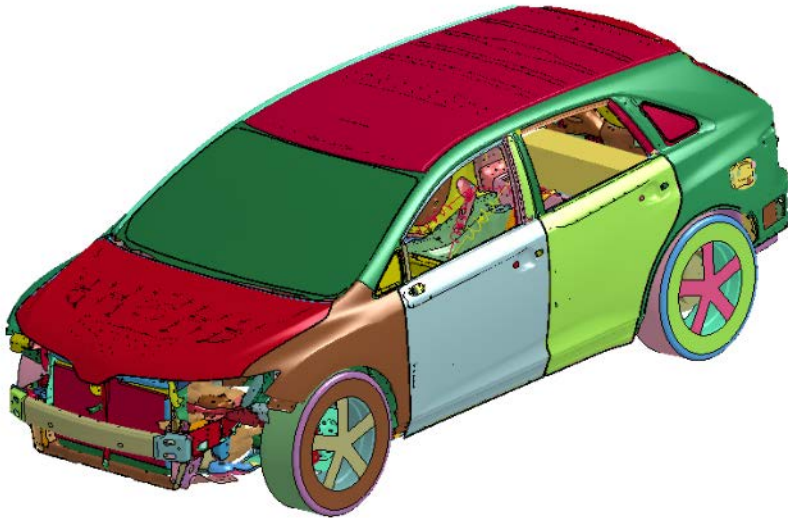




National Crash Analysis Center

2010 Toyota Venza (LO) FE Model Trend & Robustness Study

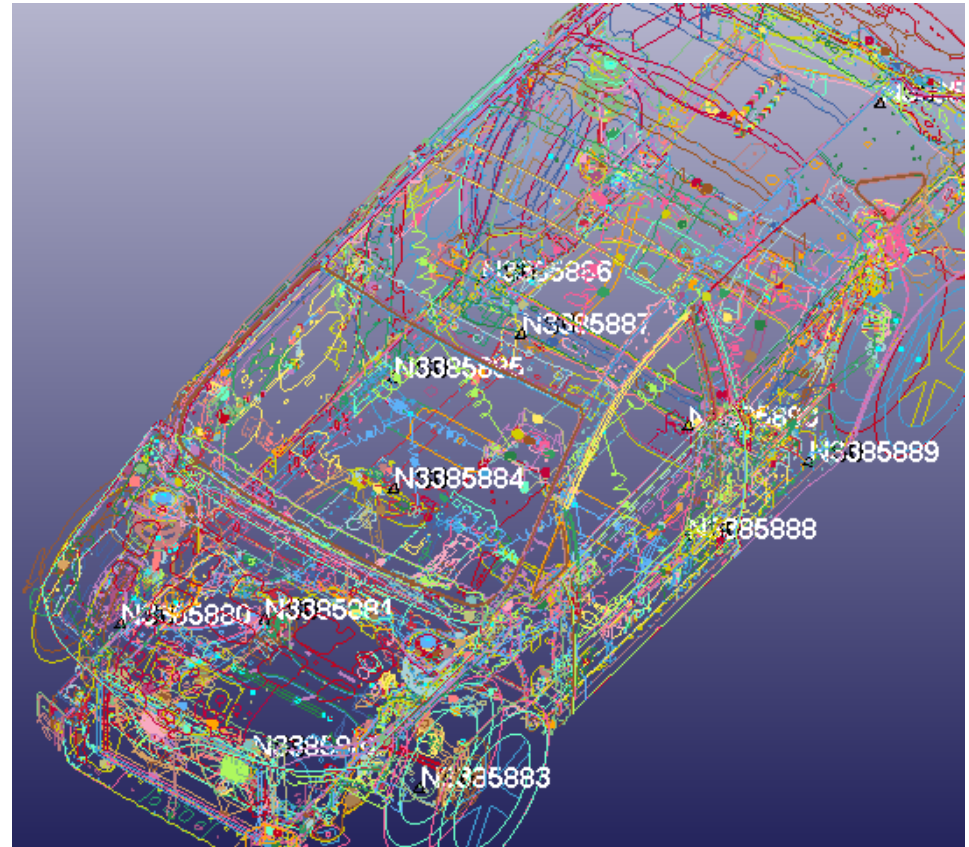
FE Model Information



| | |
|--|---------|
| File Name: VENZA_LO_V1c.key | |
| Total Number of Parts | 1154 |
| Total Number of Elements | 1383455 |
| Total Number of Nodes | 1389961 |
| Total Number of Shell Elements | 1282434 |
| Total Number of Solid Elements | 100724 |
| Total Number of Beam & Discrete Elements | 95 |

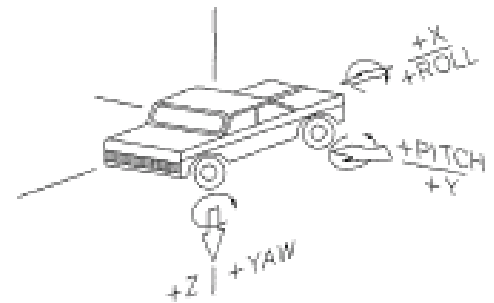
Accelerometers

| | |
|---------|----------------------|
| 3385880 | BRAKE_CALIPER_RH |
| 3385881 | ENG_TOP |
| 3385882 | ENG_BOTTOM |
| 3385883 | BRAKE_CALIPER_LH |
| 3385884 | IP_CENTER |
| 3385885 | BPLR_BOTTOM_INNER_RH |
| 3385886 | SIDE ROCKER REAR RH |
| 3385887 | REAR SEAT XMBR RH |
| 3385888 | BPLR_BOTTOM_INNER_LH |
