39	13264.39	11.9	10.6	23.3
Average	80.4	77.1	39932.36	47745.24	22.6	19.7	43.4
Avg + 1 Std. Deviations	117.3	136.5	69495.34	82386.18	29.7	25.7	56.8
Avg + 2 Std. Deviations	154.2	195.9	99058.31	117041.59	35.4	30.6	67.5
Maximum	209.5	290.1	145786.54	171738.36	42.9	37.0	81.7

Damage Centroid Depth (x) (inches)	6.84	k^2	2778.77
Damage Centroid Depth (y) (inches)	67.80	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	935.75		

1988 PLYMOUTH RELIANT - Front Impact

Curb Weight (pounds):	2323
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2323
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	5.0
Energy Crush Depth (inches):	3.43
Damage Length (inches):	57.0
Crush Profile Measurements:	4

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1186.69

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	0.00	31.00	69.75	1.50	104.63	20.67	1441.50
C2 (inches)	4.50	22.00	159.50	3.80	605.92	34.39	5485.33
C3 (inches)	10.00	4.00	36.00	4.52	162.67	9.93	357.33
C4 (inches)	8.00						
C5 (inches)							
C6 (inches)							
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 4.65

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	bsub1
Minimum	234.3	67.1	13241.36	12007.12	12.5	14.1	25.2
Avg - 2 Std. Deviations	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Avg - 1 Std. Deviations	198.5	48.2	10369.39	9837.37	11.3	12.8	21.4
Average	470.9	271.2	39932.36	32086.64	20.4	23.7	50.7
Avg + 1 Std. Deviations	652.5	520.7	69495.34	54255.27	26.5	31.0	70.2
Avg + 2 Std. Deviations	798.8	780.5	99058.31	76392.60	31.4	36.9	86.0
Maximum	991.5	1202.3	145786.54	111349.28	37.9	44.7	106.7

Damage Centroid Depth (x) (inches)	3.29	k^2	2368.68
Damage Centroid Depth (y) (inches)	27.46	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	265.25		

4N6XPRT Systems
Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942

Phone: (619) 464-3478
Fax: (619) 464-2206
Toll Free: 1- 800-266-9778

Web Site: http://www.4n6xprt.com

E-Mail: 4n6@4n6xprt.com

To compare stiffness values between a Force-Balance approach and calculation from NHTSA Crash Tests, Force Balance calculations have been made on this crash test.

A FORCE-BALANCE approach for calculating stiffness values for the front of the Plymouth Reliant was used, with the Stiffness Values from the range of tests for the Nissan Stanza CLASS as the “Known Good” values.

The critical criteria in this analysis is -

A-B values based on MAXIMUM crush

Bumper Line Crush with C2 and C3 measured at Sill Line Crush for Damage to Stanza

1992 NISSAN STANZA SE - Side Impact

Curb Weight (pounds):	2800
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2800
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	2.0
Energy Crush Depth (inches):	8.02
Damage Length (inches):	96.0
Crush Profile Measurements:	6

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1678.00

"Known" Stifness Values

	A	B
Average	80.4	77.1
Minimum	39.0	24.3
Maximum	209.5	290.1
Std. Devation	36.9	59.4

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	1.00	22.00	110.00	3.03	333.67	13.93	1532.67
C2 (inches)	9.00	7.00	94.50	7.00	661.50	10.89	1029.00
C3 (inches)	18.00	41.00	471.50	6.36	2999.83	98.64	46507.67
C4 (inches)	5.00	11.50	57.50	2.50	143.75	40.25	2314.38
C5 (inches)	5.00	14.50	36.25	1.67	60.42	62.83	2277.71
C6 (inches)	0.00						
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 8.02

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	Closing Speed (MPH)
Minimum	39.0	24.3	11224.46	11255.37	11.0	10.3	22.6
Avg - 2 Std. Deviations	6.6	-41.7	N/A	N/A	N/A	N/A	N/A
Avg - 1 Std. Deviations	43.5	17.7	8900.29	9411.74	10.0	9.4	20.7
Average	80.4	77.1	33533.06	32472.34	18.7	17.0	37.5
Avg + 1 Std. Deviations	117.3	136.5	58165.84	55693.03	24.4	22.2	48.9
Avg + 2 Std. Deviations	154.2	195.9	82798.61	78928.19	29.1	26.3	58.1
Maximum	209.5	290.1	121708.24	115558.58	35.2	31.8	70.2

Damage Centroid Depth (x) (inches)	5.46	k^2	2778.77
Damage Centroid Depth (y) (inches)	69.71	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	769.75		

1988 PLYMOUTH RELIANT - Front Impact

Curb Weight (pounds):	2323
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2323
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	5.0
Energy Crush Depth (inches):	3.43
Damage Length (inches):	57.0
Crush Profile Measurements:	4

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1186.69

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	0.00	31.00	69.75	1.50	104.63	20.67	1441.50
C2 (inches)	4.50	22.00	159.50	3.80	605.92	34.39	5485.33
C3 (inches)	10.00	4.00	36.00	4.52	162.67	9.93	357.33
C4 (inches)	8.00						
C5 (inches)							
C6 (inches)							
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 4.65

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	bsub1
Minimum	209.6	53.7	11224.46	10483.73	11.6	12.4	22.6
Avg - 2 Std. Deviations	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Avg - 1 Std. Deviations	178.6	39.0	8900.29	8726.01	10.6	11.3	19.2
Average	423.7	219.5	33533.06	27280.90	18.8	20.5	45.6
Avg + 1 Std. Deviations	588.4	423.5	58165.84	45764.44	24.3	26.7	63.3
Avg + 2 Std. Deviations	721.5	636.7	82798.61	64219.83	28.8	31.8	77.7
Maximum	896.8	983.6	121708.24	93340.73	34.7	38.4	96.5

Damage Centroid Depth (x) (inches)	3.29	k^2	2368.68
Damage Centroid Depth (y) (inches)	27.46	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	265.25		

Expert VIN DeCoder®

Version Number 3.1.0.3

DeCoded VIN: 2P4GH2533RR648226

Model:	1994 Plymouth Voyager Wagon
Engine Size:	3.0L / 180 cu.in.
Engine Description:	V-6 cylinder with Overhead Cam
Horse Power:	142 @ 5000 rpm
Torque:	173 lb-ft at 2800 rpm
Injection System:	Electronic Fuel Injection (EFI)
PSI:	48 psi
Ignition:	Electronic
Manufacturer:	Mitsubishi
Assembly Plant:	Windsor, ONT
Drive Wheels:	This is a Front Wheel Drive vehicle

The First through Third characters (2P4) indicate a Plymouth MPV made in Canada

The Fourth character (G) indicates a GVWR of 5001-6000 lbs.

The Fifth through Seventh characters (H25) indicate a Voyager

The Eighth character (3) indicates the OEM engine: 3.0L / 180 cu.in., V6, OHC

The Ninth character (the check digit) is entered as 3.
The VIN appears Valid, the calculated value is 3.

The Tenth character (R) indicates the model year 1994

The Eleventh character (R) indicates the vehicle was made in the assembly plant in Windsor, ONT

The Twelfth through Seventeenth characters (648226) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.2.0.2

PROVIDED BY:
4N6XPRT Systems
8387 University Avenue
La Mesa CA 91941

7/24/2012

1994 PLYMOUTH VOYAGER 2WD 3 DOOR MINI VAN

Curb Weight:	3000 lbs.		1361	kg.
Curb Weight Distribution - Front:	59 %	Rear:	41	%
Gross Vehicle Weight Rating:	5100 lbs.		2313	kg.
Number of Tires on Vehicle:	4			
Drive Wheels:	FRONT			

Horizontal Dimensions	Inches	Feet	Meters
Total Length	178	14.83	4.52
Wheelbase:	112	9.33	2.84
Front Bumper to Front Axle:	31	2.58	0.79
Front Bumper to Front of Front Well:	18	1.50	0.46
Front Bumper to Front of Hood:	3	0.25	0.08
Front Bumper to Base of Windshield:	41	3.42	1.04
Front Bumper to Top of Windshield:	67	5.58	1.70
Rear Bumper to Rear Axle:	35	2.92	0.89
Rear Bumper to Rear of Rear Well:	19	1.58	0.48
Rear Bumper to Rear of Trunk:	3	0.25	0.08
Rear Bumper to Base of Rear Window:	4	0.33	0.10
Width Dimensions			
Maximum Width:	72	6.00	1.83
Front Track:	60	5.00	1.52
Rear Track:	62	5.17	1.57
Vertical Dimensions			
Height:	66	5.50	1.68
Ground to -			
Front Bumper (Top)	23	1.92	0.58
Headlight - center	30	2.50	0.76
Hood - top front:	36	3.00	0.91
Base of Windshield	46	3.83	1.17
Rear Bumper - top:	23	1.92	0.58
Trunk - top rear:	35	2.92	0.89
Base of Rear Window:	43	3.58	1.09

1994 PLYMOUTH VOYAGER 2WD 3 DOOR MINI VAN

Interior Dimensions

	Inches	Feet	Meters
Front Seat Shoulder Width	58	4.83	1.47
Front Seat to Headliner	40	3.33	1.02
Front Leg Room - seatback to floor (max)	39	3.25	0.99
Rear Seat Shoulder Width	61	5.08	1.55
Rear Seat to Headliner	38	3.17	0.97
Front Leg Room - seatback to floor (min)	31	2.58	0.79

Seatbelts: 3pt LAP & SHOULDER - front, None or Unknown - rear

Airbags: DRIVER SIDE AIRBAGS

Steering Data

Turning Circle (Diameter)	516	43.00	13.11
Steering Ratio: 17.17:1			
Wheel Radius:	13	1.08	0.33
Tire Size (OEM): 195-75R14			

Acceleration & Braking Information

Brake Type: FRONT DISC - REAR DRUM

ABS System: ABS UNKNOWN

Braking, 60 mph to 0 (Hard pedal, no skid, dry pavement):

d = 143.0 ft t = 3.3 sec a = -27.0 ft/sec² G-force = -0.84

Acceleration:

0 to 30mph	t =		sec	a =		ft/sec²	G-force =	
0 to 60mph	t =	11.5	sec	a =	7.7	ft/sec²	G-force =	0.24
45 to 65mph	t =		sec	a =		ft/sec²	G-force =	

Transmission Type: AUTOMATIC

Notes:

Federal Bumper Standard Requirements: No Requirement mph

This vehicles Rated Bumper Strength: 5 mph

N.S.D.C = 1992 - 1995

1994 PLYMOUTH VOYAGER 2WD 3 DOOR MINI VAN

Other Information

Tip-Over Stability Ratio =	1.18	Reasonably Stable
NHTSA Star Rating (calculated)		***

Center of Gravity (No Load):

Inches behind front axle	=	45.92
Inches in front of rear axle	=	66.08
Inches from side of vehicle	=	36.00
Inches from ground	=	25.84
Inches from front corner	=	84.93
Inches from rear corner	=	107.30
Inches from front bumper	=	76.92
Inches from rear bumper	=	101.08

Moments of Inertia Approximations (No Load):

Yaw Moment of Inertia	=	1747.00	lb*ft*sec²
Pitch Moment of Inertia	=	1703.00	lb*ft*sec²
Roll Moment of Inertia	=	425.00	lb*ft*sec²

Front Profile Information

Angle Front Bumper to Hood Front	=	77.0	deg
Angle Front of Hood to Windshield Base	=	14.7	deg
Angle Front of Hood to Windshield Top	=	23.6	deg
Angle of Windshield	=	34.7	deg
Angle of Steering Tires at Max Turn	=	24.9	deg

First Approximation Crush Factors:

Speed Equivalent (mph) of Kinetic Energy (KE) used in causing crush of indentation may be evaluated using the following formula, the appropriated Crush Factor (CF), and Maximum Indentation Depth (MID), in feet:

$$V(mph) = \sqrt{(30 * CF * MID)}$$

KE Equivalent Speed (Front/Rear/Side)	=	21	CF
Bullet vehicle IMPACT SPEED estimation based on TARGET VEHICLE damage ONLY (Tested for Rear/Side Impact only)	=	27	CF

These CF values are based upon analysis of NHTSA Barrier Crash data, and from over 1000 vehicle accidents where independant evaluation of speed was possible. (These are NOT 'A', 'B', 'C', or 'G' values)

The rear Impact data with more then 2-3 inches of crush damage should be looked at carefully, since some vehicles have very weak trunk & fender strength. Therefore, on some cars, especially GM, you estimate from the rear crush data may be high by as much as 4-5 mph (on a crush of 18 inches).

Stiffness Values and Test Data

Derived from

NHTSA Crash Test

#1983

1994 DODGE CARAVAN

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS
8387 UNIVERSITY AVENUE
LA MESA CA 91941-3842
11R-030201SC01301

4N6XPRT Systems | 8387 University Avenue | La Mesa, CA 91942 | USA
(800) 266-9778 | (619) 464-3478 | FAX: (619) 464-2206 | Email: 4n6@4n6xprt.com

Sister/Clone database reader

You entered: **1994 PLYMOUTH VOYAGER**

The Sister/Clone Vehicle Year/Model Interchange list indicates the following are Similar Models

Year Range	Make	Model	Body Styles	Wheelbase
1991 - 1995	PLYMOUTH	VOYAGER	MiniVan, VAN	112, 127
Remarks:				
1991 - 1992	CHRYSLER	TOWN & COUNTRY	SW, VAN	121.2, 119.3
Remarks:				
1991 - 1995	DODGE	CARAVAN	VAN	113.3, 119.3
Remarks:				
1993 - 1995	CHRYSLER	TOWN & COUNTRY	SW, VAN	121.2, 119.3
Remarks:				
1991 - 1995	DODGE	GRAND CARAVAN	VAN	121.2
Remarks:				
1991 - 1995	PLYMOUTH	GRAND VOYAGER	VAN	96.9
Remarks:				

If you have suggestions, corrections, etc., you should contact Greg Anderson at Scalia Safety Engineering,
521 East Washington Avenue, Suite 200, Madison, WI 53703-2914, (608) 256-0820, FAX (608) 256-0212, E-mail: greganderson@cs.com.

Test Information

Test #	1983	NHTSA Test Reference Guide Version #	2			
Test Date	1993-09-29	Contract #	DTNH22-90-D-22121			
Contract/Study Title	1994 DODGE CARAVAN INTO FLAT FRONTAL BARRIER					
Test Objective(s)	OBTAIN 35 MPH NEW CAR ASSESSMENT AND RESEARCH DATA					
Test Type	NEW CAR ASSESSMENT TEST	Configuration	VEHICLE INTO BARRIER			
Impact Angle	0	Side Impact Point	0	mm	0.0	inches
			0	mm	0.0	inches
		Closing Speed	56.5	Km/Hr	35.11	MPH
Test Performer	TRC OF OHIO					
Test Reference #	930929					
Test Track Surface	CONCRETE	Condition	DRY			
Ambient Temperature	21 C	69.8 F	Total Number of Curves	83		
Data Recorder Type	FM MULTIPLEXOR TAPE RECORDER	Data Link	UMBILICAL CABLE			
Test Commentary	NO COMMENTS					

Fixed Barrier Information

Barrier Type	RIGID	Pole Barrier Diameter	0	mm	0 inches
Barrier Shape	LOAD CELL BARRIER				
Barrier Commentary	NO COMMENTS				

1994 DODGE CARAVAN LEFT FRONT SEAT OCCUPANT

Test #	1983		
Vehicle #	1	Sex	MALE
Location	LEFT FRONT SEAT	Age	0
Position	CENTER POSITION	Height	0 mm 0.0 inches
Type	HYBRID III DUMMY	Weight	0.0 kg 0 pounds
Size	50 PERCENTILE		
Calibration Method	HYBRID III		
Occupant Manufacturer	HUMANOID SYSTEMS S/N 142		
Occupant Modification	UNMODIFIED		
Occupant Description	NO COMMENTS		
Occupant Commentary	HEAD & CHEST CONTACTED AIRBAG		

Head

Head to -

Windshielder Header	439	mm	17.3	inches	Head Injury Criteria (HIC)	514	
WindShield	603	mm	23.7	inches	HIC Lower Time Interval (ms)	56.16	
Seatback	0	mm	0.0	inches	HIC Upper Time Interval (ms)	92.16	
Side Header	251	mm	9.9	inches			
Side Window	338	mm	13.3	inches			

Neck to Seatback 0 mm 0.0 inches

First Contact Region (Head): AIR BAG

Second Contact Region (Head):

Chest

Chest to -

Dash	493	mm	19.4	inches	Arm to Door	85	mm	3.3	inches
Steering Wheel	274	mm	10.8	inches	Hip to Door	111	mm	4.4	inches
Seatback	0	mm	0.0	inches					

Chest Severity Index: 534 — Pelvic Peak Lateral Acceleration (g's):

Thoracic Trauma Index: — Thorax Peak Acceleration (g's): 51.3

Lap Belt Peak Load: 5130 Newtons 1153.3 pound Force

Shoulder Belt Peak Load: 8108 Newtons 1822.8 pound Force

First Contact Region (Chest/Abdomen): AIR BAG

Second Contact Region (Chest/Abdomen): NONE

Legs

Knees to Dash: 161 mm 6.3 inches — Knees to Seatback: 0 mm 0.0 inches

Left Femur Peak Load: -4055 Newtons -911.6 pounds Force

Right Femur Peak Load: -5062 Newtons -1138.0 pounds Force

First Contact Region (Legs): DASHPANEL

Second Contact Region (Legs):

1994 DODGE CARAVAN LEFT FRONT SEAT OCCUPANT

Test #	1983					
Vehicle #	1	Sex	MALE			
Location	LEFT FRONT SEAT	Age	0			
Position	CENTER POSITION	Height	0	mm	0.0	inches
Type	HYBRID III DUMMY	Weight	0.0	kg	0	pounds
Size	50 PERCENTILE					

Calibration Method	HYBRID III
Occupant Manufacturer	HUMANOID SYSTEMS S/N 142
Occupant Modification	UNMODIFIED
Occupant Description	NO COMMENTS
Occupant Commentary	HEAD & CHEST CONTACTED AIRBAG

