Finite Element Model of C1500 Pickup Truck

Model Year 1994
Version 7
FE Model of C1500 Pick-up Truck

- FE model extensively used in roadside hardware simulations.
- Material data derived from coupon testing.
- Model verified to NCAP test and many other roadside hardware impact tests.

Number of Parts - 251
Number of Nodes - 66586
Number of Shells - 54565
Number of Beams - 163
Number of Solids - 3561
Number of Elements - 58313
Accelerometer Locations

<table>
<thead>
<tr>
<th>Location</th>
<th>Node ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left seat</td>
<td>2061924</td>
</tr>
<tr>
<td>Right seat</td>
<td>2061932</td>
</tr>
<tr>
<td>Engine Top</td>
<td>2061940</td>
</tr>
<tr>
<td>Engine Bottom</td>
<td>2061948</td>
</tr>
<tr>
<td>IP top</td>
<td>2061972</td>
</tr>
<tr>
<td>Vehicle CG</td>
<td>2061916</td>
</tr>
<tr>
<td>Lt. brake caliper</td>
<td>2061964</td>
</tr>
<tr>
<td>Rt. brake caliper</td>
<td>2061956</td>
</tr>
</tbody>
</table>
Benchmark Data

**LS-DYNA**
Version: mpp971
Revision: 7600.1224
Platform: SGI Altix (Itanium 2)
OS level: Linux 2.4
Precision: Single precision (I4R4)
Total Elapsed time: ~ 49 minutes (for 150 ms)
Number of processors: 8
### NCAP Comparison

<table>
<thead>
<tr>
<th></th>
<th>FE Model</th>
<th>Test Vehicle</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weight (Kgs)</strong></td>
<td>2013</td>
<td>2023</td>
</tr>
<tr>
<td><strong>Engine Type</strong></td>
<td>4.3L V6</td>
<td>4.3L V6</td>
</tr>
<tr>
<td><strong>Attitude (mm)</strong></td>
<td>F - 840</td>
<td>F - 825</td>
</tr>
<tr>
<td>As delivered</td>
<td>R - 871</td>
<td>R - 888</td>
</tr>
<tr>
<td><strong>Wheelbase (mm)</strong></td>
<td>3382</td>
<td>3340</td>
</tr>
<tr>
<td><strong>CG (mm)</strong></td>
<td>1430</td>
<td>1557</td>
</tr>
<tr>
<td>Rearward of front wheel C/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Seating</strong></td>
<td>2 passenger</td>
<td>2 passenger</td>
</tr>
</tbody>
</table>
Test No.: 1741
Contract or Study Title: 1992 CHEVROLET C1500 PICKUP INTO FLAT FRONTAL BARRIER (Load cell wall)
Test Performer: TRC OF OHIO
Test Reference No.: 920806
Test Type: NEW CAR ASSESSMENT TEST
Test Configuration: VEHICLE INTO BARRIER
Closing Speed (kph): 55.8
Impact Angle (degrees): 0
Offset Distance (mm):
Version No.: 2
Test Objectives: OBTAIN 35 MPH NEW CAR ASSESSMENT AND RESEARCH DATA
Test Date: 8/6/1992
Contract No.: DTNH22-90-D-22121
Test Track Surface: CONCRETE
Test Track Condition: DRY
Ambient Temperature (degrees Celsius): 0
Type of Recorder: FM MULTIPLEXOR TAPE RECORDER
Total No. of Curves: 83
Test Commentary: THIS IS A 1993 TEST ALTHOUGH 92 MODEL WAS USED AS THE MODELS ARE SAME
NCAP Test Vehicle Data

**TABLE 2 TEST VEHICLE INFORMATION CONT'D**

_**TIRES ON VEHICLE (MFR., LINE, SIZE):**_ General, Ameritech ST, P225/75R15

_**TIRE PRESSURE WITH MAXIMUM CAPACITY VEHICLE LOAD:**_ FRONT: 241 kPa  
REAR: 241 kPa

_**SPARE TIRE (MFR., LINE, SIZE):**_ General, Ameritech ST, P225/75R15

_**TYPE OF SEATS:**_ FRONT: Bench  
REAR: NA

_**TYPE OF FRONT SEAT BACKS:**_ Non-adjustable

_**MAXIMUM WIDTH:**_ 1956 mm

_**WHEELBASE:**_ 3340 mm

_**LOCATION OF LABEL STATING TIRE DATA:**_

The label was located on the driver's door.