| 3385889 | SIDE_ROCKER_REAR_LH |
| 3385890 | REAR SEAT XMBR LH |
| 3385891 | REAR TRUNK CENTER |



Vehicle Data

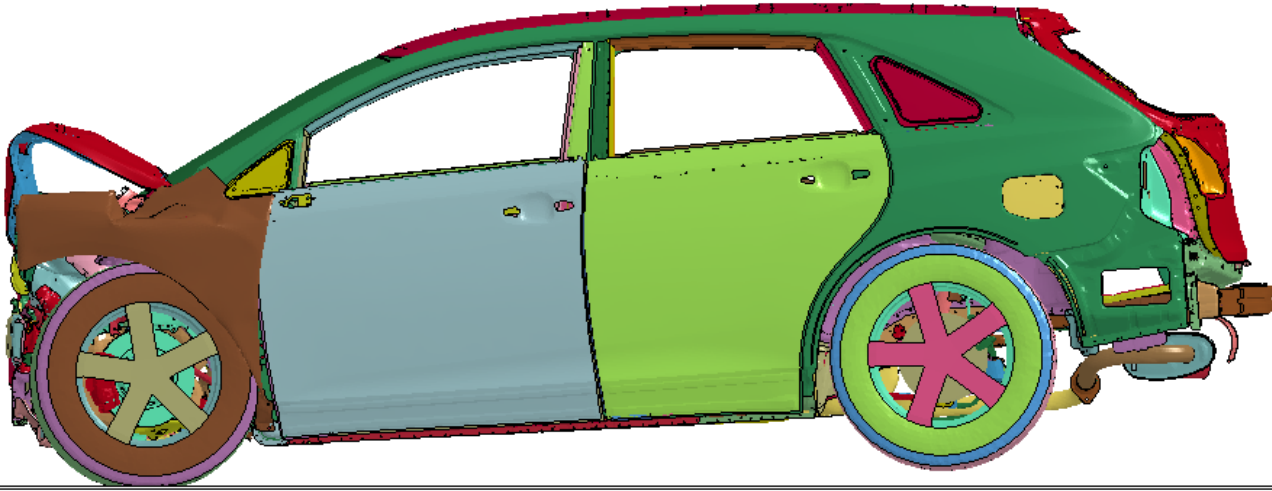
| | NCAP Test 6601 (2 HIII 50 th) | VRTC Test 40 kmph (1 HIII 5 th) | VENZA <u>BL</u> FE MODEL | VENZA <u>LO</u> FE MODEL | VENZA <u>HO</u> FE MODEL |
|------------------------------------|---|---|-----------------------------|-----------------------------|-----------------------------|
| Weight (Kg) | 2074 | 1786 | 1767+38 | 1459+44 | |
| Pitch Inertia (Kg-m ²) | | | 3102 | 2550 | |
| Yaw Inertia (Kg-m ²) | | | 3444 | 2850 | |
| Roll Inertia (Kg-m ²) | | | 694 | 583 | |
| Vehicle CG 'X' (mm) | 1258 | 1226 | 1205 | 1154 | |
| Tire | P245/50R20 | P245/55R19 | P245/55R19 | P245/55R19 | |
| Engine | 3.5 liter 6 cyl | 2.7 liter 4 cyl | 2.7 liter 4 cyl | 2.7 liter 4 cyl | |