Restraints

Restraint # 1	3 POINT BELT
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	NO COMMENTS
Restraint # 2	FRONTAL AIRBAG
Mounted	
Deployment	DEPLOYED PROPERLY
Restraint Commentary	NO COMMENTS

1994 DODGE CARAVAN RIGHT FRONT SEAT OCCUPANT

Test #	1983		
Vehicle #	1	Sex	MALE
Location	RIGHT FRONT SEAT	Age	0
Position	CENTER POSITION	Height	0 mm 0.0 inches
Type	HYBRID III DUMMY	Weight	0.0 kg 0 pounds
Size	50 PERCENTILE		
Calibration Method	HYBRID III		
Occupant Manufacturer	ALDERSON RESEARCH LABS S/N 192		
Occupant Modification	UNMODIFIED		
Occupant Description	NO COMMENTS		
Occupant Commentary	HEAD AND CHEST CONTACTED AIRBAG		

Head

Head to -

Windshielder Header	400	mm	15.7	inches	Head Injury Criteria (HIC)	422	
WindShield	537	mm	21.1	inches	HIC Lower Time Interval (ms)	48.88	
Seatback	0	mm	0.0	inches	HIC Upper Time Interval (ms)	84.88	
Side Header	239	mm	9.4	inches			
Side Window	319	mm	12.6	inches			

Neck to Seatback 0 mm 0.0 inches

First Contact Region (Head): AIR BAG

Second Contact Region (Head):

Chest

Chest to -

Dash	523	mm	20.6	inches	Arm to Door	72	mm	2.8	inches
Steering Wheel	0	mm	0.0	inches	Hip to Door	138	mm	5.4	inches
Seatback	0	mm	0.0	inches					

Chest Severity Index: 446 — Pelvic Peak Lateral Acceleration (g's):

Thoracic Trauma Index: — Thorax Peak Acceleration (g's): 45.4

Lap Belt Peak Load: 3683 Newtons 828.0 pound Force

Shoulder Belt Peak Load: 5048 Newtons 1134.8 pound Force

First Contact Region (Chest/Abdomen): AIR BAG

Second Contact Region (Chest/Abdomen): NONE

Legs

Knees to Dash	138	mm	5.4	inches	Knees to Seatback	0	mm	0.0	inches

Left Femur Peak Load	-7275 Newtons	-1635.5	pounds Force
Right Femur Peak Load	-4460 Newtons	-1002.7	pounds Force

First Contact Region (Legs): DASHPANEL

Second Contact Region (Legs):

1994 DODGE CARAVAN RIGHT FRONT SEAT OCCUPANT

Test #	1983					
Vehicle #	1	Sex	MALE			
Location	RIGHT FRONT SEAT	Age	0			
Position	CENTER POSITION	Height	0	mm	0.0	inches
Type	HYBRID III DUMMY	Weight	0.0	kg	0	pounds
Size	50 PERCENTILE					

Calibration Method	HYBRID III
Occupant Manufacturer	ALDERSON RESEARCH LABS S/N 192
Occupant Modification	UNMODIFIED
Occupant Description	NO COMMENTS
Occupant Commentary	HEAD AND CHEST CONTACTED AIRBAG

Restraints

Restraint # 1	3 POINT BELT
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	NO COMMENTS
Restraint # 2	FRONTAL AIRBAG
Mounted	
Deployment	DEPLOYED PROPERLY
Restraint Commentary	NO COMMENTS

Vehicle 1 1994 DODGE CARAVAN

Test #	1983		
VIN	2B4GH25K2RR526983	NHTSA Test Vehicle Number	1
Year	1994	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	DODGE	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	CARAVAN	Steering Column Collapse Mechanism	NOT APPLICABLE
Body	VAN		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	2.5 Liter	Transmission	AUTOMATIC - FRONT WHEEL DRIVE
Vehicle Modification(s) Description	NO COMMENTS		
Vehicle Commentary	STEERING COLUMN COVER COVERED COLLAPSE MECHANISM & SHEAR CAPSULE		

Vehicle Length	4560	mm	179.5	inches	CG behind Front Axle	1201	mm	47.3	inches
Vehicle Width	1810	mm	71.3	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Wheelbase	2850	mm	112.2	inches	Total Length of Indentation	1524	mm	60.0	inches
Vehicle Test Weight	1739	KG	3833	pounds	Maximum Static Crush Depth	600	mm	23.6	inches
					Pre-Impact Speed	57	kph	35.1	mph

Vehicle Damage Index: 12FDEW4

Principal Direction of Force: 0

Damage Profile Distance Measurements

(Measured Left-to-Right, Rear-to-Front)

DPD 1	527	mm	20.7	inches
DPD 2	583	mm	23.0	inches
DPD 3	584	mm	23.0	inches
DPD 4	584	mm	23.0	inches
DPD 5	600	mm	23.6	inches
DPD 6	495	mm	19.5	inches

Crush from Pre & Post Test Damage Measurements

	Pre-Test		Post-Test		Crush Depth	
Left Bumper Corner	173.9	inches	153.1	inches	20.7	inches
	4417	mm	3890	mm	527	mm
Centerline	179.5	inches	155.3	inches	24.2	inches
	4560	mm	3945	mm	615	mm
Right Bumper Corner	173.8	inches	154.3	inches	19.5	inches
	4415	mm	3920	mm	495	mm

Bumper Engagement (Inline Impact Only): 0.0

Sill Engagement (Side Impact Only): NOT APPLICABLE

A-pillar Engagement (Side Impact Only): 0.0

Moving Test Cart Angle: NOT APPLICABLE

Magnitude of the Tilt Angle Measured between surface of a Rollover Test Cart and the Ground

Moving Test Cart/Vehicle Crabbed Angle: 0.0

Magniture of the Crabbed Angle Measure Clockwise from Longitudinal Vector to Velocity Vector of Vehicle

Vehicle Orientation on Cart Moving Test Cart: NOT APPLICABLE

Magnitude of the Angle Measured between the Vehicle Orientation and Direction of Test Cart Motion

Vehicle 1 1994 DODGE CARAVAN

Test #	1983		
VIN	2B4GH25K2RR526983	NHTSA Test Vehicle Number	1
Year	1994	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	DODGE	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	CARAVAN	Steering Column Collapse Mechanism	NOT APPLICABLE
Body	VAN		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	2.5 Liter	Transmission	AUTOMATIC - FRONT WHEEL DRIVE
Vehicle Modification(s) Description	NO COMMENTS		
Vehicle Commentary	STEERING COLUMN COVER COVERED COLLAPSE MECHANISM & SHEAR CAPSULE		

Vehicle Length	4560	mm	179.5	inches	CG behind Front Axle	1201	mm	47.3	inches
Vehicle Width	1810	mm	71.3	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Wheelbase	2850	mm	112.2	inches	Total Length of Indentation	1524	mm	60.0	inches
Vehicle Test Weight	1739	KG	3833	pounds	Maximum Static Crush Depth	600	mm	23.6	inches
					Pre-Impact Speed	57	kph	35.1	mph

Vehicle Damage Index: 12FDEW4 — Principal Direction of Force: 0

Pre & Post Test Damage Measurements

(Measurements are taken in a longitudinaldirection. Except for Engine Block, all measurements are take from the Rear Vehicle Surface forward.)

Left Side Pre-Test mm	Left Side Pre-Test inches	Left Side Post-Test mm	Left Side Post-Test inches	Centerline	Centerline Pre-Test mm	Centerline Pre-Test inches	Centerline Post-Test mm	Centerline Post-Test inches	Right Side Pre-Test mm	Right Side Pre-Test inches	Right Side Post-Test mm	Right Side Post-Test inches
				Length of Vehicle at Centerline	4560	179.5	3945	155.3				
				Engine Block	4800	189.0	480	18.9				
4417	173.9	3890	153.1	Front Bumper Corner					4415	173.8	3920	154.3
				Front of Engine	3910	153.9	3595	141.5				
3604	141.9	3425	134.8	Firewall					3580	140.9	3400	133.9
					3662	144.2	3265	128.5				
3269	128.7	3274	128.9	Upper Leading Edge of Door					3272	128.8	3277	129.0
3202	126.1	3198	125.9	Lower Leading Edge of Door					3198	125.9	3202	126.1
3230	127.2	3225	127.0	Bottom of 'A' Post					3232	127.2	3230	127.2
2184	86.0	2190	86.2	Upper Trailing Edge of Door					2182	85.9	2192	86.3
2186	86.1	2180	85.8	Lower Trailing Edge of Door					2189	86.2	2186	86.1
				Steering Column	2781	109.5	2775	109.3				
				Center of Seering Column to 'A' Post (Horizontal)	328	12.9	302	11.9				
				Center of Steering Column to Headliner (Vertical)	460	18.1	378	14.9				

1994 DODGE CARAVAN

NHTSA Crash Test - #1983 - Front Impact

Pre/Post Depths - Vehicle Width - Closing Speed - Trapezoidal Average

Test Vehicle Weight = 3833 pounds
Vehicle Closing Speed = 35.1 mph
Test Crush Length = 71.3 inches

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	20.7	24.2	19.5	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 19.5 inches					139.8
Using a Rated No Damage Speed of	2.5 mph	180.3	120.6	134.8	
Using a Rated No Damage Speed of	5.0 mph	332.9	102.8	539.0	
Using a Rated No Damage Speed of	7.5 mph	457.9	86.4	1212.8	
Using a Rated No Damage Speed of	10.0 mph	555.2	71.5	2156.0	
Average Crush = 22.2 inches					107.8
Using a Rated No Damage Speed of	2.5 mph	158.3	93.0	134.8	
Using a Rated No Damage Speed of	5.0 mph	292.4	79.3	539.0	
Using a Rated No Damage Speed of	7.5 mph	402.2	66.7	1212.8	
Using a Rated No Damage Speed of	10.0 mph	487.7	55.2	2156.0	
Maximum Crush = 24.2 inches					90.8
Using a Rated No Damage Speed of	2.5 mph	145.3	78.3	134.8	
Using a Rated No Damage Speed of	5.0 mph	268.2	66.7	539.0	
Using a Rated No Damage Speed of	7.5 mph	368.9	56.1	1212.8	
Using a Rated No Damage Speed of	10.0 mph	447.4	46.4	2156.0	

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

****

4N6XPRT System's First Approximation Crush Factor (CF)

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

Impact Speed (mph) = SQRT(30 * CF * max crush in feet)

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	24.2	35.6	0.5	1.5

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 20.4

CF = (mph * mph) / (30 * max crush in feet), dimensionless

4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test

1994 DODGE CARAVAN

NHTSA Crash Test - #1983 - Front Impact

Pre/Post Depths - Indention Length - Closing Speed - Trapezoidal Average

Test Vehicle Weight = 3833 pounds
Vehicle Closing Speed = 35.1 mph
Test Crush Length = 60.0 inches

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	20.7	24.2	19.5	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 19.5 inches					166.0
Using a Rated No Damage Speed of	2.5 mph	214.1	143.2	160.0	
Using a Rated No Damage Speed of	5.0 mph	395.4	122.1	640.2	
Using a Rated No Damage Speed of	7.5 mph	543.8	102.7	1440.4	
Using a Rated No Damage Speed of	10.0 mph	659.4	84.9	2560.7	
Average Crush = 22.2 inches					128.1
Using a Rated No Damage Speed of	2.5 mph	188.1	110.5	160.0	
Using a Rated No Damage Speed of	5.0 mph	347.3	94.2	640.2	
Using a Rated No Damage Speed of	7.5 mph	477.7	79.2	1440.4	
Using a Rated No Damage Speed of	10.0 mph	579.2	65.5	2560.7	
Maximum Crush = 24.2 inches					107.8
Using a Rated No Damage Speed of	2.5 mph	172.5	93.0	160.0	
Using a Rated No Damage Speed of	5.0 mph	318.6	79.3	640.2	
Using a Rated No Damage Speed of	7.5 mph	438.2	66.7	1440.4	
Using a Rated No Damage Speed of	10.0 mph	531.3	55.1	2560.7	

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

****

4N6XPRT System's First Approximation Crush Factor (CF)

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

Impact Speed (mph) = SQRT(30 * CF * max crush in feet)

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	24.2	35.6	0.5	1.5

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 20.4

CF = (mph * mph) / (30 * max crush in feet), dimensionless

4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test

Available Test Results
Front Impact Test Summary

Report Filter Settings

Year Range: 1991 - 1995
Make: PLYMOUTH
Model: VOYAGER

Test Number	Vehicle Info	No Damage Speed (mph)	Average Crush (inch)	Closing Speed (mph)	Vehicle Stiffness A	Vehicle Stiffness B	Vehicle Width Values G	Vehicle Width Values Kv	Crush Factor
2351	1992 PLYMOUTH VOYAGER VAN VAN	5.0	6.8	9.8	171.3	24.3	604.1	100.9	5.7
2350	1992 PLYMOUTH VOYAGER VAN VAN	5.0	4.6	9.8	250.6	52.0	604.1	215.8	8.3
1669	1992 DODGE CARAVAN VAN	5.0	24.0	35.0	281.7	70.2	564.7	95.6	20.4
1983	1994 DODGE CARAVAN VAN	5.0	22.5	35.1	288.0	77.0	539.0	104.7	21.9
2353	1992 PLYMOUTH VOYAGER VAN VAN	5.0	24.7	35.0	292.9	71.0	604.1	96.7	19.8
1662	1992 PLYMOUTH VOYAGER VAN VAN	5.0	18.4	29.6	304.4	81.3	570.2	117.7	19.0
2352	1992 PLYMOUTH VOYAGER VAN VAN	5.0	11.6	19.9	308.7	78.9	604.1	140.8	13.6
2091	1994 DODGE CARAVAN VAN	5.0	17.1	29.1	334.3	94.2	593.1	137.4	19.8
	Average (AVG)				**279.0**	**68.6**	**585.4**	**126.2**	**16.1**
	Minimum (MIN)				**171.3**	**24.3**	**539.0**	**95.6**	**5.7**
	Maximum (MAX)				**334.3**	**94.2**	**604.1**	**215.8**	**21.9**
	Standard Deviation (STDev-sample)				**49.7**	**21.5**	**24.7**	**40.3**	**6.1**
	Number of Tests (n)			**8**					

Available Test Results
Front Impact Test Summary

Report Filter Settings

Year Range: 1991 - 1995
Make: PLYMOUTH
Model: VOYAGER

Test Number	Vehicle Info	No Damage Speed (mph)	Max Crush (inch)	Closing Speed (mph)	Vehicle Stiffness A	Vehicle Stiffness B	Vehicle Width Values G	Vehicle Width Values Kv	Crush Factor
2351	1992 PLYMOUTH VOYAGER VAN VAN	5.0	11.1	9.8	104.9	9.1	604.1	37.8	3.5
2350	1992 PLYMOUTH VOYAGER VAN VAN	5.0	8.1	9.8	142.9	16.9	604.1	70.1	4.7
2352	1992 PLYMOUTH VOYAGER VAN VAN	5.0	20.4	19.9	176.0	25.6	604.1	45.8	7.7
2874	1994 DODGE CARAVAN VAN	5.0	18.6	25.3	259.3	56.7	592.9	88.1	13.8
2353	1992 PLYMOUTH VOYAGER VAN VAN	5.0	27.6	35.0	262.5	57.0	604.1	77.7	17.7
1669	1992 DODGE CARAVAN VAN	5.0	25.3	35.0	267.5	63.4	564.7	86.3	19.3
1983	1994 DODGE CARAVAN VAN	5.0	24.2	35.1	268.1	66.7	539.0	90.7	20.4
1662	1992 PLYMOUTH VOYAGER VAN VAN	5.0	20.5	29.6	273.3	65.5	570.2	94.9	17.1
2091	1994 DODGE CARAVAN VAN	5.0	19.9	29.1	286.8	69.3	593.1	101.1	17.0
	Average (AVG)				**226.8**	**47.8**	**586.3**	**76.9**	**13.5**
	Minimum (MIN)				**104.9**	**9.1**	**539.0**	**37.8**	**3.5**
	Maximum (MAX)				**286.8**	**69.3**	**604.1**	**101.1**	**20.4**
	Standard Deviation (STDev-sample)				**67.0**	**23.7**	**23.2**	**22.0**	**6.5**
	Number of Tests (n)			**9**					

4N6XPRT Systems
Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942

Phone: (619) 464-3478
Fax: (619) 464-2206
Toll Free: 1- 800-266-9778

Web Site: http://www.4n6xprt.com

E-Mail: 4n6@4n6xprt.com

To compare stiffness values between a Force-Balance approach and calculation from NHTSA Crash Tests, Force Balance calculations have been made on this crash test.

A FORCE-BALANCE approach for calculating stiffness values for the front of the Honda Accord was used, with the Stiffness Values from the range of tests for the Plymouth Voyager as the “Known Good” values.