_**TIME & CAPACITY DATA FROM VEHICLE'S LABEL:**_

_**RECOMMENDED TIRE SIZE:**_ P225/75R15

_**RECOMMENDED COLD TIRE PRESSURE:**_ FRONT: 221 kPa; REAR: 241 kPa

_**DESIGNATED SEATING CAPACITY:**_ NA, FRONT NA, REAR NA, TOTAL NA

_**VEHICLE CAPACITY WEIGHT:**_ NA kg

_**TEST VEHICLE ATTITUDES (ALL MEASUREMENTS ARE IN MILLIMETERS):**_

_**DELIVERED ATTITUDE:**_ LF 826; RF 824; LR 886; RR 889

_**PRE-TEST ATTITUDE:**_ LF 821; DF 816; LR 876; RR 851

_**POST-TEST ATTITUDE:**_ LF 790; RF 919; LR 819; RR 902

**TABLE 2 TEST VEHICLE INFORMATION CONT'D**

_**WEIGHT OF TEST VEHICLE AS RECEIVED WITH MAXIMUM FLUIDS:**_

RIGHT FRONT 507 kg  RIGHT REAR 363 kg
LEFT FRONT 507 kg  LEFT REAR 374 kg
TOTAL FRONT WEIGHT 1014 kg  (58.2% OF TOTAL VEHICLE WEIGHT)
TOTAL REAR WEIGHT 727 kg  (41.8% OF TOTAL VEHICLE WEIGHT)
TOTAL DELIVERED WEIGHT 1741 kg

_**CALCULATION OF TEST VEHICLE'S TARGET TEST WEIGHT:**_

RCLM = RATED CARGO AND LUGGAGE WEIGHT*
UDW = UNLOADED DELIVERED WEIGHT (1741 kg)
VCW = VEHICLE CAPACITY WEIGHT (NA)*
DSC = DESIGNATED SEATING CAPACITY (NA)*
RCLM* = VCW - 88 (DSC) = NA

TARGET TEST WEIGHT = UDW + RCW + (NO. OF HYBRID III DUMMIES X 76 KG/DUMMY)
TARGET TEST WEIGHT = 1741 + 136 + 152
TARGET TEST WEIGHT = 2029 kg

_**WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 134 KG OF CARGO WEIGHT:**_

RIGHT FRONT 537 kg  RIGHT REAR 461 kg
LEFT FRONT 543 kg  LEFT REAR 482 kg
TOTAL FRONT WEIGHT 1080 kg  (53.4% OF TOTAL VEHICLE WEIGHT)
TOTAL REAR WEIGHT 943 kg  (46.6% OF TOTAL VEHICLE WEIGHT)
TOTAL TEST WEIGHT 2023 kg  (0.3% UNDER TARGET TEST WEIGHT)

_**WEIGHT OF BALLAST SECURED IN VEHICLE CARGO AREA:**_ 0 kg

_**COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT:**_ None

CG = 1357 MM REARWARD OF FRONT WHEEL CENTERLINE

*Cargo weight for multi-purpose passenger vehicles, trucks, and buses is the vehicle's rated cargo and luggage weight from the vehicle's label or 134 kg, whichever is less.
NCAP 36 load cell wall
Accelerometer Data
Total wall force
Energy Balance
Front and rear suspension have been improved based on pendulum tests conducted at FOIL

Additional information can be found in the references below