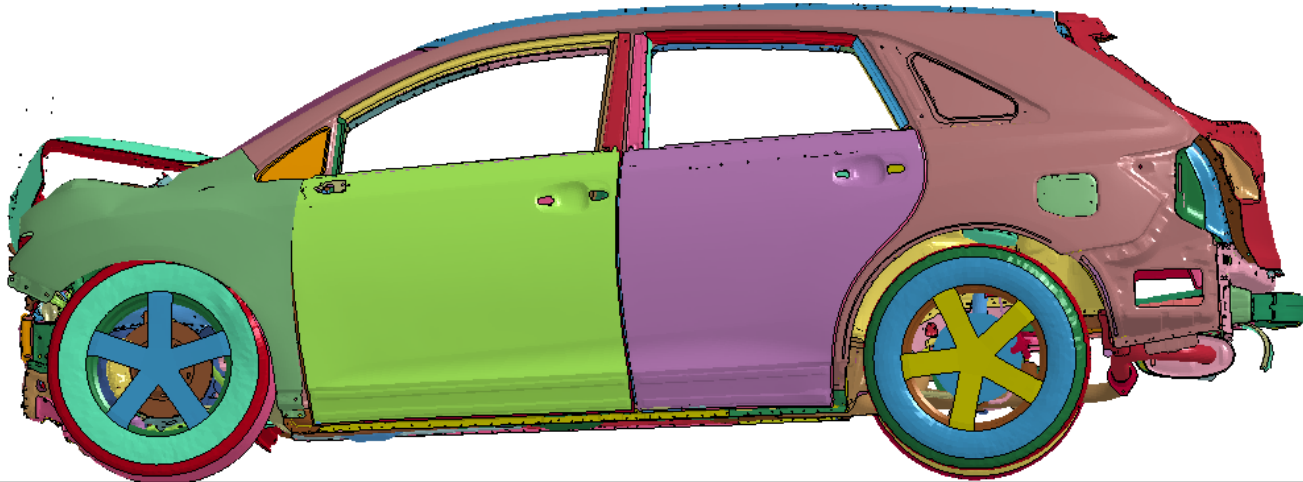
Full Frontal Impact Comparison @ 35 mph