The critical criteria in this analysis is -

A-B values based on AVERAGE crush

1994 PLYMOUTH VOYAGER 2WD - Front Impact

Curb Weight (pounds):	3000
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	3000
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	5.0
Energy Crush Depth (inches):	3.73
Damage Length (inches):	61.0
Crush Profile Measurements:	4

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1747.00

"Known" Stifness Values

	A	B
Average	279.0	68.6
Minimum	171.3	24.3
Maximum	334.3	94.2
Std. Devation	49.7	21.5

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	4.00	30.00	105.00	1.76	185.00	14.29	1500.00
C2 (inches)	3.00	17.00	59.50	1.76	104.83	25.90	1541.33
C3 (inches)	4.00	14.00	63.00	2.26	142.33	35.26	2221.33
C4 (inches)	5.00						
C5 (inches)							
C6 (inches)							
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 3.73

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	Closing Speed (MPH)
Minimum	171.3	24.3	7988.78	7191.91	8.5	7.8	16.6
Avg - 2 Std. Deviations	179.6	25.6	8389.80	7529.39	8.7	8.0	16.9
Avg - 1 Std. Deviations	229.3	47.1	12351.28	8880.70	9.4	8.8	18.6
Average	279.0	68.6	16312.75	10643.98	10.3	9.6	20.4
Avg + 1 Std. Deviations	328.7	90.1	20274.23	12524.30	11.2	10.4	22.1
Avg + 2 Std. Deviations	378.4	111.6	24235.70	14454.03	12.0	11.1	23.6
Maximum	334.3	94.2	20911.40	12745.65	11.3	10.5	22.3

Damage Centroid Depth (x) (inches)	1.90	k^2	2700.16
Damage Centroid Depth (y) (inches)	23.13	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	227.50		

1986 HONDA ACCORD LXI - Front Impact

Curb Weight (pounds):	2668
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2668
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	5.0
Energy Crush Depth (inches):	3.28
Damage Length (inches):	61.0
Crush Profile Measurements:	4

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1542.04

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	5.00	17.00	68.00	2.04	138.83	7.79	529.83
C2 (inches)	3.00	14.00	42.00	1.50	63.00	21.00	882.00
C3 (inches)	3.00	30.00	90.00	1.50	135.00	75.00	6750.00
C4 (inches)	3.00						
C5 (inches)							
C6 (inches)							
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 3.28

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	bsub1
Minimum	162.8	30.2	7988.78	5792.09	8.1	8.8	16.3
Avg - 2 Std. Deviations	168.7	32.4	8389.80	5952.22	8.2	8.9	16.9
Avg - 1 Std. Deviations	221.5	55.9	12351.28	7492.11	9.2	9.9	22.2
Average	267.5	81.5	16312.75	8976.09	10.0	10.8	26.8
Avg + 1 Std. Deviations	308.6	108.6	20274.23	10421.59	10.8	11.7	31.0
Avg + 2 Std. Deviations	346.3	136.7	24235.70	11838.55	11.5	12.5	34.7
Maximum	314.9	113.0	20911.40	10651.23	10.9	11.8	31.6

Damage Centroid Depth (x) (inches)	1.68	k^2	2679.96
Damage Centroid Depth (y) (inches)	40.81	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	200.00		

4N6XPRT Systems
Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942

Phone: (619) 464-3478
Fax: (619) 464-2206
Toll Free: 1- 800-266-9778

Web Site: http://www.4n6xprt.com

E-Mail: 4n6@4n6xprt.com

To compare stiffness values between a Force-Balance approach and calculation from NHTSA Crash Tests, Force Balance calculations have been made on this crash test.

A FORCE-BALANCE approach for calculating stiffness values for the front of the Honda Accord was used, with the Stiffness Values from the range of tests for the Plymouth Voyager as the “Known Good” values.

The critical criteria in this analysis is -

A-B values based on MAXIMUM crush

1994 PLYMOUTH VOYAGER 2WD - Front Impact

Curb Weight (pounds):	3000
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	3000
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	5.0
Energy Crush Depth (inches):	3.73
Damage Length (inches):	61.0
Crush Profile Measurements:	4

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1747.00

"Known" Stifness Values

	A	B
Average	226.8	47.8
Minimum	104.9	9.1
Maximum	286.8	69.3
Std. Devation	67.0	23.7

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	4.00	30.00	105.00	1.76	185.00	14.29	1500.00
C2 (inches)	3.00	17.00	59.50	1.76	104.83	25.90	1541.33
C3 (inches)	4.00	14.00	63.00	2.26	142.33	35.26	2221.33
C4 (inches)	5.00						
C5 (inches)							
C6 (inches)							
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 3.73

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	Closing Speed (MPH)
Minimum	104.9	9.1	4234.58	5389.92	7.3	6.7	14.3
Avg - 2 Std. Deviations	92.8	0.4	2875.90	56494.81	23.8	16.8	35.7
Avg - 1 Std. Deviations	159.8	24.1	7615.28	6590.59	8.1	7.6	16.1
Average	226.8	47.8	12354.65	8756.34	9.4	8.7	18.6
Avg + 1 Std. Deviations	293.8	71.5	17094.03	11213.38	10.6	9.8	20.8
Avg + 2 Std. Deviations	360.8	95.2	21833.40	13744.17	11.7	10.8	22.9
Maximum	286.8	69.3	16630.28	10949.79	10.5	9.7	20.6

Damage Centroid Depth (x) (inches)	1.90	k^2	2700.16
Damage Centroid Depth (y) (inches)	23.13	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	227.50		

1986 HONDA ACCORD LXI - Front Impact

Curb Weight (pounds):	2668
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2668
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	5.0
Energy Crush Depth (inches):	3.28
Damage Length (inches):	61.0
Crush Profile Measurements:	4

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1542.04

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	5.00	17.00	68.00	2.04	138.83	7.79	529.83
C2 (inches)	3.00	14.00	42.00	1.50	63.00	21.00	882.00
C3 (inches)	3.00	30.00	90.00	1.50	135.00	75.00	6750.00
C4 (inches)	3.00						
C5 (inches)							
C6 (inches)							
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 3.28

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	bsub1
Minimum	100.8	11.6	4234.58	4236.04	6.9	7.6	10.1
Avg - 2 Std. Deviations	73.9	6.2	2875.90	3636.30	6.4	18.9	7.4
Avg - 1 Std. Deviations	157.2	28.2	7615.28	5642.08	8.0	8.5	15.8
Average	221.6	55.9	12354.65	7493.40	9.2	9.8	22.2
Avg + 1 Std. Deviations	275.9	86.8	17094.03	9263.83	10.2	11.0	27.7
Avg + 2 Std. Deviations	323.8	119.5	21833.40	10982.29	11.1	12.1	32.5
Maximum	270.9	83.6	16630.28	9093.20	10.1	10.9	27.2

Damage Centroid Depth (x) (inches)	1.68	k^2	2679.96
Damage Centroid Depth (y) (inches)	40.81	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	200.00		

Expert VIN DeCoder®

Version Number 3.1.0.3

DeCoded VIN: 1HGBA7446GA128552

Model:	1986 Honda Accord LXi 4 Door Sedan
Engine Size:	1.8 L/ 107 cu.in.
Engine Description:	In-Line 4 cylinder with Overhead Cam
Horse Power:	98 @ 5500 rpm
Torque:	109 lb-ft at 3500 rpm
Injection System:	2 Bbl Carburetor
PSI:	3 psi
Ignition:	electronic
Manufacturer:	Honda
Assembly Plant:	Marysville, Ohio
Drive Wheels:	This is a Front Wheel Drive vehicle w/ Manual Seatbelts

The First through Third characters (1HG) indicate a Honda Passenger Car made in the U.S.A.

The Fourth through Sixth characters (BA7) indicate an Accord and the OEM engine: 1.8 L/ 107 cu.in., L4, OHC

The Seventh character (4) indicates a 4 Door Sedan

The Eighth character (4) indicates a LXi series and Manual Seatbelts

The Ninth character (the check digit) is entered as 6.
The VIN appears Valid, the calculated value is 6.

The Tenth character (G) indicates the model year 1986

The Eleventh character (A) indicates the vehicle was made in the assembly plant in Marysville, Ohio

The Twelfth through Seventeenth characters (128552) indicate the Serial Number and are unique to this vehicle.

Expert AutoStats®

Version 5.2.0.4

PROVIDED BY:
4N6XPRT Systems
8387 University Avenue
La Mesa CA 91942

7/19/2012

1986 HONDA ACCORD LXI 4 DOOR SEDAN

Curb Weight:		2668	lbs.	1210	kg.
Curb Weight Distribution -	Front:	63	% Rear:	37	%
Gross Vehicle Weight Rating:		3470	lbs.	1574	kg.
Number of Tires on Vehicle:		4			
Drive Wheels:		FRONT			

Horizontal Dimensions	Inches	Feet	Meters
Total Length	180	15.00	4.57
Wheelbase:	102	8.50	2.59
Front Bumper to Front Axle:	36	3.00	0.91
Front Bumper to Front of Front Well:	17	1.42	0.43
Front Bumper to Front of Hood:	4	0.33	0.10
Front Bumper to Base of Windshield:	47	3.92	1.19
Front Bumper to Top of Windshield:	76	6.33	1.93
Rear Bumper to Rear Axle:	42	3.50	1.07
Rear Bumper to Rear of Rear Well:	29	2.42	0.74
Rear Bumper to Rear of Trunk:	4	0.33	0.10
Rear Bumper to Base of Rear Window:	21	1.75	0.53
Width Dimensions			
Maximum Width:	67	5.58	1.70
Front Track:	58	4.83	1.47
Rear Track:	58	4.83	1.47
Vertical Dimensions			
Height:	53	4.42	1.35
Ground to -			
Front Bumper (Top)	17	1.42	0.43
Headlight - center	24	2.00	0.61
Hood - top front:	26	2.17	0.66
Base of Windshield	34	2.83	0.86
Rear Bumper - top:	23	1.92	0.58
Trunk - top rear:	37	3.08	0.94
Base of Rear Window:	38	3.17	0.97

1986 HONDA ACCORD LXI 4 DOOR SEDAN

Interior Dimensions	Inches	Feet	Meters
Front Seat Shoulder Width			
Front Seat to Headliner	39	3.25	0.99
Front Leg Room - seatback to floor (max)	43	3.58	1.09
Rear Seat Shoulder Width			
Rear Seat to Headliner	37	3.08	0.94
Front Leg Room - seatback to floor (min)	32	2.67	0.81

Seatbelts: 3pt - front and rear

Airbags: NO AIRBAGS

Steering Data

Turning Circle (Diameter)	492	41.00	12.50
Steering Ratio: 17.30:1			
Wheel Radius:	11	0.92	0.28
Tire Size (OEM): 195-60R14			

Acceleration & Braking Information

Brake Type: FRONT DISC - REAR DRUM

ABS System: ABS UNKNOWN

Braking, 60 mph to 0 (Hard pedal, no skid, dry pavement):

d = 134.0 ft t = 3.1 sec a = -28.8 ft/sec² G-force = -0.90

Acceleration:

	t	a	G-force
0 to 30mph	sec	ft/sec²	
0 to 60mph	9.8 sec	9.0 ft/sec²	0.28
45 to 65mph	sec	ft/sec²	

Transmission Type: 5spd MANUAL

Notes:

Federal Bumper Standard Requirements: 2.5 mph

This vehicles Rated Bumper Strength: 5 mph

N.S.D.C = 1986 - 1989

1986 HONDA ACCORD LXI 4 DOOR SEDAN

Other Information

Tip-Over Stability Ratio =	1.39	Stable
NHTSA Star Rating (calculated)		****

Center of Gravity (No Load):

Inches behind front axle	=	37.74
Inches in front of rear axle	=	64.26
Inches from side of vehicle	=	33.50
Inches from ground	=	20.80
Inches from front corner	=	80.99
Inches from rear corner	=	111.42
Inches from front bumper	=	73.74
Inches from rear bumper	=	106.26

Moments of Inertia Approximations (No Load):

Yaw Moment of Inertia	=	1542.04	lb*ft*sec²
Pitch Moment of Inertia	=	1492.32	lb*ft*sec²
Roll Moment of Inertia	=	330.24	lb*ft*sec²

Front Profile Information

Angle Front Bumper to Hood Front	=	66.0	deg
Angle Front of Hood to Windshield Base	=	10.5	deg
Angle Front of Hood to Windshield Top	=	19.1	deg
Angle of Windshield	=	30.4	deg
Angle of Steering Tires at Max Turn	=	23.8	deg

First Approximation Crush Factors:

Speed Equivalent (mph) of Kinetic Energy (KE) used in causing crush of indentation may be evaluated using the following formula, the appropriated Crush Factor (CF), and Maximum Indentation Depth (MID), in feet:

$$V(mph) = v(30 * CF * MID)$$

KE Equivalent Speed (Front/Rear/Side)	=	21 CF
Bullet vehicle IMPACT SPEED estimation based on TARGET VEHICLE damage ONLY (Tested for Rear/Side Impact only)	=	27 CF

These CF values are based upon analysis of NHTSA Barrier Crash data, and from over 1000 vehicle accidents where independant evaluation of speed was possible. (These are NOT 'A', 'B', 'C', or 'G' values)

The rear Impact data with more then 2-3 inches of crush damage should be looked at carefully, since some vehicles have very weak trunk & fender strength. Therefore, on some cars, especially GM, you estimate from the rear crush data may be high by as much as 4-5 mph (on a crush of 18 inches).

Stiffness Values and Test Data

Derived from

NHTSA Crash Test

#1054

1987 HONDA ACCORD

Provided By

4N6XPRT StifCalcs®

Registered to:

4N6XPRT SYSTEMS
8387 UNIVERSITY AVENUE
LA MESA CA 91941-3842
11R-030201SC01301

4N6XPRT Systems | 8387 University Avenue | La Mesa, CA 91942 | USA
(800) 266-9778 | (619) 464-3478 | FAX: (619) 464-2206 | Email: 4n6@4n6xprt.com

Sister/Clone database reader

You entered: **1986 HONDA ACCORD**

The Sister/Clone Vehicle Year/Model Interchange list indicates the following are Similar Models

Year Range	Make	Model	Body Styles	Wheelbase
1986 - 1989	HONDA	ACCORD	2D, 3D, 4D, SW	110.2, 107.9

Remarks: NEW COUPE MID-YEAR in 88

If you have suggestions, corrections, etc., you should contact Greg Anderson at Scalia Safety Engineering,
521 East Washington Avenue, Suite 200, Madison, WI 53703-2914, (608) 256-0820, FAX (608) 256-0212, E-mail: greganderson@cs.com.

Test Information

Test #	1054	NHTSA Test Reference Guide Version #	2				
Test Date	1987-07-24	Contract #	DTNH22-87-C-01024				
Contract/Study Title	1987 HONDA ACCORD INTO FRONTAL BARRIER						
Test Objective(s)	30 MPH FRONTAL BARRIER IMPACT 208,212,219(PARTIAL) & 301-75 COMPLIANCE						
Test Type	FMVSS 208 OCCUPANT CRASH PROTECTION	Configuration	VEHICLE INTO BARRIER				
Impact Angle	0	Side Impact Point	0	mm	0.0	inches	
			0	mm	0.0	inches	
		Closing Speed	47.5	Km/Hr	29.52	MPH	
Test Performer	TRC OF OHIO						
Test Reference #	870724						
Test Track Surface	CONCRETE	Condition	DRY				
Ambient Temperature	32 C	89.6 F	Total Number of Curves	23			
Data Recorder Type	FM MULTIPLEXOR TAPE RECORDER	Data Link	UMBILICAL CABLE				
Test Commentary	NO COMMENTS						

Fixed Barrier Information

Barrier Type	RIGID	Pole Barrier Diameter	0	mm	0	inches
Barrier Shape	FLAT BARRIER					
Barrier Commentary	NO COMMENTS					

1987 HONDA ACCORD LEFT FRONT SEAT OCCUPANT

Test #	1054		
Vehicle #	1	Sex	MALE
Location	LEFT FRONT SEAT	Age	0
Position	CENTER POSITION	Height	0 mm 0.0 inches
Type	PART 572 DUMMY	Weight	0.0 kg 0 pounds
Size	50 PERCENTILE		
Calibration Method	PART 572		
Occupant Manufacturer	MFG: HUMANOID SYSTEMS S/N 357		
Occupant Modification	UNMODIFIED		
Occupant Description	PART 572B DUMMY CALIBRATION		
Occupant Commentary	NO COMMENTS		

Head

Head to -

Windshielder Header	391	mm	15.4	inches	Head Injury Criteria (HIC)	315	
WindShield	472	mm	18.6	inches	HIC Lower Time Interval (ms)	65	
Seatback	0	mm	0.0	inches	HIC Upper Time Interval (ms)	101	
Side Header	147	mm	5.8	inches			
Side Window	229	mm	9.0	inches			

Neck to Seatback 0 mm 0.0 inches

First Contact Region (Head): NONE

Second Contact Region (Head):

Chest

Chest to -

Dash	630	mm	24.8	inches	Arm to Door	99	mm	3.9	inches
Steering Wheel	455	mm	17.9	inches	Hip to Door	178	mm	7.0	inches
Seatback	0	mm	0.0	inches					

Chest Severity Index: 307

Pelvic Peak Lateral Acceleration (g's):

Thoracic Trauma Index:

Thorax Peak Acceleration (g's): 45.6

Lap Belt Peak Load: Newtons 0.0 pound Force

Shoulder Belt Peak Load: Newtons 0.0 pound Force

First Contact Region (Chest/Abdomen): NONE

Second Contact Region (Chest/Abdomen): NONE

Legs

Knees to Dash 173 mm 6.8 inches Knees to Seatback 0 mm 0.0 inches

Left Femur Peak Load -7073 Newtons -1590.1 pounds Force

Right Femur Peak Load -1237 Newtons -278.1 pounds Force

First Contact Region (Legs): DASHPANEL

Second Contact Region (Legs):

1987 HONDA ACCORD LEFT FRONT SEAT OCCUPANT

Test #	1054					
Vehicle #	1	Sex	MALE			
Location	LEFT FRONT SEAT	Age	0			
Position	CENTER POSITION	Height	0	mm	0.0	inches
Type	PART 572 DUMMY	Weight	0.0	kg	0	pounds
Size	50 PERCENTILE					

Calibration Method	PART 572
Occupant Manufacturer	MFG: HUMANOID SYSTEMS S/N 357
Occupant Modification	UNMODIFIED
Occupant Description	PART 572B DUMMY CALIBRATION
Occupant Commentary	NO COMMENTS

Restraints

Restraint # 1	PASSIVE 3 POINT BELT
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	NO COMMENTS
Restraint # 2	DASHPANEL
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	NO COMMENTS

1987 HONDA ACCORD RIGHT FRONT SEAT OCCUPANT

Test #	1054		
Vehicle #	1	Sex	MALE
Location	RIGHT FRONT SEAT	Age	0
Position	CENTER POSITION	Height	0 mm 0.0 inches
Type	PART 572 DUMMY	Weight	0.0 kg 0 pounds
Size	50 PERCENTILE		
Calibration Method	PART 572		
Occupant Manufacturer	MFG: HUMANOID SYSTEMS S/N 358		
Occupant Modification	UNMODIFIED		
Occupant Description	PART 572B DUMMY CALIBRATION		
Occupant Commentary	NO COMMENTS		