Comparison – BL vs LO

BL

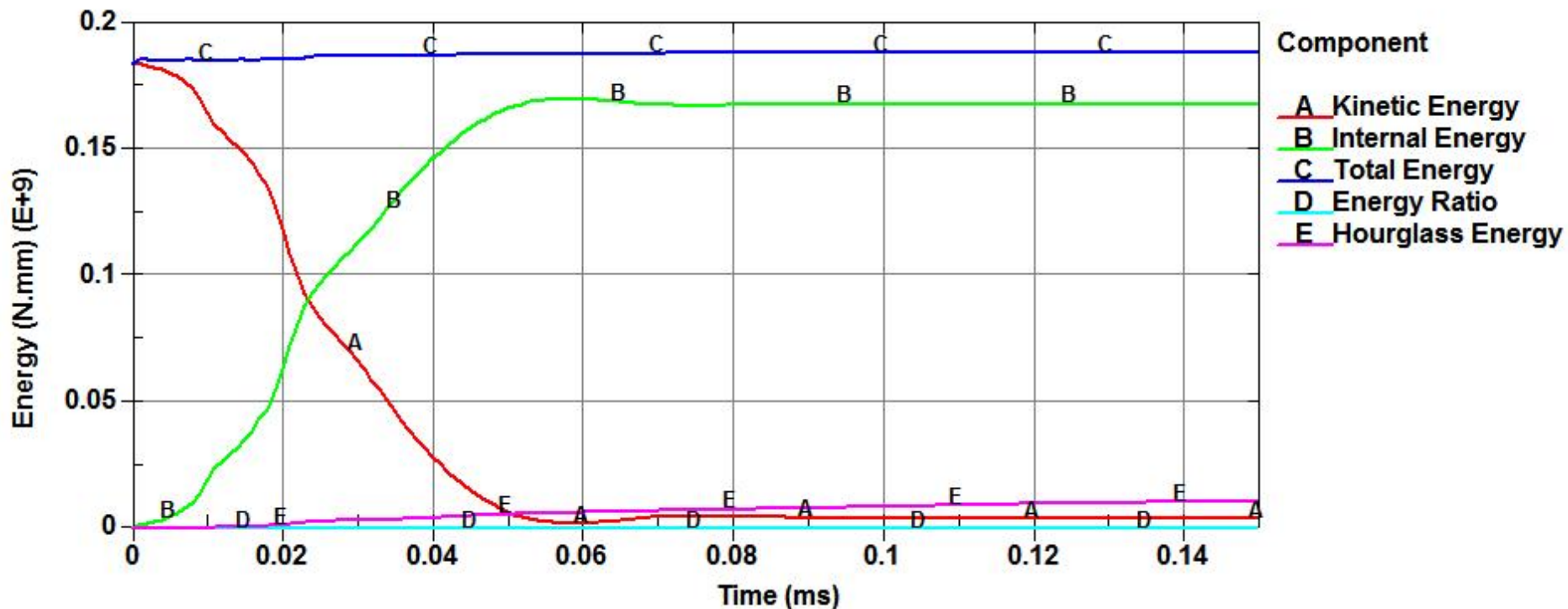


LO