Head

Head to -

Windshielder Header	424	mm	16.7	inches	Head Injury Criteria (HIC)	374	
WindShield	546	mm	21.5	inches	HIC Lower Time Interval (ms)	76.75	
Seatback	0	mm	0.0	inches	HIC Upper Time Interval (ms)	112.75	
Side Header	155	mm	6.1	inches			
Side Window	150	mm	5.9	inches			

Neck to Seatback 0 mm 0.0 inches

First Contact Region (Head): NONE

Second Contact Region (Head):

Chest

Chest to -

Dash	645	mm	25.4	inches	Arm to Door	86	mm	3.4	inches
Steering Wheel	0	mm	0.0	inches	Hip to Door	216	mm	8.5	inches
Seatback	0	mm	0.0	inches					

Chest Severity Index	294	Pelvic Peak Lateral Acceleration (g's)	
Thoracic Trauma Index		Thorax Peak Acceleration (g's)	38.5

Lap Belt Peak Load: Newtons 0.0 pound Force

Shoulder Belt Peak Load: Newtons 0.0 pound Force

First Contact Region (Chest/Abdomen): NONE

Second Contact Region (Chest/Abdomen): NONE

Legs

Knees to Dash	193	mm	7.6	inches	Knees to Seatback	0	mm	0.0	inches

Left Femur Peak Load	-1935	Newtons	-435.0	pounds Force
Right Femur Peak Load	-2095	Newtons	-471.0	pounds Force

First Contact Region (Legs): DASHPANEL

Second Contact Region (Legs):

1987 HONDA ACCORD RIGHT FRONT SEAT OCCUPANT

Test #	1054					
Vehicle #	1	Sex	MALE			
Location	RIGHT FRONT SEAT	Age	0			
Position	CENTER POSITION	Height	0	mm	0.0	inches
Type	PART 572 DUMMY	Weight	0.0	kg	0	pounds
Size	50 PERCENTILE					

Calibration Method	PART 572
Occupant Manufacturer	MFG: HUMANOID SYSTEMS S/N 358
Occupant Modification	UNMODIFIED
Occupant Description	PART 572B DUMMY CALIBRATION
Occupant Commentary	NO COMMENTS

Restraints

Restraint # 1	PASSIVE 3 POINT BELT
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	NO COMMENTS
Restraint # 2	DASHPANEL
Mounted	
Deployment	NOT APPLICABLE
Restraint Commentary	NO COMMENTS

Vehicle 1 1987 HONDA ACCORD

Test #	1054		
VIN	JHMCA5366HC095583	NHTSA Test Vehicle Number	1
Year	1987	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	HONDA	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	ACCORD	Steering Column Collapse Mechanism	NOT APPLICABLE
Body	THREE DOOR HATCHBACK		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	2 Liter	Transmission	MANUAL - FRONT WHEEL DRIVE
Vehicle Modification(s) Description	NO COMMENTS		
Vehicle Commentary	INSTR PANEL COVER BLOCKED VIEW OF STEERING COLUMN COLLAPSE		

Vehicle Length	4440	mm	174.8	inches	CG behind Front Axle	1133	mm	44.6	inches
Vehicle Width	1689	mm	66.5	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Wheelbase	2604	mm	102.5	inches	Total Length of Indentation	1549	mm	61.0	inches
Vehicle Test Weight	1332	KG	2936	pounds	Maximum Static Crush Depth	437	mm	17.2	inches
					Pre-Impact Speed	48	kph	29.5	mph

Vehicle Damage Index: 12FDEW2 — Principal Direction of Force: 0

Damage Profile Distance Measurements

(Measured Left-to-Right, Rear-to-Front)

DPD 1	391	mm	15.4	inches
DPD 2	411	mm	16.2	inches
DPD 3	427	mm	16.8	inches
DPD 4	427	mm	16.8	inches
DPD 5	417	mm	16.4	inches
DPD 6	399	mm	15.7	inches

Crush from Pre & Post Test Damage Measurements

	Pre-Test		Post-Test		Crush Depth	
Left Bumper Corner	171.0	inches	155.6	inches	15.4	inches
	4343	mm	3952	mm	391	mm
Centerline	174.8	inches	157.6	inches	17.2	inches
	4440	mm	4003	mm	437	mm
Right Bumper Corner	171.0	inches	155.3	inches	15.7	inches
	4343	mm	3945	mm	398	mm

Bumper Engagement (Inline Impact Only)	Sill Engagement (Side Impact Only)	A-pillar Engagement (Side Impact Only)
0.0	NOT APPLICABLE	0.0

Moving Test Cart Angle	Moving Test Cart/Vehicle Crabbed Angle	Vehicle Orientation on Cart Moving Test Cart
NOT APPLICABLE	0.0	NOT APPLICABLE
Magnitude of the Tilt Angle Measured between surface of a Rollover Test Cart and the Ground	*Magniture of the Crabbed Angle Measure Clockwise from Longitudinal Vector to Velocity Vector of Vehicle*	*Magnitude of the Angle Measured between the Vehicle Orientation and Direction of Test Cart Motion*

Vehicle 1 1987 HONDA ACCORD

Test #	1054		
VIN	JHMCA5366HC095583	NHTSA Test Vehicle Number	1
Year	1987	Vehicle Modification Indicator	PRODUCTION VEHICLE
Make	HONDA	Post-test Steering Column Shear Capsule Seperation	UNKNOWN
Model	ACCORD	Steering Column Collapse Mechanism	NOT APPLICABLE
Body	THREE DOOR HATCHBACK		
Engine	4 CYLINDER TRANSVERSE FRONT		
Displacement	2 Liter	Transmission	MANUAL - FRONT WHEEL DRIVE
Vehicle Modification(s) Description	NO COMMENTS		
Vehicle Commentary	INSTR PANEL COVER BLOCKED VIEW OF STEERING COLUMN COLLAPSE		

Vehicle Length	4440	mm	174.8	inches	CG behind Front Axle	1133	mm	44.6	inches
Vehicle Width	1689	mm	66.5	inches	Center of Damage to CG Axis	0	mm	0.0	inches
Vehicle Wheelbase	2604	mm	102.5	inches	Total Length of Indentation	1549	mm	61.0	inches
Vehicle Test Weight	1332	KG	2936	pounds	Maximum Static Crush Depth	437	mm	17.2	inches
					Pre-Impact Speed	48	kph	29.5	mph

Vehicle Damage Index	12FDEW2	Principal Direction of Force	0

Pre & Post Test Damage Measurements

(Measurements are taken in a longitudinaldirection. Except for Engine Block, all measurements are take from the Rear Vehicle Surface forward.)

Left Side				Centerline				Right Side			
Pre-Test		Post-Test		Pre-Test		Post-Test		Pre-Test		Post-Test	
mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches
				Length of Vehicle at Centerline							
				4440	174.8	4003	157.6				
				Engine Block							
				417	16.4	417	16.4				
4343	171.0	3952	155.6	Front Bumper Corner				4343	171.0	3945	155.3
				Front of Engine							
				3891	153.2	3787	149.1				
3358	132.2	3322	130.8	Firewall				3353	132.0	3340	131.5
				3327	131.0	3279	129.1				
3058	120.4	3043	119.8	Upper Leading Edge of Door				3058	120.4	3051	120.1
3068	120.8	3030	119.3	Lower Leading Edge of Door				3053	120.2	3053	120.2
3035	119.5	3018	118.8	Bottom of 'A' Post				3028	119.2	3028	119.2
1732	68.2	1722	67.8	Upper Trailing Edge of Door				1730	68.1	1730	68.1
1791	70.5	1758	69.2	Lower Trailing Edge of Door				1775	69.9	1781	70.1
				Steering Column							
				2604	102.5	2593	102.1				
				Center of Seering Column to 'A' Post (Horizontal)							
				406	16.0	376	14.8				
				Center of Steering Column to Headliner (Vertical)							
				452	17.8	445	17.5				

1987 HONDA ACCORD

NHTSA Crash Test - #1054 - Front Impact

Pre/Post Depths - Vehicle Width - Closing Speed - Trapezoidal Average

Test Vehicle Weight = 2936 pounds
Vehicle Closing Speed = 29.5 mph
Test Crush Length = 66.5 inches

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	15.4	17.2	15.7	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 15.4 inches					130.0
Using a Rated No Damage Speed of	2.5 mph	155.2	108.9	110.6	
Using a Rated No Damage Speed of	5.0 mph	281.7	89.7	442.4	
Using a Rated No Damage Speed of	7.5 mph	379.5	72.3	995.5	
Using a Rated No Damage Speed of	10.0 mph	448.5	56.8	1769.7	
Average Crush = 16.4 inches					114.6
Using a Rated No Damage Speed of	2.5 mph	145.8	96.0	110.6	
Using a Rated No Damage Speed of	5.0 mph	264.5	79.1	442.4	
Using a Rated No Damage Speed of	7.5 mph	356.4	63.8	995.5	
Using a Rated No Damage Speed of	10.0 mph	421.2	50.1	1769.7	
Maximum Crush = 17.2 inches					104.2
Using a Rated No Damage Speed of	2.5 mph	139.0	87.3	110.6	
Using a Rated No Damage Speed of	5.0 mph	252.2	71.9	442.4	
Using a Rated No Damage Speed of	7.5 mph	339.8	58.0	995.5	
Using a Rated No Damage Speed of	10.0 mph	401.6	45.6	1769.7	

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

****

4N6XPRT System's First Approximation Crush Factor (CF)

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

Impact Speed (mph) = SQRT(30 * CF * max crush in feet)

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	17.2	30.0	0.5	1.8

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 20.3

CF = (mph * mph) / (30 * max crush in feet), dimensionless

4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test

1987 HONDA ACCORD

NHTSA Crash Test - #1054 - Front Impact

Pre/Post Depths - Indention Length - Closing Speed - Trapezoidal Average

Test Vehicle Weight = 2936 pounds
Vehicle Closing Speed = 29.5 mph
Test Crush Length = 61.0 inches

Pre/Post Collision Crush Depths (inches)

	Left Side Crush	Centerline Crush	Right Side Crush	
(Driver Side)	15.4	17.2	15.7	(Pass. Side)

		CRASH 3 Stiffness Coefficents			SMAC Stiffness
		A	B	G	Kv
Minimum Crush = 15.4 inches					141.8
Using a Rated No Damage Speed of	2.5 mph	169.3	118.8	120.6	
Using a Rated No Damage Speed of	5.0 mph	307.2	97.8	482.4	
Using a Rated No Damage Speed of	7.5 mph	413.8	78.9	1085.5	
Using a Rated No Damage Speed of	10.0 mph	489.1	62.0	1929.7	
Average Crush = 16.4 inches					125.0
Using a Rated No Damage Speed of	2.5 mph	158.9	104.7	120.6	
Using a Rated No Damage Speed of	5.0 mph	288.5	86.2	482.4	
Using a Rated No Damage Speed of	7.5 mph	388.6	69.5	1085.5	
Using a Rated No Damage Speed of	10.0 mph	459.2	54.6	1929.7	
Maximum Crush = 17.2 inches					113.6
Using a Rated No Damage Speed of	2.5 mph	151.5	95.2	120.6	
Using a Rated No Damage Speed of	5.0 mph	275.0	78.4	482.4	
Using a Rated No Damage Speed of	7.5 mph	370.5	63.2	1085.5	
Using a Rated No Damage Speed of	10.0 mph	437.9	49.7	1929.7	

Rated No Damage Speed = Impact speed with a barrier resulting in no permanant vehicle deformation
Normal "Rated No Damage Speed" is 2.5 or 5 mph. Some Specific vehicles may, however, have a higher rating

A = Maximum force per inch of damage without permanent damage, lb/in
B = Crush resistance per inch of damage width (Crash), lb/in^2
G = Energy dissipated without permanent damage, lb
Kv = Crush resistance per inch of damage width (SMAC), lb/in^2

****

4N6XPRT System's First Approximation Crush Factor (CF)

Speed from Crush calculation using a generic CF of 21 as suggested in Expert AutoStats

Impact Speed (mph) = SQRT(30 * CF * max crush in feet)

Crush Factor	Maximum Crush (inches)	Calculated Impact Speed (mph)	Calculated Error (mph)	Calculated Error (%)
21	17.2	30.0	0.5	1.8

4N6XPRT Systems Specific Crush Factor (CF Specific to this test) = 20.3

CF = (mph * mph) / (30 * max crush in feet), dimensionless

4N6XPRT Systems CF is calculated based upon the data reported and is specific to this vehicle and this test

Available Test Results
Front Impact Test Summary

Report Filter Settings

Year Range: 1986 - 1989
Make: HONDA
Model: ACCORD

Test Number	Vehicle Info	No Damage Speed (mph)	Average Crush (inch)	Closing Speed (mph)	Vehicle Stiffness A	Vehicle Stiffness B	Vehicle Width Values G	Vehicle Width Values Kv	Crush Factor
897	1986 HONDA ACCORD FOUR DOOR SEDAN	5.0	20.9	35.0	264.4	75.9	460.6	103.3	23.4
1054	1987 HONDA ACCORD THREE DOOR HATCHBACK	5.0	16.4	29.5	265.3	79.5	442.4	115.3	21.3
1045	1987 HONDA ACCORD THREE DOOR HATCHBACK	5.0	21.1	35.0	276.3	78.6	485.8	107.0	23.2
	Average (AVG)				**270.8**	**79.1**	**464.1**	**111.1**	**22.3**
	Minimum (MIN)				**265.3**	**78.6**	**442.4**	**107.0**	**21.3**
	Maximum (MAX)				**276.3**	**79.5**	**485.8**	**115.3**	**23.2**
	Standard Deviation (STDev-sample)				**7.8**	**0.7**	**30.7**	**5.9**	**1.3**
	Number of Tests (n)			**2**					

Available Test Results
Front Impact Test Summary

Report Filter Settings

Year Range: 1986 - 1989
Make: HONDA
Model: ACCORD

Test Number	Vehicle Info	No Damage Speed (mph)	Max Crush (inch)	Closing Speed (mph)	Vehicle Stiffness A	Vehicle Stiffness B	Vehicle Width Values G	Vehicle Width Values Kv	Crush Factor
897	1986 HONDA ACCORD FOUR DOOR SEDAN	5.0	22.2	35.0	248.8	67.2	460.6	91.5	22.0
1054	1987 HONDA ACCORD THREE DOOR HATCHBACK	5.0	17.2	29.5	252.2	71.9	442.4	104.2	20.3
1045	1987 HONDA ACCORD THREE DOOR HATCHBACK	5.0	21.6	35.0	269.6	74.8	485.8	101.8	22.6
	Average (AVG)				**256.9**	**71.3**	**462.9**	**99.2**	**21.6**
	Minimum (MIN)				**248.8**	**67.2**	**442.4**	**91.5**	**20.3**
	Maximum (MAX)				**269.6**	**74.8**	**485.8**	**104.2**	**22.6**
	Standard Deviation (STDev-sample)				**11.2**	**3.8**	**21.8**	**6.7**	**1.2**
	Number of Tests (n)			**3**					

4N6XPRT Systems
Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942

Phone: (619) 464-3478
Fax: (619) 464-2206
Toll Free: 1- 800-266-9778

Web Site: http://www.4n6xprt.com

E-Mail: 4n6@4n6xprt.com

To compare stiffness values between a Force-Balance approach and calculation from NHTSA Crash Tests, Force Balance calculations have been made on this crash test.

A FORCE-BALANCE approach for calculating stiffness values for the front of the Plymouth Voyager was used, with the Stiffness Values from the range of tests for the Honda Accord as the “Known Good” values.

The critical criteria in this analysis is -

A-B values based on AVERAGE crush

1986 HONDA ACCORD LXI - Front Impact

Curb Weight (pounds):	2668
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2668
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	5.0
Energy Crush Depth (inches):	3.28
Damage Length (inches):	61.0
Crush Profile Measurements:	4

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1542.04

"Known" Stifness Values

	A	B
Average	268.7	78.0
Minimum	264.4	75.9
Maximum	276.3	79.5
Std. Devation	6.6	1.9

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	5.00	17.00	68.00	2.04	138.83	7.79	529.83
C2 (inches)	3.00	14.00	42.00	1.50	63.00	21.00	882.00
C3 (inches)	3.00	30.00	90.00	1.50	135.00	75.00	6750.00
C4 (inches)	3.00						
C5 (inches)							
C6 (inches)							
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 3.28

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	Closing Speed (MPH)
Minimum	264.4	75.9	15654.20	8878.13	10.0	10.6	19.9
Avg - 2 Std. Deviations	255.5	74.2	15212.75	8577.21	9.8	10.4	19.7
Avg - 1 Std. Deviations	262.1	76.1	15604.05	8798.81	9.9	10.5	19.9
Average	268.7	78.0	15995.35	9020.41	10.1	10.6	20.1
Avg + 1 Std. Deviations	275.3	79.9	16386.65	9242.01	10.2	10.7	20.3
Avg + 2 Std. Deviations	281.9	81.8	16777.95	9463.61	10.3	10.8	20.5
Maximum	276.3	79.5	16377.15	9277.21	10.2	10.7	20.3

Damage Centroid Depth (x) (inches)	1.68	k^2	2679.96
Damage Centroid Depth (y) (inches)	40.81	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	200.00		

1994 PLYMOUTH VOYAGER 2WD - Front Impact

Curb Weight (pounds):	3000
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	3000
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	5.0
Energy Crush Depth (inches):	3.73
Damage Length (inches):	61.0
Crush Profile Measurements:	4

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1747.00

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	4.00	30.00	105.00	1.76	185.00	14.29	1500.00
C2 (inches)	3.00	17.00	59.50	1.76	104.83	25.90	1541.33
C3 (inches)	4.00	14.00	63.00	2.26	142.33	35.26	2221.33
C4 (inches)	5.00						
C5 (inches)							
C6 (inches)							
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 3.73

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	bsub1
Minimum	259.2	68.1	15654.20	9874.91	9.9	9.4	23.1
Avg - 2 Std. Deviations	254.3	65.5	15212.75	9689.38	9.8	9.3	22.7
Avg - 1 Std. Deviations	258.7	67.8	15604.05	9853.86	9.9	9.4	23.1
Average	263.0	70.1	15995.35	10017.89	10.0	9.5	23.5
Avg + 1 Std. Deviations	267.3	72.4	16386.65	10181.49	10.1	9.6	23.8
Avg + 2 Std. Deviations	271.5	74.7	16777.95	10344.66	10.2	9.6	24.2
Maximum	267.2	72.3	16377.15	10177.52	10.1	9.6	23.8

Damage Centroid Depth (x) (inches)	1.90	k^2	2700.16
Damage Centroid Depth (y) (inches)	23.13	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	227.50		

4N6XPRT Systems
Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942

Phone: (619) 464-3478
Fax: (619) 464-2206
Toll Free: 1- 800-266-9778

Web Site: http://www.4n6xprt.com

E-Mail: 4n6@4n6xprt.com

To compare stiffness values between a Force-Balance approach and calculation from NHTSA Crash Tests, Force Balance calculations have been made on this crash test.