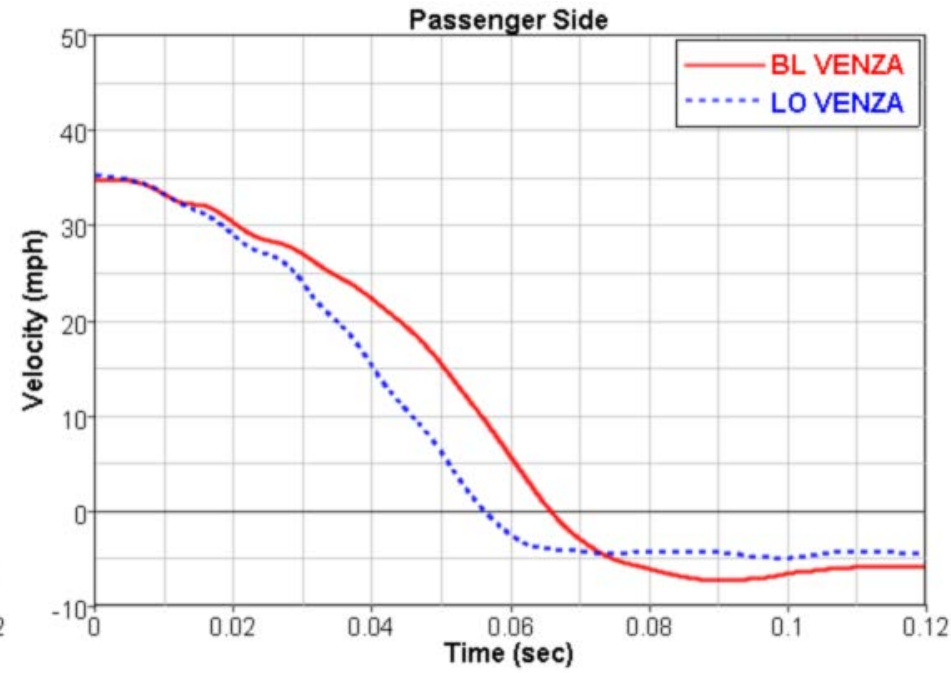
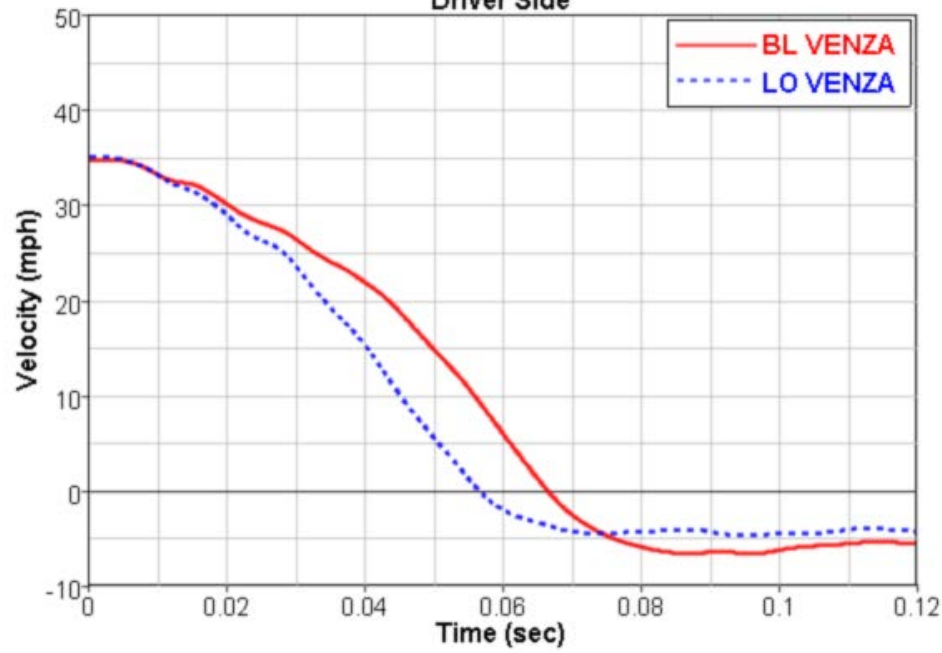
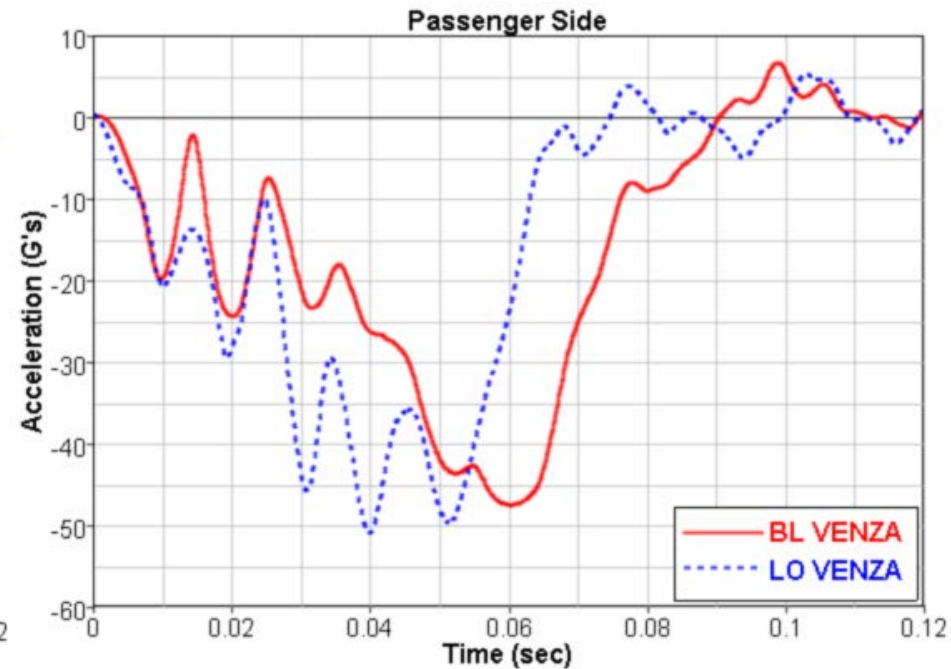
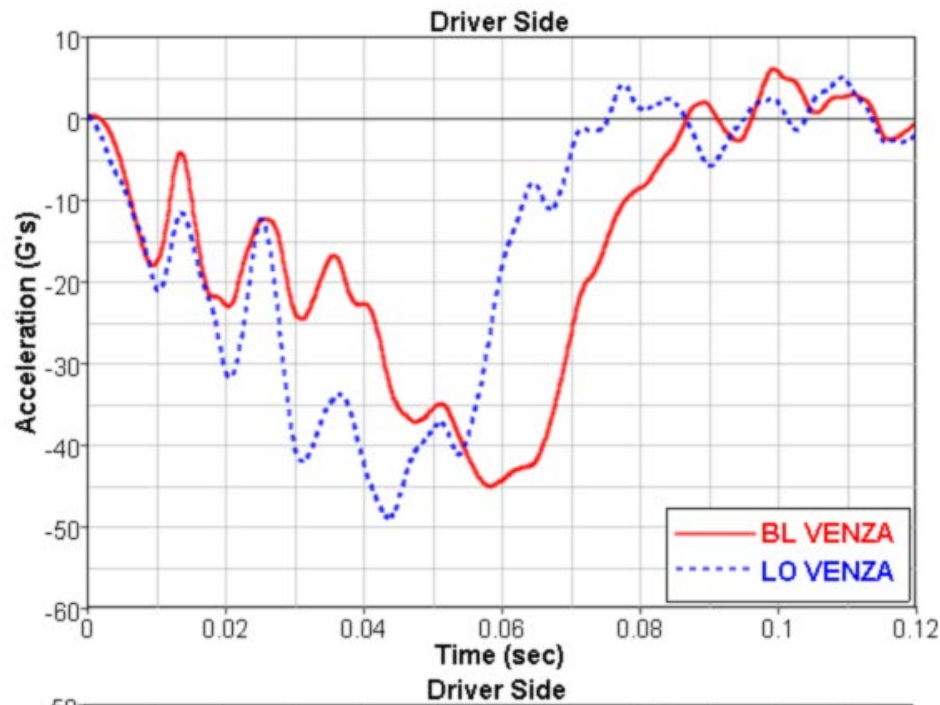