A FORCE-BALANCE approach for calculating stiffness values for the front of the Plymouth Voyager was used, with the Stiffness Values from the range of tests for the Honda Accord as the “Known Good” values.

The critical criteria in this analysis is -

A-B values based on MAXIMUM crush

1986 HONDA ACCORD LXI - Front Impact

Curb Weight (pounds):	2668
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	2668
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	5.0
Energy Crush Depth (inches):	3.28
Damage Length (inches):	61.0
Crush Profile Measurements:	4

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1542.04

"Known" Stifness Values

	A	B
Average	256.9	71.3
Minimum	248.8	67.2
Maximum	269.6	74.8
Std. Devation	11.2	3.8

		Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches)	5.00	17.00	68.00	2.04	138.83	7.79	529.83
C2 (inches)	3.00	14.00	42.00	1.50	63.00	21.00	882.00
C3 (inches)	3.00	30.00	90.00	1.50	135.00	75.00	6750.00
C4 (inches)	3.00						
C5 (inches)							
C6 (inches)							
C7 (inches)							
C8 (inches)							
C9 (inches)							
C10 (inches)							

Average Crush (inches): 3.28

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	Closing Speed (MPH)
Minimum	248.8	67.2	14308.40	8374.20	9.7	10.2	19.4
Avg - 2 Std. Deviations	234.5	63.7	13522.25	7890.50	9.4	10.0	18.9
Avg - 1 Std. Deviations	245.7	67.5	14243.85	8262.82	9.6	10.2	19.3
Average	256.9	71.3	14965.45	8635.67	9.9	10.4	19.7
Avg + 1 Std. Deviations	268.1	75.1	15687.05	9008.96	10.1	10.6	20.0
Avg + 2 Std. Deviations	279.3	78.9	16408.65	9382.63	10.3	10.8	20.4
Maximum	269.6	74.8	15702.80	9062.70	10.1	10.6	20.0

Damage Centroid Depth (x) (inches)	1.68	k^2	2679.96
Damage Centroid Depth (y) (inches)	40.81	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	200.00		

1994 PLYMOUTH VOYAGER 2WD - Front Impact

Curb Weight (pounds):	3000
Occupant + Cargo Weight (pounds):	0
Total Weight (pounds):	3000
Angle Coll Force to Normal (degrees):	0.0
No Damage Speed (mph):	5.0
Energy Crush Depth (inches):	3.73
Damage Length (inches):	61.0
Crush Profile Measurements:	4

PDOF

Lever Arm Distance (inches):	0.00
Yaw Moment of Inertia (lb-ft-sec^2)	1747.00

	Unequal Spacing (inches)	Zone Area (inches^2)	Zone Depth(x) (inches)	Area Depth(x) (inches^2)	Zone Depth(y) (inches)	Area Depth(y) (inches^2)
C1 (inches) 4.00	30.00	105.00	1.76	185.00	14.29	1500.00
C2 (inches) 3.00	17.00	59.50	1.76	104.83	25.90	1541.33
C3 (inches) 4.00	14.00	63.00	2.26	142.33	35.26	2221.33
C4 (inches) 5.00						
C5 (inches)						
C6 (inches)						
C7 (inches)						
C8 (inches)						
C9 (inches)						
C10 (inches)						

Average Crush (inches): 3.73

Results

	A	B	Average Force (pounds)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	bsub1
Minimum	244.0	60.4	14308.40	9307.45	9.6	9.1	21.8
Avg - 2 Std. Deviations	234.8	55.9	13522.25	8973.25	9.5	8.9	20.9
Avg - 1 Std. Deviations	243.3	60.0	14243.85	9280.08	9.6	9.1	21.7
Average	251.5	64.1	14965.45	9585.19	9.8	9.3	22.4
Avg + 1 Std. Deviations	259.6	68.3	15687.05	9888.69	9.9	9.4	23.2
Avg + 2 Std. Deviations	267.5	72.5	16408.65	10190.67	10.1	9.6	23.9
Maximum	259.8	68.4	15702.80	9895.30	9.9	9.4	23.2

Damage Centroid Depth (x) (inches)	1.90	k^2	2700.16
Damage Centroid Depth (y) (inches)	23.13	Eff. Mass Ratio (gamma)	1.00
Area of Damage (inches^2):	227.50		

4N6XPRT Systems
Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942

Phone: (619) 464-3478
Fax: (619) 464-2206
Toll Free: 1- 800-266-9778

Web Site: http://www.4n6xprt.com

E-Mail: 4n6@4n6xprt.com

Dear Conference Attendee,

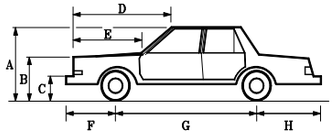
We at 4N6XPRT Systems were pleased to be able to provide you with the preceding data for the crash test vehicles.

Information regarding the Services available to you through our company, as well as the Programs used to create the data report follows this page.

We look forward to providing you similar information in the near future.

Sincerely,

Daniel W. Vomhof III
Daniel W. Vomhof, Ph.D.



Expert AutoStats®

Expert AutoStats® is a program that has over 40,000 cars, pick-ups, vans, and utility vehicles that range in years from the 1940's to the present. Expert AutoStats® has specifications that can assist in reconstructing accidents when the data for the vehicle is unavailable or the vehicle is too severely damaged to get correct measurements.

For many vehicles mid-1960's to present, data such as bumper height, front and rear overhang, hood height, etc., are also included.

********** | PARTIAL OUTPUT | **********

2001 FORD CROWN VICTORIA 4DR SEDAN

[HORIZONTAL DIMENSIONS]

LENGTH	212 in.
WHEELBASE	115 in.
FRONT BUMPER TO FRONT AXLE	44 in.
FRONT BUMPER TO FRONT OF HOOD	8 in.
FRONT BUMPER TO BASE OF WINDSHIELD	66 in.
FRONT BUMPER TO TOP OF WINDSHIELD	91 in.
FRONT BUMPER TO FRONT WELL	27 in.
REAR BUMPER TO REAR OF TRUNK	8 in.
REAR BUMPER TO BASE OF REAR WINDOW	39 in.
REAR BUMPER TO REAR WELL	37 in.
REAR BUMPER TO REAR AXLE	53 in.

[VERTICAL DIMENSIONS]

HEIGHT	57 in.
GROUND TO:	
FRONT BUMPER (Top)	23 in.
HEADLIGHT - Center	27 in.
HOOD - Top Front	26 in.
BASE OF WINDSHIELD	38 in.
REAR BUMPER (Top)	26 in.
TRUNK - Top Rear	40 in.
BASE OF REAR WINDOW	40 in.

[DEPTH DIMENSIONS]

WIDTH	78 in.
FRONT TRACK	63 in.
REAR TRACK	64 in.

[WEIGHT DIMENSIONS]

CURB WEIGHT	3920 lbs.
Curb Weight Distribution: FRONT = 55%	REAR = 45%
GROSS VEHICLE WEIGHT	5170 lbs.

EXPERT AUTOSTATS(c) Reg.To:4N6XPRT Systems S/N:01R-930512AQ03201

2001 FORD CROWN VICTORIA 4DR SEDAN

[ACCELERATION/BRAKING]

ACCELERATION 0-30 mph	16.9 ft/sec/sec
ACCELERATION 0-60 mph	11.1 ft/sec/sec
ACCELERATION 45-65 mph	6.8 ft/sec/sec
BRAKING 60-0 mph	133 ft

DRIVE WHEELS	REAR
TURNING CIRCLE (DIAMETER)	41 ft.
NUMBER OF WHEELS	4
WHEEL RADIUS	13 in.
TIRE SIZE	P225/60SR16

BUMPER STRENGTH:	5 mph
STEERING RATIO	16.40:1

[INTERIOR DIMENSIONS]

FRONT SHOULDER ROOM	61 in.
FRONT HEAD ROOM	39 in.
FRONT LEG ROOM	43 in.
REAR SHOULDER ROOM	60 in.
REAR HEAD ROOM	38 in.
REAR LEG ROOM	40 in.

ALL DISC - REAR ABS - OPTIONAL
3pt - front and rear, FRONT SEAT AIRBAGS
4spd AUTOMATIC

N.S.D.C. = 1998 - 2001
---- = Value not in Database

EXPERT AUTOSTATS(c) Reg.To:4N6XPRT Systems S/N:01R-930512AQ03201

4N6XPRT BioMeknx™

Collecting the Biomechanical data of importance to the Accident Investigator into one easily accessible reference location

Biomechanics is the application of physics to describe, evaluate, or model living tissue and biological materials. Originally it was the application of the part of physics known as Mechanics to living systems. This is the same portion of physics which is used as the basis for much of accident reconstruction.

Biomechanics is important in many aspects of forensic work from vehicle accident reconstruction to slip-trip-stumble-fall cases. This particular program contains modules containing information on a variety of biomechanics and injury modalities, physical data found in the literature for failure of bone and tissue, calculation modules to evaluate individual specific parameters, and definitions and terminology used in the literature and found in medical reports.

4N6XPRT BioMeknx™ is a program designed for the accident investigator. The BioMeknx program incorporates information from a number of different sources, as well as over 30 years of reconstruction experience. 4N6XPRT BioMeknx™ compiles into one source a number of items of information to assist in reconstructing accidents by tying in the human component more tightly without the need to be a BioMechanics expert. Identification of body location, body part illustrations, failure threshold limits, definitions of terms, calculation modules for body link lengths, weights, stride lengths, and formulas for other types of calculations are only some of the material included in the program.

To gather into your library the material included in the 4N6XPRT BioMeknx™, you would need a minimum of 10-15 Anatomy and Physiology, Human Factors, and Biomechanics books, as well as conduct over 50 hours of internet research.

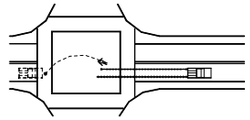
Expert VIN DeCoder®

3FAPP1280MR117253

Expert VIN DeCoder® is a program that "DeCodes" the 17 character VIN number for Cars, Vans, Pickups, and Utility vehicles manufactured from 1981 to the present.

Cars/Vans/Utility/Lt. Trucks Modules: 1981 to Present

Ford	Chevrolet/Geo
Mercury/Lincoln	Pontiac / Buick / Oldsmobile
Chrysler/AMC/Jeep	Cadillac/Saturn
European Import	Asian Import



4N6XPRT Ped & Bike Calcs®

The **4N6XPRT Ped & Bike Calcs®)** program is a program that provides FIRST ESTIMATE calculations to evaluate the speed of a vehicle involved in striking a pedestrian or bicyclist, IF Vehicle, scene, and pedestrian {or pedestrian and bicycle in a vehicle-bike accident} measurements are available. This program may also be used when skateboards or roller skates are involved.

Expert Qwic Calcs®

>>>Calculate Time given D & V<<<
Enter Distance (in feet) : 45
Enter Velocity (in mph) : 6

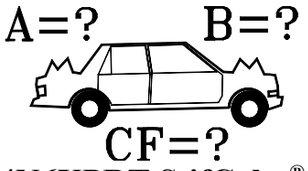
Expert Qwic Calcs® quickly provides answers to questions important in vehicle collision litigation. The user inputs data in response to relevant questions, Expert Qwic Clacs® performs the mathematical calculations required. Both the input data and the calculated result are then displayed, and may be "dumped" to a printer.

When the law enforcement accident report gives insufficient information to do a full - blown accident reconstruction, Expert Qwic Calcs® may be used to "scope out"the parameters of speeds, times, and distances to determine these relationships in a vehicle accident.

Expert TireStuf®

The Expert TireStuf® program is a Menu Driven program which has 19 modules explaining the various tire size designation systems, the information which MAY be in the DOT tire number, the DOT mandated Tire Grading system, Lug Nut Tightening and Tire Rotation schemes, Mix and Match precautions, a glossary of Tire Terms, and Addresses of a few of the sources of additional information on tires and rims.

Also included is a calculation of the number of revolutions in one mile given the tire dimensions.



4N6XPRT StifCalcs®

4N6XPRT StifCalcs®. Is a program which puts the NHTSA Crash Test database at your fingertips with no need to access the internet!

In addition to the NHTSA Crash Test data, the program includes a "Sister/Clone List Reader" developed in cooperation with Greg Anderson. This allows quick retrieval of the "Sister/Clone" data for the desired vehicle. This will drive the initial selection of the available tests. Alternatively, we have an ADVANCED SEARCH module for the initial vehicle selection.

STIFFNESS DATA, based on the selected test, is automatically calculated based on the reported crush depths and widths for front, side, and rear tests.

To use the program, follow this "Yellow Brick Road":

1) Sister/Clone Reader -

(a) - Select YEAR (b) - Select Manufacturer
(c) - Select Model

▼

2) Click on TEST SELECTION Tab

▼

3) Select a test from the available tests which are displayed

▼

4) View TEST INFORMATION

▼

5) View OCCUPANT DATA

▼

6) View VEHICLE DATA

▼

7) View STIFFNESS CALCS

▼

8) Click on Reports - PRINT REPORT

IT'S THAT SIMPLE .... REALLY!!

Please use this order form when ordering. Due to conditions and rising costs beyond our control, Shipping & Handling for program orders must be paid per the included schedule.

Contact Name:_____

Title:_____

Company/Organization:_____

Street:_____

City: _____ State: _____ Zip: _____

Phone: (_____)_____ FAX: (_____)_____

E-Mail: _____

PAYMENT BY: Check____ Money Order____ Govt. Purchase Order____

for Credit Card Orders, **please circle Credit Card type: Am. Express / Visa / MasterCard**, then complete the following:

Card Number: _____Expiration Date (MM/YY):____/____

Security code (card ID) on **back of** Visa/MasterCard card or **front of** American Express Card:

←Visa/MasterCard | Security | American Express →

Address for where the **credit card bill is sent**: _____

(This is the address that the credit card bill would go to, not where we would send the data or product to)

Zip for where the **credit card bill is sent**:_____

(This is the zip code that the credit card bill would go to, not where we would send the data or product to)

Authorized signature: _____

PROGRAM ORDER FORM:

(Pricing effective as of 5/20/11 - prices subject to change without notice)

Expert AutoStats®:	$ 595.00 *	$_____
4N6XPRT BioMeknx™:	$ 495.00 *	$_____
4N6XPRT Ped & Bike Calcs®:	$ 375.00 *	$_____
Expert Qwic Calcs®:	$ 275.00 *	$_____
Expert TireStuf®:	$ 85.00 *	$_____
4N6XPRT StifCalcs®:	$ 600.00 *	$_____
Expert VIN DeCoder®:	$ 525.00 *	$_____
	SUB-TOTAL	$_____
Handling **:		$_____

(Cash or Check with order = $5.00, Credit Card = $10.00 , Govt. Purchase Order = $15.00)

Notarized Affidavit Filing Requirement $_____

($25.00 per required Notarized Signature)

Normal delivery is via electronic download

☐ - Deliver via electronic download link (e-mail address required) $ 0.00

☐ - Deliver on USB - **additional cost of $35.00 / disk / program** $_____

SUB-TOTAL $_____

California shipping addresses add **9.50%** sales tax $_____

(*California orders delivered electronically **DO NOT** owe sales tax*)

TOTAL $_____

Individual Vehicle Data FAX/Order Form

☐ **Expert VIN Decoder & Expert AutoStats**
☐ **NHTSA Crash Test Results**
☐ **BOTH**
Please circle ALL OPTIONS that apply

YEAR & MAKE:_____

MODEL:_____ _____

If you are requesting **VIN DeCoder & AutoStats** please also provide:

Vehicle Type:Car - Pickup - Utility - Van
No. of Doors:2/3/4/5
Car Body Style:Coupe/Conv./Sedan/Wagon
DRIVE WHEELS: 4x2 / 4x4
PICKUPS:Dual Rear Wheel - Std. / Extra / Super / Crew Cab - Short Bed / Long Bed
VANS:Cargo / Passenger - Short / Long Wheelbase

VIN Information

___ ___ ___ ___ ___ ___ ___ ___ ___
1 2 3 4 5 6 7 8 9

___ ___ ___ ___ ___ ___ ___ ___
10 11 12 13 14 15 16 17

NHTSA Crash Test Information
Impact location - Front / Side / Rear
Impact Speed - Lower / Higher

Case Reference/Number:_____

Individual Vehicle Data Search Service®

Charges & Services

Individual Vehicle Specifications
$40.00-First vehicle*, $35.00/Additional Vehicles*, $20.00/Additional Similar Model*

Medium/Heavy Truck Specifications
$40.00-First vehicle*, $35.00/Additional Vehicles*, $20.00/Additional Similar Model*

Motorcycle Specifications (1970+)
$40.00-First cycle*, $35.00/Additional cycles*, $20.00/Additional Similar Model*

NHTSA Crash Test Results
$40.00 per test - Includes A, B, & G values
Calculations are based on the test results

Individual Vehicle Specifications

Now you can get the Expert AutoStats® data for the vehicles in your case ***QUICKLY, EASILY***, and ***ECONOMICALLY***, instead of guessing, or begging a printout from a friend.

Our vehicle database includes dimensions on over 35,000 Cars, Vans, Lt. Pickups, and Utility Vehicles covering 1945 to the present.