Energy Comparison - LO

- Energy comparison looks OK
- No energy spikes & total energy remains constant
- Hourglass energy remains low

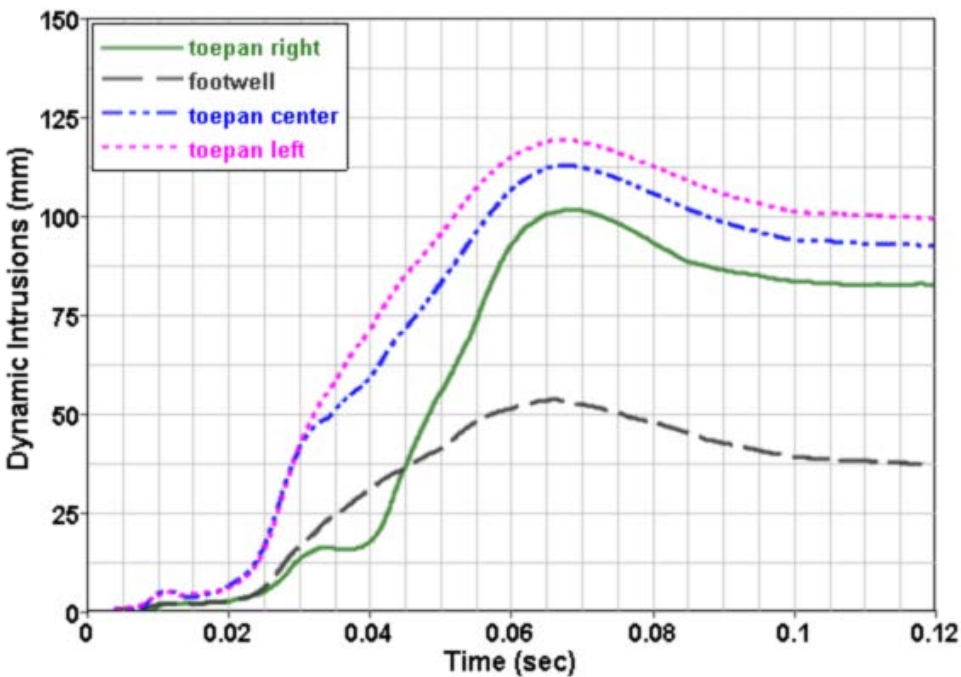


Comparison – BL vs LO (Frontal 35 mph)

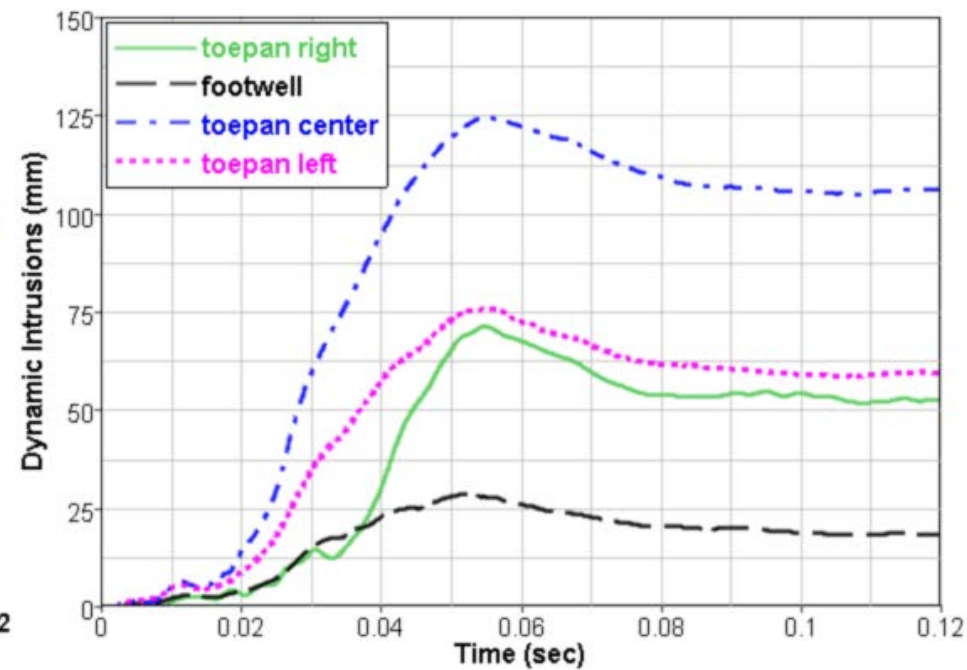


Intrusion Comparison – BL vs LO (Frontal 35 mph)