Minimum Vehicle specifications include:

Overall Length	Curb Weight
Overall Width	Weight Distribution
Overall Height	Front/Rear Track
Wheelbase	CG Location

Model years with **N**o **S**ignificant **D**imensional **C**hanges VIN DeCoding when VIN is provided Information available

Mid-60's to present **also includes** (*when available*)

Front/Rear Overhang	Bumper Heights
Hood height	Turning Circle
Bumper-to-hood	Ground-to-hood

Dimensions are given in both Imperial and metric (SI) units. Motorcycle specifications will be similar to the Vehicle specifications with appropriate changes where applicable.

NHTSA Crash Test Results

Test results include: General Test information, Barrier Data when provided, Vehicle Data as reported by the testing organization, Occupant (Dummy) data when provided, and A-B-G Stiffness calculations based on the test results.

4N6XPRT Systems®

Providing Vehicle dimensional data, VIN DeCoding, and NHTSA Crash Test Results as a service to the Litigation community, in the form of:

Expert Systems Software Programs for Litigation

Expert AutoStats®
4N6XPRT StifCalcs®
4N6XPRT BioMeknx™
4N6XPRT Ped & Bike Calcs®
Expert Qwic Calcs®
Expert TireStuf®
Expert VIN DeCoder®

Vehicle Data Service

Individual Vehicle Data Search Service®

_____

8387 University Avenue, Suite P
La Mesa, CA 91942-9342

Phone: 1-800-266-9778
Fax: **(619) 464-2206**
E-Mail: **4n6@4n6xprt.com**

Web: **http://www.4n6xprt.com**

Expert VIN DeCoder®

Expert VIN DeCoder® is a program that "DeCodes" the 17 character VIN number for vehicles manufactured from 1981 to the present.

Modules: 1981 to Present
Control Module - One Required per Set

Ford Cars (includes Festiva & Merkur)
Mercury/Lincoln Cars
Ford vans/Utility/Lt. Trucks

Chevrolet/Geo Cars
Pontiac/GM of Canada Cars
Oldsmobile Cars
Buick Cars
Cadillac/Saturn Cars
General Motors Vans/Utility/Lt. Trucks

Chrysler/AMC/Jeep Cars
Chrysler/Jeep Vans/Utility/Lt. Trucks

European Import Cars/Vans/Utility/Lt. Trucks
Asian Import Cars/Vans/Utility/Lt. Trucks

SYSTEM REQUIREMENTS

Expert VIN DeCoder® has been tested on a wide variety of IBM laptop and desktop clones ranging from 8088 through Pentium® chips. A math co-processor chip is NOT required. Expert VIN DeCoder® has also been tested under the various versions of MS-DOS 3.0 thru 7.0, DrDOS 6.0, and PC DOS 7.0. It also works as a DOS program under Windows 3.x, Windows, 95, Windows 98, Windows NT, OS/2 2.x, OS/2 Warp, and various versions of LINUX.

A variety of dot matrix printers emulating the EPSON series have been used with no difficulty. The output is also compatible with the Hewlett-Packard II, IIP, III and IIIP Laser printers. Expert VIN DeCoder® works with monochrome and color monitors.

As of April 1995 the 4N6XPRT Systems® programs Expert AutoStats®, Expert Qwic Calcs®, Expert TireStuf®, 4N6XPRT Ped & Bike Calcs®, and Expert VIN DeCoder® are accessible from within RECTEC.

PLEASE PRINT

Contact Name:_____
Company/Dept:_____
Mailing Address:_____
City:_____State:____Zip:_____
Phone:_____
Fax:_____
E-Mail:_____

Expert VIN DeCoder®
_____ (copies) x $525.00 . . . . . = $_____
Handling **: $_____
(Check with order = $5.00, Credit Card = $10.00 , Govt. P.O.r = $15.00)
Notarized Affidavit Filing Requirement $_____
($25.00 per required Notarized Signature)

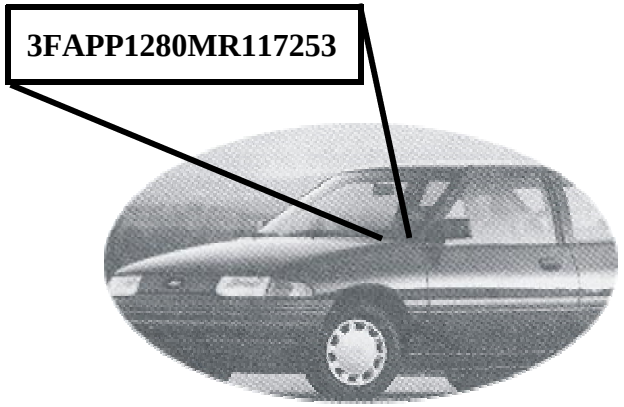
Normal delivery is via electronic download
☐ - Deliver via electronic download link (e-mail address required) $ 0.00
☐ Please deliver on USB at an
additional cost of $35.00 per disk $_____
SUB-TOTAL = $_____
CA Addresses add 9.50% sales tax . . . . = $_____
*(California orders delivered by e-mail attachment **DO NOT** owe sales tax)*
TOTAL = $_____

Enclosed is:
Check*/Money Order:___ Credit Card:___ P.O.:___
Please make check*/M.O./P.O. payable to:
4N6XPRT Systems®
Credit Card Orders:
MasterCard:___ Visa:___ Am.Ex.:___
Card #:_____
Expires:_____
Name on Card: _____
Signature: _____
Billing Add. #: _____
Billing Zip: _____

Mail to: 4N6XPRT Systems®
8387 University Avenue
La Mesa, CA 91942-9342
Telephone Orders:
Monday-Friday - 9:30am-5:00pm PST
Phone: (619) 464-3478 Fax: (619) 464-2206

Orders will be shipped Priority Mail within 10 working days of receipt of order.
Prices subject to change WITHOUT NOTICE.
** Checks MUST be drawn from a bank in the U.S.A.*

Expert VIN DeCoder®



User Friendly Software to provide interpretation of the 17 character VIN Number on Cars, Lt. Pickups, Utility Vehicles, and Vans.

4N6XPRT Systems®
Forensic Expert Software
8387 University Avenue
La Mesa, CA 91942-9342

Web: http://www.4n6xprt.com
E-Mail: VIN@4n6xprt.com

1-800-266-9778

Expert VIN DeCoder® example

INPUT:

1) Enter VIN Numbers to be DeCoded: 3FAPP1280MR117253

3FA PP128 0 MR 117253

2) Is this the VIN Number to be DeCoded (Y/N)? **Y**

OUTPUT:

EXPERT VIN DeCoder

The VIN Number is 3FA PP128 0 MR 117253

The vehicle should be a 1991 Ford
The model: Escort 2/3-door Hatchback GT
The assembly plant: Hermosillo, Mexico
The 4 passenger vehicle had : Passive (Automatic) Front Belts

The OEM engine was: In-line 4 cylinder with Double Overhead Cam
Engine Displacement/Type = 1.8 L/ 112 cu.in. L4, DOHC
Brake Horsepower (SAE) = 127 @ 6500 rpm
Torque (SAE) = 114 lb-ft at 4500 rpm
Engine manufacturer = Mazda

The fuel distribution system: Electronic Fuel Injection (EFI)
Fuel pump/line pressure = 35-45 psi
The ignition system = electronic

This is a Front Wheel Drive vehicle.

The first three characters {3, F, A} indicates that the vehicle was a Ford made in Mexico

The fourth character {P} indicates the vehicle had Passive (Automatic) Front Belts

The fifth character {P} indicates it was a Passenger Car

The sixth with the seventh character {12} indicates a Escort 2/3-door Hatchback GT

The eighth character {8} indicates the OEM engine : 1.8 L/ 112 cu.in. L4, DOHC

The 9th Character { the Check Digit } is 0
The calculated Check Digit value is 0

The tenth character {M} indicates the Model Year was 1991

The eleventh character {R} indicates it was made at the assembly plant in Hermosillo, Mexico

The twelveth through the seventeenth characters { 117253 } is the Serial Number unique to this vehicle.

01-01-2001 S/N:930114VD01201 Reg. User: 4N6XPRT SYSTEMS

Expert AutoStats®

The Expert AutoStats® program contains data on more than 40,000 cars, pick-ups, vans, and utility vehicles that range in years from the 1940's to the present. The Expert AutoStats® base information can assist in reconstructing accidents when the data for the vehicle is unavailable or the vehicle is too severely damaged to get correct measurements. The program is currently relied upon by over 600 private and 250 Government entities within the United States for this very purpose. Additionally, for many vehicles mid-1960's to present, data such as bumper height, front and rear overhang, hood height, etc., are also included.

As of April 1995 the 4N6XPRT Systems® programs Expert AutoStats®, Expert Qwic Calcs®, Expert TireStuf®, and Expert VIN DeCoder® are accessible from within RECTEC.

SYSTEM REQUIREMENTS

Expert AutoStats® has been tested on a wide variety of IBM laptop and desktop clones ranging from 8088 through Pentium® chips. A math co-processor chip is NOT required. Expert AutoStats® has also been tested under the various versions of MS-DOS 3.0 thru 7.0, DrDOS 6.0, and PC DOS 7.0. It also works as a DOS program under Windows 3.x, Windows, 95, Windows 98, Windows NT, Windows Me, Windows 2000, Windows XP, Windows Vista, OS/2 2.x, OS/2 Warp, and various versions of LINUX.

A variety of dot matrix printers emulating the EPSON series have been used with no difficulty. The output is also compatible with the Hewlett-Packard II, IIP, III and IIIP Laser printers and Hewlett-Packard Desk Jet inkjet printers. Expert AutoStats® works with monochrome and color monitors.

PLEASE PRINT

Contact Name: _____
Company/Dept: _____
Mailing Address: _____
City:State:Zip: _____
Phone: _____
Fax: _____
E-Mail: _____

AutoStats® _____ (copies) x $595.00 . . = $_____
Handling **: $_____
(Check with order = $5.00, Credit Card = $10.00 , Govt. P.O.r = $15.00)
Notarized Affidavit Filing Requirement $_____
($25.00 per required Notarized Signature)

Normal delivery is via electronic download

☐ - Deliver via electronic download link (e-mail address required) $ 0.00
☐ Please deliver on USB at an
additional cost of $35.00 per disk $_____

SUB-TOTAL = $_____

CA Addresses add 9.50% sales tax . . . . = $_____
(*California orders delivered by e-mail attachment **DO NOT** owe sales tax*)

TOTAL = $_____

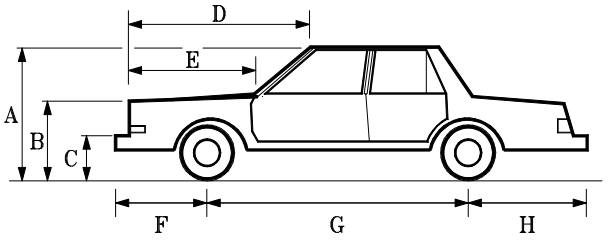
Enclosed is:
Check*/Money Order:___ Credit Card:___ P.O.:___
Please make check*/M.O./P.O. payable to:
4N6XPRT Systems®

Credit Card Orders:
MasterCard:___ Visa:___ Am.Ex.:___
Card #: _____
Expires: _____
Name on Card: _____
Signature: _____
Billing Add. : _____
Billing Zip: _____

Mail to: 4N6XPRT Systems®
8387 University Avenue
La Mesa, CA 91942-9342
Telephone Orders:
Monday-Friday - 9:30am-5:00pm PST
Phone: (619) 464-3478 Fax: (619) 464-2206

Orders will be shipped Priority Mail within 10 working days of receipt of order.
Prices subject to change WITHOUT NOTICE.
** Checks MUST be drawn from a bank in the U.S.A.*

Expert AutoStats®



Over 40,000 cars, pick-ups, vans, and utility vehicles 1940's to the present are represented.

4N6XPRT Systems®
Forensic Expert Software
8387 University Avenue
La Mesa, CA 91942-9342

Web: http://www.4n6xprt.com
E-Mail: autostats@4n6xprt.com

1-800-266-9778

Select Your Vehicle

```
MAKE OF VEHICLE:      FORD
YEAR OF VEHICLE:      2001
BODYSTYLE OF VEHICLE: CAR

More than one model matches the make, year, and body style you specified.
Select the actual model from the list.  Use the arrow keys to highlight the
model, then press Enter.  Press Esc to return to the list of manufacturers.
(You can also begin typing the name of the model to jump directly to it.)

[ ** AVAILABLE MODELS - 2001 FORD ** ]   [ WB(in)  OAL(in) ]
CROWN VICTORIA                  4DR SEDAN     115     212
CROWN VICTORIA (CNG) MSP POLICE PACKAG  4DR SEDAN     115     212
CROWN VICTORIA 4.6L MSP POLICE PACKAGE  4DR SEDAN     115     212
CROWN VICTORIA EXTENDED         4DR SEDAN     121     218
ESCORT                          4DR SEDAN      98     175
ESCORT ZX2                      2DR COUPE      98     175
FOCUS                           4DR SEDAN     103     175
FOCUS                           4DR WAGON     103     178
FOCUS ZX3                       2DR HATCHBACK 103     168
MUSTANG                         2DR CONVERTIBLE 101   183
MUSTANG                         2DR COUPE     101     183
MUSTANG COBRA                   2DR CONVERTIBLE 101   183
MUSTANG COBRA                   2DR COUPE     101     183
```

After typing in the Make, Year, and Type of vehicle, you are presented with the vehicles which are available for that year.

Screen 1

```
2001 FORD CROWN VICTORIA 4.6L MSP POLICE PACKAGE  4DR SEDAN

[ HORIZONTAL DIMENSIONS ]                [ VERTICAL DIMENSIONS ]
LENGTH                          212 in.  | HEIGHT                    57 in.
WHEELBASE                       115 in.  | GROUND TO:
FRONT BUMPER TO FRONT AXLE       44 in.  |  FRONT BUMPER (Top)       23 in.
FRONT BUMPER TO FRONT OF HOOD     8 in.  |  HEADLIGHT - Center       27 in.
FRONT BUMPER TO BASE OF WINDSHIELD 66 in. |  HOOD - Top Front         29 in.
FRONT BUMPER TO TOP OF WINDSHIELD 91 in. |  BASE OF WINDSHIELD       38 in.
FRONT BUMPER TO FRONT WELL       27 in.  |  REAR BUMPER (Top)        26 in.
REAR BUMPER TO REAR OF TRUNK      8 in.  |  TRUNK - Top Rear         40 in.
REAR BUMPER TO BASE OF REAR WINDOW 39 in. |  BASE OF REAR WINDOW      40 in.
REAR BUMPER TO REAR WELL         37 in.  |
REAR BUMPER TO REAR AXLE         53 in.  |----[ WEIGHT DIMENSIONS ]------
                                         | CURB WEIGHT             4020 lbs.
----------[ DEPTH DIMENSIONS ]----------| Curb Weight Distribution:
WIDTH                            78 in.  |      FRONT = 55%   REAR = 45%
FRONT TRACK                      63 in.  |
REAR TRACK                       64 in.  | GROSS VEHICLE WEIGHT  5170 lbs.
                                         |

          P)rint this screen,      ANY OTHER KEY = Continue
```

The first screen of data contains exterior dimensions and weight data. Length, Height, Wheelbase, Width, and Weight Distribution are published dimensions. Curb Weight is an average of published curb weights for the given vehicle. Detail dimensions such as the bumper heights and Front Bumper to Front of Hood are measurements obtained by our staff from actual vehicles.

Screen 2

```
2001 FORD CROWN VICTORIA 4.6L MSP POLICE PACKAGE  4DR SEDAN

--------[ ACCELERATION/BRAKING ]---------|  BUMPER STRENGTH:          5 mph
ACCELERATION 0-30 mph   13.8 ft/sec/sec  |  STEERING RATIO          16.40:1
ACCELERATION 0-60 mph   10.1 ft/sec/sec  |
ACCELERATION 45-65 mph   6.7 ft/sec/sec  |-------[ INTERIOR DIMENSIONS ]-----
BRAKING 60-0 mph       145   ft          |  FRONT SHOULDER ROOM      61 in.
-----------------------------------------|  FRONT HEAD ROOM          39 in.
DRIVE WHEELS                  REAR       |  FRONT LEG ROOM           43 in.
TURNING CIRCLE (DIAMETER)      41 ft.    |  REAR SHOULDER ROOM       60 in.
NUMBER OF WHEELS                4        |  REAR HEAD ROOM           38 in.
WHEEL RADIUS                   13 in.    |  REAR LEG ROOM            40 in.
TIRE SIZE                P225/60R16      |
-----------------------------------------|

ALL DISC - ALL WHEEL ABS
3pt - front and rear, FRONT SEAT AIRBAGS
4spd AUTOMATIC

N.S.D.C. = 2001 - 2001
___ = Value not in Database

   B)ack a screen,      P)rint this screen,      ANY OTHER KEY = Continue
```

The second screen of data contains interior dimensions and various performance data. The data contained in the second screen comes from various published sources.

Screen 3

```
2001 FORD CROWN VICTORIA 4.6L MSP POLICE PACKAGE  4DR SEDAN

-----------------------[ ANGLE MEASUREMENTS ]-----------------------
ANGLE FRONT BUMPER TO HOOD FRONT          =  36.9   deg
ANGLE FRONT OF HOOD TO WINDSHIELD BASE    =   8.8   deg
ANGLE FRONT OF HOOD TO WINDSHIELD TOP     =  17.4   deg
ANGLE OF WINDSHIELD                       =  34.2   deg
ANGLE OF STEERING TIRES AT MAX TURN       =  26.8   deg
----------------------[ CENTER OF GRAVITY ]-----------------------
Inches from ground        =  22.37 | Inches from side of vehicle  =  39.00
Inches behind front axle  =  51.75 | Inches in front of rear axle =  63.25
Inches from front bumper  =  95.75 | Inches from rear bumper      = 116.25
Inches from front corner  = 103.39 | Inches from rear corner      = 122.62

TIP-OVER STABILITY RATIO                  =   1.42    STABLE
NHTSA Static Stability Factor (calculated) Star Rating:   ****
----------------------[ MOMENTS OF INERTIA ]----------------------
YAW MOMENT OF INERTIA                     =  2934.60  lb-ft-sec^2
PITCH MOMENT OF INERTIA                   =  2830.80  lb-ft-sec^2
ROLL MOMENT OF INERTIA                    =   573.60  lb-ft-sec^2

   B)ack a screen,      P)rint this screen,      ANY OTHER KEY = Continue
```

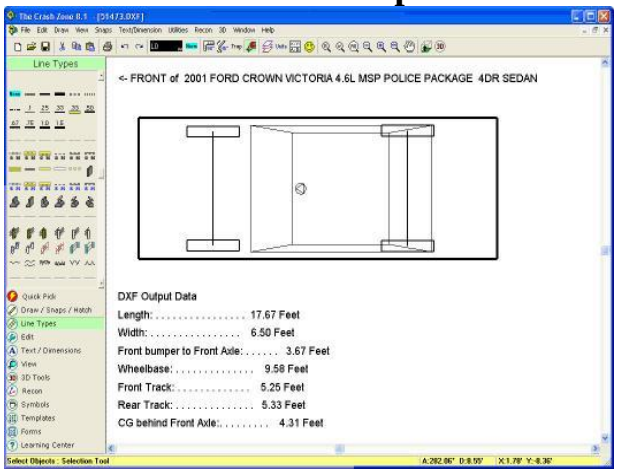
The third and last screen contains a number of calculated items of information which may be of use depending upon the type of case, the other software that you use, and the questions which need to be answered.

Screen 4

```
2001 FORD CROWN VICTORIA 4.6L MSP POLICE PACKAGE  4DR SEDAN

-----------------------[ ANGLE MEASUREMENTS ]-----------------------
ANGLE FRONT BUMPER TO HOOD FRONT          =  36.9   deg
ANGLE FRONT OF HOOD TO WINDSHIELD BASE    =   8.8   deg
ANGLE FRONT OF HOOD TO WINDSHIELD TOP     =  17.4   deg
ANGLE OF WINDSHIELD                       =  34.2   deg
ANGLE OF STEERING TIRES AT MAX TURN       =  26.8   deg
----------------------[ CENTER OF GRAVITY ]-----------------------
Inches from ground        =  22.37 | Inches from side of vehicle  =  39.00
Inches behind front axle  =  51.75 | Inches in front of rear axle =  63.25
Inches from front bumper  =  95.75 | Inches from rear bumper      = 116.25
Inches from front corner  = 103.39 | Inches from rear corner      = 122.62

TIP-OVER STABILITY RATIO                  =   1.42    STABLE
NHTSA Static Stability Factor (calculated) Star Rating:   ****
----------------------[ MOMENTS OF INERTIA ]----------------------
YAW MOMENT OF INERTIA                     =  2934.60  lb-ft-sec^2
PITCH MOMENT OF INERTIA                   =  2830.80  lb-ft-sec^2
ROLL MOMENT OF INERTIA                    =   573.60  lb-ft-sec^2

N)ext Car, Print to - P)rinter or to File, E)xchange File, D)XF File, Q)uit
```

From within the Expert AutoStats program you have the ability to output the data to a 2-D DXF file for importation into your CAD Scene Drawings. The screen below shows an import of the DXF file with Text into the CAD Zone program.

CADZONE Import



4N6XPRT StifCalcs®

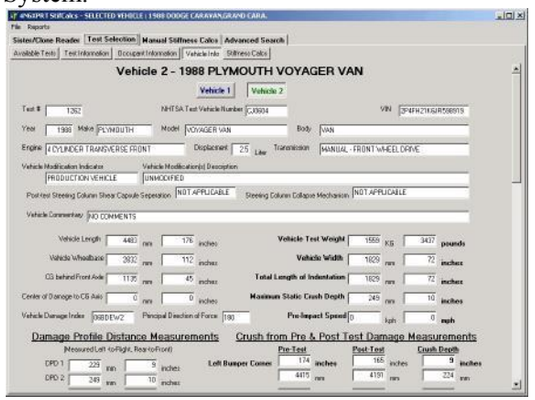
Introducing ..... 4N6XPRT StifCalcs®. A program which puts the NHTSA Crash Test database at your fingertips with no need to access the internet!

In addition to the NHTSA Crash Test data, the program includes a "Sister/Clone List Reader" developed in cooperation with Greg Anderson. This allows quick retrieval of the "Sister/Clone" data for the desired vehicle. This will drive the initial selection of the available tests. Alternatively, we have an ADVANCED SEARCH module for the initial vehicle selection.

STIFFNESS DATA, based on the selected test, is automatically calculated based on the reported crush depths and widths for front, side, and rear tests.

SYSTEM REQUIREMENTS

4N6XPRT StifCalcs® is a MS-Windows program designed to work under a 32 bit (95/98/Me/NT/ 2000/XP/Vista) Windows System.



To use the program, follow this "Yellow Brick Road":

1) Sister/Clone Reader -
(a) - Select YEAR
(b) - Select Manufacturer
(c) - Select Model

▼

2) Click on TEST SELECTION Tab

▼

3) Select a test from the available tests which are displayed

▼

4) View TEST INFORMATION

▼

5) View OCCUPANT DATA

▼

6) View VEHICLE DATA

▼

7) View STIFFNESS CALCS

▼

8) Click on Reports - PRINT REPORT

IT'S THAT SIMPLE .... <u>REALLY!!</u>

PLEASE PRINT

Contact Name: _____
Company/Dept: _____
Mailing Address: _____
City:State:Zip: _____
Phone: _____
Fax: _____
E-Mail: _____
(E-mail address required for electronic delivery)

StifCalcs®_____ (copies) x $600.00 . . = $_____
Handling **: $_____
(Check with order = $5.00, Credit Card = $10.00 , Govt. P.O.r = $15.00)
Notarized Affidavit Filing Requirement $_____
($25.00 per required Notarized Signature)

Normal delivery is via electronic download
☐ - Deliver via electronic download link (e-mail address required) $ 0.00
☐ Please deliver on USB at an
<u>**additional cost of $35.00 per disk**</u> $_____
SUB-TOTAL = $_____
CA Addresses add 9.50% sales tax . . = $_____
(*California orders delivered by e-mail attachment **DO NOT** owe sales tax*)

TOTAL = $_____

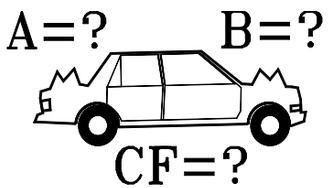
Enclosed is:
Check/M. O. :___ Credit Card:___ P.O.:___

Please make check/M.O./P.O. payable to:
4N6XPRT Systems®
Credit Card Orders:
MasterCard:___ Visa:___ Am.Ex.:___
Card #: _____
Expires: _____
Name on Card: _____
Signature: _____
Billing Add. #: _____
Billing Zip: _____

Mail to: 4N6XPRT Systems®
8387 University Avenue
La Mesa, CA 91942-9342
Telephone Orders:
Monday-Friday - 9:30am-5:00pm PST
Phone: (619) 464-3478 Fax: (619) 464-2206

Orders within the U.S. will be shipped Priority Mail or via E-mail attachment within 10 working days of receipt of order.
*All prices are in U.S. Dollars, and subject to change <u>**WITHOUT NOTICE.**</u>*
*Orders outside of U.S.A. shipped via E-Mail attachment <u>**ONLY**</u>.*

4N6XPRT StifCalcs®



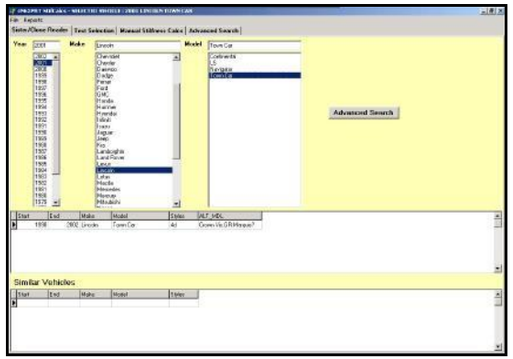
Quick, Convenient, Easy access to the NHTSA Crash Test data on your own MS-Windows computer without the need for an internet connection.

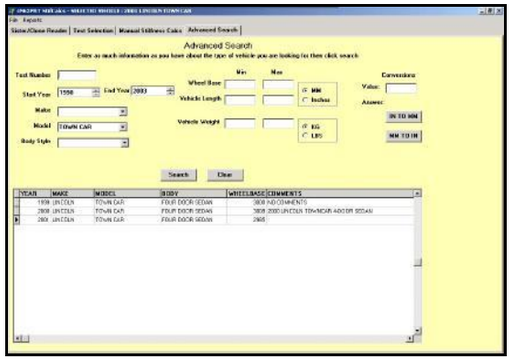
4N6XPRT Systems®
Forensic Expert Software
8387 University Avenue
La Mesa, CA 91942-9342

Web: http://www.4n6xprt.com
E-Mail: <u>stifcalcs@4n6xprt.com</u>

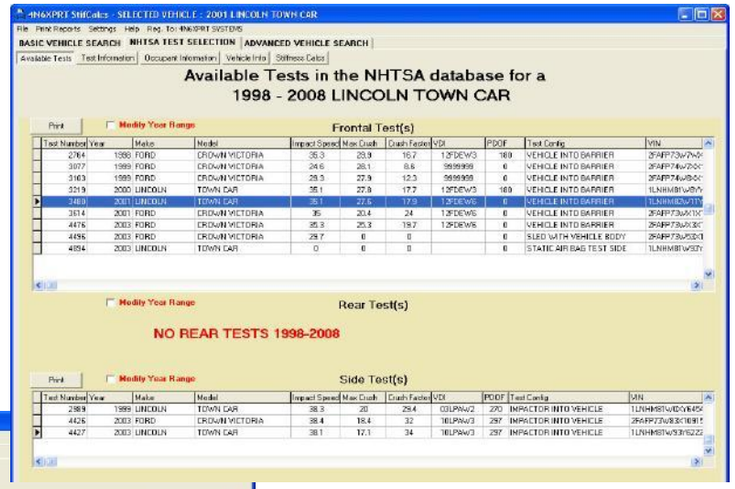
1-800-266-9778

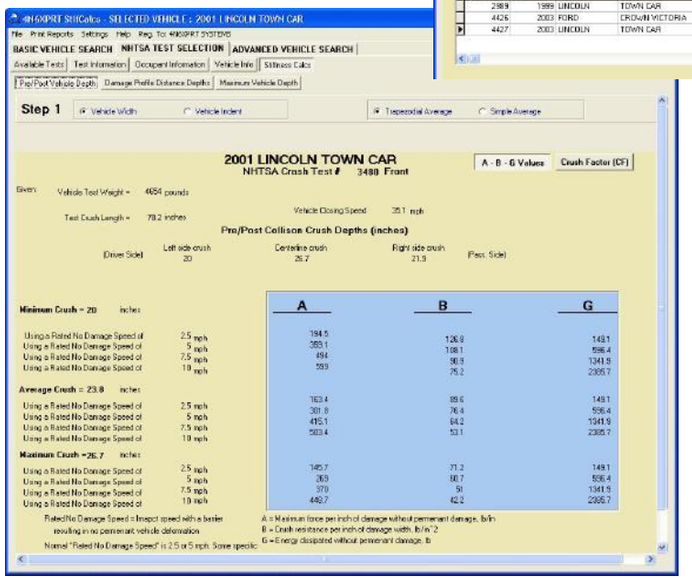
Select the desired vehicle through either our SISTER/CLONE READER or our ADVANCED SEARCH tab.



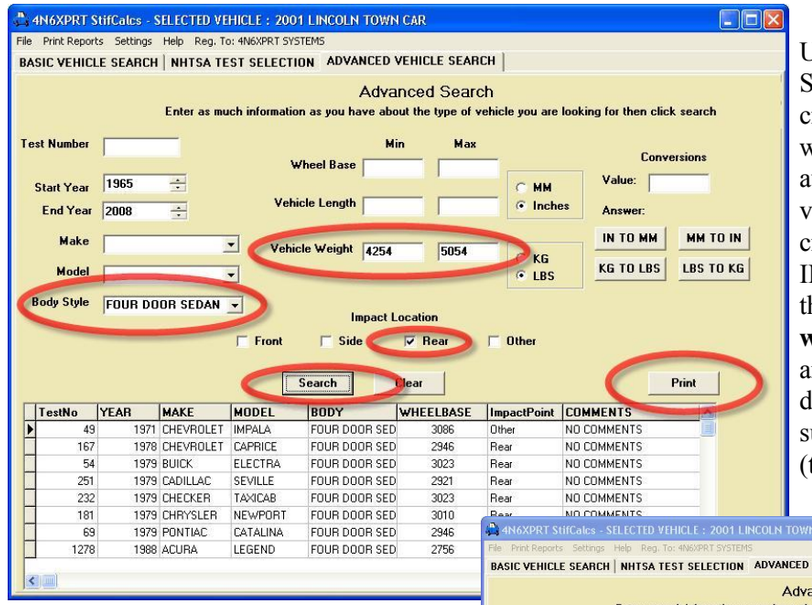


Once the desired vehicle is found/selected, click on the Test Selection tab. From here, select the test to be viewed



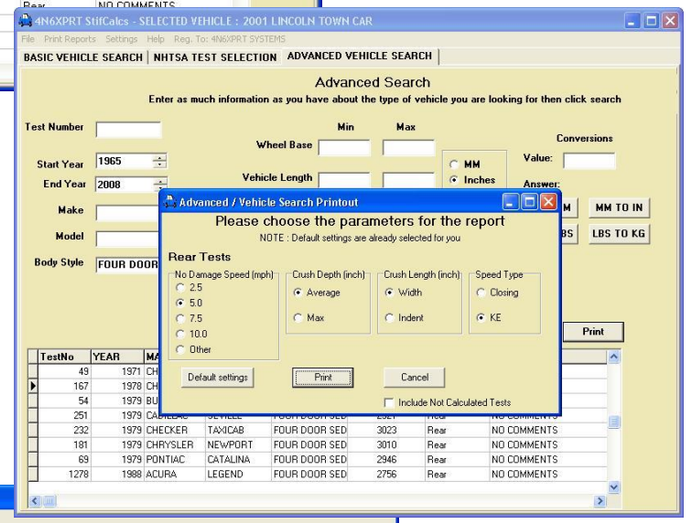


Once a test is selected, the available data for the Test, Occupant(s), Vehicle(s), and Stiffness data can be viewed. The stiffness values are automatically generated from the available test data.

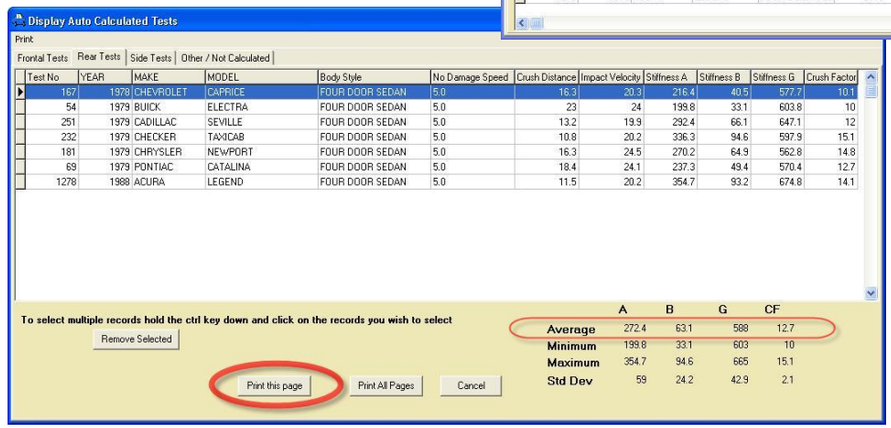


Using the ADVANCED SEARCH tab, you can also create a CLASS of vehicle for when there are no tests available for the specific vehicle and test type. To create a class of REAR IMPACT stiffness values for the Lincoln, first set the **weight range**, **body style**, and **test type**, then **search** the database, when you have a sufficient number of tests (that is, more than one or

two) that have been found, click the PRINT button:



Now Set your calculation parameters - **No Damage Speed - Crush Depth - Indentation (Crush) Length** - and **Speed**, then view your results, and if desired, print them to hard copy



The program will calculate the **AVERAGE, MINIMUM, MAXIMUM,** and **Standard Deviation** of the Stiffness Values calculated based upon the parameters you set in the preceding step.

4N6XPRT Systems

Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91941-3842

FED Tax ID No.: 95-3121248

Phone: 1- 800-266-9778
Fax: (619) 464-2206

Web Site: ***http://www.4n6xprt.com***

E-Mail: ***4n6@4n6xprt.com***

2011 ORDER FORM

Expert AutoStats® - Expert VIN DeCoder® - 4N6XPRT StifCalcs® - 4N6XPRT BioMeknx™
Expert Qwic Calcs® - Expert TireStuf® - 4N6XPRT Ped & Bike Calcs®

Please use this order form when ordering your programs. Due to conditions and rising costs beyond our control, Shipping & Handling must be paid per the included schedule.

Contact Name: _____
Title: _____
Company/Organization: _____
Street: _____
City: _____ State: _____ Zip: _____
Phone: (_____)_____ FAX: (_____)_____
E-Mail: _____

Expert AutoStats®:	$ 595.00 *	$_____
4N6XPRT BioMeknx™:	$ 495.00 *	$_____
4N6XPRT Ped & Bike Calcs®:	$ 375.00 *	$_____
Expert Qwic Calcs®:	$ 275.00 *	$_____
Expert TireStuf®:	$ 85.00 *	$_____
4N6XPRT StifCalcs®**:**	$ 600.00 *	$_____
Expert VIN DeCoder®:	$ 525.00 *	$_____
		======
	SUB-TOTAL	$_____

California shipping addresses add **9.50%** sales tax $_____
(*California orders delivered by e-mail attachment **DO NOT** owe sales tax*)

Handling **: *(Cash or Check with order = **$5.00**, Credit Card = **$10.00** , Govt. Purchase Order = **$15.00**)* $_____

Notarized Affidavit filing requirement - **$25.00 per required notarized signature**: $_____

Normal delivery will be via email of a download link to a self extracting zip file

☐ - Deliver via electronic download link (e-mail address required) $ 0.00

☐ - Please deliver on USB at an **additional cost of $35.00 per program** $_____

======

TOTAL $_____

Enclosed is:
Check____ Money Order____ Purchase Order____ Credit Card: Visa_____ Master Card_____ American Express_____

Card #_____ Expires_____
Billing Add. :_____ Billing Zip: _____
Name on Card:_____ Signature: _____

PLEASE NOTE

-- Orders cannot be shipped without correct Shipping & Handling included.
-- California orders cannot be shipped without sales tax included.
-- Written Purchase Orders must be received in office before shipping.

* *Prices are subject to change without notice. Call for Multi-program and package purchase discounts.*
** *Orders will be shipped within 10 working days. Other shipping methods may cost extra. The Handling charge listed is for the first program,* ***add $5.00 per additional program*** *ordered at the same time and shipped to the same address.*

Please make checks, money orders or Purchase Orders Payable to: **4N6XPRT Systems®**

You may call or fax your order to us if paying by credit card.

4N6XPRT Systems

Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942-9342

FED Tax ID No.: 95-3121248

Phone: 1- 800-266-9778
Fax: (619) 464-2206

Web Site: http://www.4n6xprt.com

E-Mail: 4n6@4n6xprt.com

Dear Customer,

Due to the governments desire (both U.S. & California) to "protect us" we will need the following information from you in order to process your credit card(s). Please complete this form and return it with your order.

Card type: Am. Express / Visa / MasterCard
Card Number: _____
Expiration Date (MM/YY): ____/____

←Visa/MasterCard American Express →

Security code (card ID) on back of Visa/MasterCard card or front of American Express Card:

Address for where the **credit card bill is sent**:

_____

*(This is the address number - for instance, ours would be **8387 University Avenue** - that the credit card bill would go to, not where we would send the data or product to)*

City/State/Zip for where the **credit card bill is sent**:

_____

*(- for instance, ours would be **La Mesa, CA 91941** - that the credit card bill would go to, not where we would send the data or product to)*

Authorized signature: _____

We appreciate your cooperation in supplying us with this information and understanding that it is being required of us to obtain the information.

Sincerely,

Daniel W. Vomhof III
General Manager/Technical Support

SERVICE

You may make your request by phone or fax. Our fax machine is on 24 hours, 7 days a week, and can be reached at (619) 464-2206. A request may also be made by e-mail, which reaches us when we are "on the road" as well as in the office..

Upon receiving your request, we will research you request and **fax the information to you at NO ADDITIONAL CHARGE!** Normal response time is one working day or less. Your hard copy will follow in the mail.

Please include the vehicle information on the sample order form when requesting your Individual Vehicle Data Search. Please also be sure to provide a Visa, MasterCard, or American Express number, name as it appears on the card, Expiration date, and the billing address # and Zip.

*Pricing is for multiple vehicles on same Order/Request. Similar Vehicles may be required when it is not possible to determine the exact model of vehicle requested, based upon the information provided.

VIN DeCoding Information

FAX/Order Form

☐ **Expert VIN Decoder & Expert AutoStats**
☐ **NHTSA Crash Test Results**
☐ **BOTH**

Please circle ALL OPTIONS that apply

YEAR & MAKE:

_____

MODEL:_____

If you are requesting
VIN DeCoder & AutoStats
please also provide the following information:

No. of Doors:	2/3/4/5
Body Style:	Coupe/Conv./Sedan/Wagon
SUV & P/U:	4x2 / 4x4 / Dual Rear Wheel
PICKUPS:	Std. / Extra / Super / Crew Cab
	Short Bed / Long Bed
VANS:	Cargo / Passenger
	Short / Long Wheelbase

VIN Information

___	___	___		___	___	___	___	___		___						
1	2	3		4	5	6	7	8		9						
											___	___		___	___	___	___	___	___
											10	11		12	13	14	15	16	17

NHTSA Crash Test Information
Impact location - Front / Side / Rear
Impact Speed - Lower / Higher

PAYMENT INFORMATION
Visa/MasterCard / American Express:

_____

Expires: _____ / _____

Name & Address:

_____

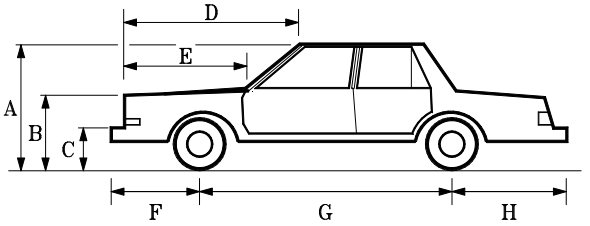
_____

_____

_____

Case Reference Name/Number:_____

Individual Vehicle Data Search Service®



Providing Vehicle dimensional data, VIN DeCoding, and NHTSA Crash Test Results as a service to the Litigation community.

E-Mail: **ivdss@4n6xprt.com**

FAX: (619) 464-2206
Phone: (619) 464-3478 / 1-800-266-9778

4N6XPRT Systems®
Forensic Expert Software
8387 University Avenue, Suite P
La Mesa, CA 91942-9342

Web: http://www.4n6xprt.com

How often have you been confronted with the

following on a Traffic Collision Report - "87 Ford, 4 door, Blue"? We have the answer to the problem of determining WHICH Ford 4 door model this was!

We will DeCode the VIN number and provide you with the information contained within that VIN number

Information generally includes:

Year	OEM Engine
Make	Displacement/Type
Model	Rated Horsepower
Drive Wheels	Rated Torque
Rated Pass. Load	Iginition System
Plant of Manufacture	Fuel Line Pressure

Also (*when provided by VIN*)

Gross Vehicle Weight	Safety Equipment
Transmission	

A DMV search for a vehicle identification from the registration will typically cost less than $10.00 and will give the VIN number, Make, and Year of vehicle. However, to also obtain the vehicle Model requires a "Manual Search" which will typically cost $30.00/vehicle/year searched.

With our service, you will be able to find out the model of vehicle as well as all of the other information mentioned above. This information will be faxed to you, typically in less than one working day, and the hard copy will follow in the mail.

Allow us to help you have all the information you require in your next Accident, Personal Injury, Criminal, Domestic, or Product Liability case.

Individual Vehicle Specifications

Now you can get the Expert AutoStats® data for the vehicles in your case ***QUICKLY, EASILY***, and ***ECONOMICALLY***, instead of guessing, or begging a printout from a friend.

Our vehicle database includes dimensions on over 35,000 Cars, Vans, Lt. Pickups, and Utility Vehicles covering 1945 to the present.

Minimum Vehicle specifications include:

Overall Length	Curb Weight
Overall Width	Weight Distribution
Overall Height	Front/Rear Track
Wheelbase	CG Location

Model yeasr with **N**o **S**ignificant **D**imensional **C**hanges
VIN DeCoding when VIN is provided Information available

Mid-60's to present **also includes** (*when available*)

Fron/Reart Overhang	Bumper Heights
Hood height	Turning Circle
Bumper-to-hood	Ground-to-hood

Dimensions are given in both Imperial and metric (SI) units. Motorcycle specifications will be similar to the Vehicle specifications with appropriate changes where applicable.

While the VIN number contains much information, it does not contain everything needed to identify a particular vehicle in every situation. Therefore, we would appreciate you providing as much of the information on the order form as possible.

If you are not sure of the specific model, we will provide dimensions on the similar model vehicles matching the provided data for a small additional cost per model*.

Individual Vehicle Data Search Service® Charges & Services

Individual Vehicle Specifications

$40.00-First vehicle*, $35.00/Additional Vehicles*,
$20.00/Additional Similar Model*

Medium/Heavy Truck Specifications

$40.00-First vehicle*, $35.00/Additional Vehicles*,
$20.00/Additional Similar Model*

Motorcycle Specifications (1970+)

$40.00-First cycle*, $35.00/Additional cycles*,
$20.00/Additional Similar Model*

NHTSA Crash Test Results

$40.00 per test - Includes A, B, & G values
Calculations are based on the test results

NHTSA Crash Test Results

Test results include: General Test information, Barrier Data when provided, Vehicle Data as reported by the testing organization, Occupant (Dummy) data when provided, and A-B-G Stiffness calculations based on the test results.

You may make your request by phone or fax. Our fax machine is on 24 hours/day and can be reached at:

(619) 464-2206

Individual Vehicle Data Search Service® Charges & Services

You may make your request by phone or fax. Our fax machine is on 24 hours/day and can be reached at

(619) 464-2206

Individual Vehicle Specifications

$40.00-First vehicle*, $35.00/Additional Vehicles*, $20.00/Additional Similar Model*

Medium/Heavy Truck Specifications

$40.00-First vehicle*, $35.00/Additional Vehicles*, $20.00/Additional Similar Model*

Motorcycle Specifications (1970+)

$40.00-First cycle*, $35.00/Additional cycles*, $20.00/Additional Similar Model*

NHTSA Crash Test Results

$40.00 per test - Includes A, B, & G values
Calculations are based on the test results

Contact Name & Address:

_____
_____
_____
_____

Phone: (_____) _____
Fax: (_____) _____

PAYMENT INFORMATION
Visa/MasterCard / American Express:

_____
Expires: _____ / _____
Credit Card billing address and Zip:
Address:_____
Zip: _____
Security Code # _____

FAX/Order Form

☐ **Expert VIN Decoder & Expert AutoStats**
☐ **NHTSA Crash Test Results**
☐ **BOTH**

Please circle <u>ALL OPTIONS</u> that apply

YEAR & MAKE:
_____
MODEL: _____

If you are requesting
VIN DeCoder & AutoStats
please also provide:

No. of Doors:	2/3/4/5
Body Style:	Coupe/Conv./Sedan/Wagon
SUV - P/U:	4x2 / 4x4 / Dual Rear Wheel
PICKUPS:	Std. / Extra / Super / Crew Cab
	Short Bed / Long Bed
VANS:	Cargo / Passenger
	Short / Long Wheelbase

VIN Information

__ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

NHTSA Crash Test Information

YEAR & MAKE:
_____
MODEL: _____

Impact location - Front / Side / Rear
Impact Speed - Lower / Higher

Case Reference/Number:_____

FAX/Order Form

☐ **Expert VIN Decoder & Expert AutoStats**
☐ **NHTSA Crash Test Results**
☐ **BOTH**

Please circle <u>ALL OPTIONS</u> that apply

YEAR & MAKE:
_____
MODEL: _____

If you are requesting
VIN DeCoder & AutoStats
please also provide:

No. of Doors:	2/3/4/5
Body Style:	Coupe/Conv./Sedan/Wagon
SUV - P/U:	4x2 / 4x4 / Dual Rear Wheel
PICKUPS:	Std. / Extra / Super / Crew Cab
	Short Bed / Long Bed
VANS:	Cargo / Passenger
	Short / Long Wheelbase

VIN Information

__ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

NHTSA Crash Test Information

YEAR & MAKE:
_____
MODEL: _____

Impact location - Front / Side / Rear
Impact Speed - Lower / Higher

Case Reference/Number:_____

4N6XPRT Systems

Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942-9342

FED Tax ID No.: 95-3121248

Phone: 1- 800-266-9778
Fax: (619) 464-2206

Web Site: http://www.4n6xprt.com

E-Mail: 4n6@4n6xprt.com

Dear Customer,

Due to the governments desire (both U.S. & California) to "protect us" we will need the following information from you in order to process your credit card(s). Please complete this form and return it with your order.

Card type: Am. Express / Visa / MasterCard
Card Number: _____
Expiration Date (MM/YY): ____/____

←Visa/MasterCard American Express →

Security code (card ID) on back of Visa/MasterCard card or front of American Express Card:

Address for where the **credit card bill is sent**:

_____

*(This is the address number - for instance, ours would be **8387 University Avenue** - that the credit card bill would go to, not where we would send the data or product to)*

City/State/Zip for where the **credit card bill is sent**:

_____

*(- for instance, ours would be **La Mesa, CA 91941** - that the credit card bill would go to, not where we would send the data or product to)*

Authorized signature: _____

We appreciate your cooperation in supplying us with this information and understanding that it is being required of us to obtain the information.

Sincerely,

Daniel W. Vomhof III
General Manager/Technical Support

4N6XPRT Systems

Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942-9342

FED Tax ID No.: 95-3121248

Phone: 1- 800-266-9778
Fax: (619) 464-2206

Web Site: http://www.4n6xprt.com

E-Mail: 4n6@4n6xprt.com

The 2011 version of 4N6XPRT StifCalcs® contains a Force Balance module -

The Force Balance approach to Stiffness values is based on the concept of "Equal and Opposite Forces" in combination with the assumption that one of the vehicles involved has a good set of Stiffness values based on testing.

There are essentially only TWO requirements in order to use a Force Balance approach, and they are:

- ❑ You must have A-B values for one of the vehicles for the surface that was hit
- ❑ Both vehicles must have SOME damage

Beyond these two requirements, the QUALITY of your calculation results will be impacted by :

- ❑ The quality of the information you have on each vehicle (weight, pass/cargo load, etc.)
- ❑ The quality/accuracy of your crush measurements
- ❑ The quality of your A-B stiffness values

while the Force Balance analysis CAN be run with degraded information in the above three areas, the quality of the results will also be degraded, sometimes significantly so.

As an extension of our **I**ndividual **V**ehicle **D**ata **S**earch **S**ervice, we have now added Force Balance Analysis runs to our services. An order form with pricing follows on the next page.

With respect to the Order Form -

A) Please be SPECIFIC on the vehicle make and model, including drive wheels, bed length, etc.
B) The Curb Weight used will come from Expert AutoStats unless you specify some other weight
C) The PDOF Lever Arm default length is 0 inches
D) The Angle of Collision Force to Normal Force default value is 0 degrees
E) If no Crush Spacing is indicated, equal spacing will be used.

If you have any specific questions, please be sure to call.

Sincerely,

Daniel W. Vomhof III
General Manager/Technical Support

4N6XPRT Systems

Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942-9342

FED Tax ID No.: 95-3121248

Phone: 1- 800-266-9778
Fax: (619) 464-2206

Web Site: http://www.4n6xprt.com

E-Mail: 4n6@4n6xprt.com

FORCE BALANCE ORDER FORM

$40 for the first "Run" / $20 for each additional crush variation with same vehicles

Vehicle 1 (KNOWN Stiffness) - Year/Make/Model

_____

Curb Weight (pounds) = _____
Occupant + Cargo Weight (pounds) = _____
Total Weight (pounds) = _____

Angle of Collision Force to Force Normal to
Collision Face (degrees) = _____
PDOF Lever Arm Distance (inches) = _____

Damage Length (inches) = _____

If Crush Depth measurements are equally spaced, you do not need to fill in the distance between Crush measurements.

Crush Depth	**Crush Spacing** EQUAL?? Yes / No
C1 (inches) = _____	
	Distance C1 to C2 (inches) = _____
C2 (inches) = _____	
	Distance C2 to C3 (inches) = _____
C3 (inches) = _____	
	Distance C3 to C4 (inches) = _____
C4 (inches) = _____	
	Distance C4 to C5 (inches) = _____
C5 (inches) = _____	
	Distance C5 to C6 (inches) = _____
C6 (inches) = _____	
	Distance C6 to C7 (inches) = _____
C7 (inches) = _____	
	Distance C7 to C8 (inches) = _____
C8 (inches) = _____	
	Distance C8 to C9 (inches) = _____
C9 (inches) = _____	
	Distance C9 to C10 (inches) = _____
C10 (inches) = _____	

Vehicle 2 - Year/Make/Model

_____

Curb Weight (pounds) = _____
Occupant + Cargo Weight (pounds) = _____
Total Weight (pounds) = _____

Angle of Collision Force to Force Normal to
Collision Face (degrees) = _____
PDOF Lever Arm Distance (inches) = _____

Damage Length (inches) = _____

If Crush Depth measurements are equally spaced, you do not need to fill in the distance between Crush measurements.

Crush Depth	**Crush Spacing** EQUAL?? Yes / No
C1 (inches) = _____	
	Distance C1 to C2 (inches) = _____
C2 (inches) = _____	
	Distance C2 to C3 (inches) = _____
C3 (inches) = _____	
	Distance C3 to C4 (inches) = _____
C4 (inches) = _____	
	Distance C4 to C5 (inches) = _____
C5 (inches) = _____	
	Distance C5 to C6 (inches) = _____
C6 (inches) = _____	
	Distance C6 to C7 (inches) = _____
C7 (inches) = _____	
	Distance C7 to C8 (inches) = _____
C8 (inches) = _____	
	Distance C8 to C9 (inches) = _____
C9 (inches) = _____	
	Distance C9 to C10 (inches) = _____
C10 (inches) = _____	

Name_____
Company_____
Address_____
City/State/Zip_____
Phone_____
Case Reference _____

Visa/MasterCard/American Express
Card Number_____
Expiration _____/_____
Security Code_____
Card Billing Address_____
City/State/Zip_____

E-Mail_____

A Division of Expert Witness Services, Inc.

4N6XPRT Systems

Expert System Software for Litigation

8387 University Avenue
La Mesa, CA 91942-9342

FED Tax ID No.: 95-3121248

Phone: 1- 800-266-9778
Fax: (619) 464-2206

Web Site: http://www.4n6xprt.com

E-Mail: 4n6@4n6xprt.com

Dear Customer,

Due to the governments desire (both U.S. & California) to "protect us" we will need the following information from you in order to process your credit card(s). Please complete this form and return it with your order.

Card type: Am. Express / Visa / MasterCard
Card Number: _____
Expiration Date (MM/YY): ____/____

←Visa/MasterCard American Express →

Security code (card ID) on back of Visa/MasterCard card or front of American Express Card:

Address for where the **credit card bill is sent**:

_____

*(This is the address number - for instance, ours would be **8387 University Avenue** - that the credit card bill would go to, not where we would send the data or product to)*

City/State/Zip for where the **credit card bill is sent**:

_____

*(- for instance, ours would be **La Mesa, CA 91941** - that the credit card bill would go to, not where we would send the data or product to)*

Authorized signature: _____

We appreciate your cooperation in supplying us with this information and understanding that it is being required of us to obtain the information.

Sincerely,

Daniel W. Vomhof III
General Manager/Technical Support