BL

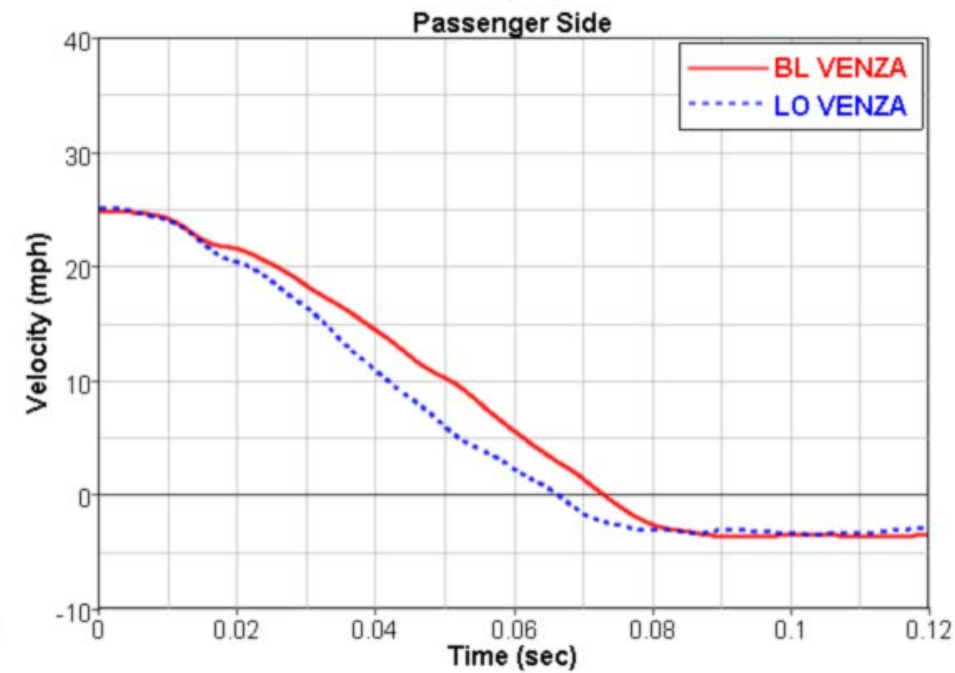
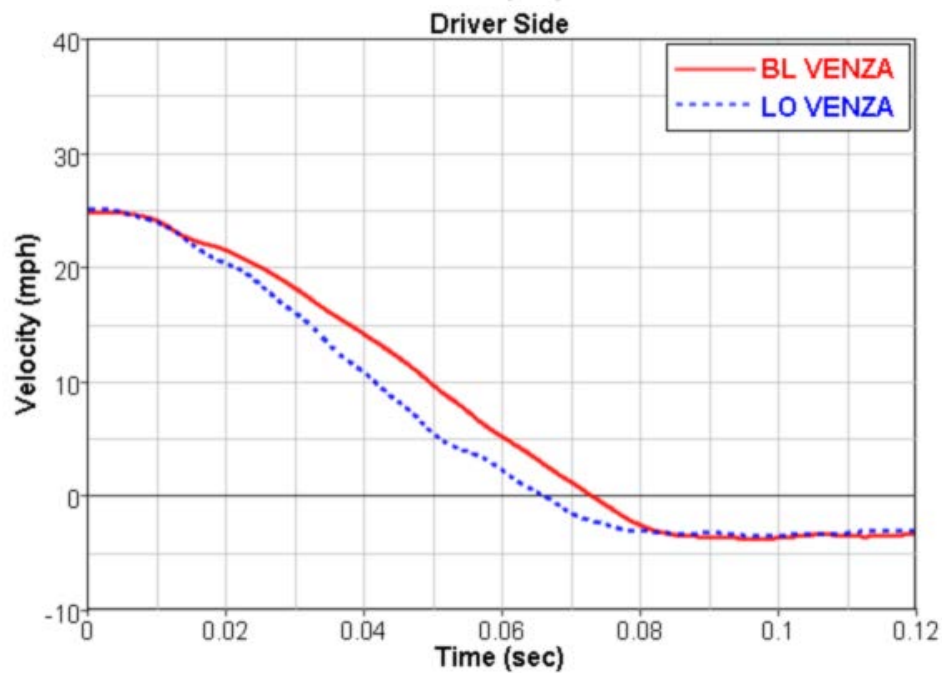
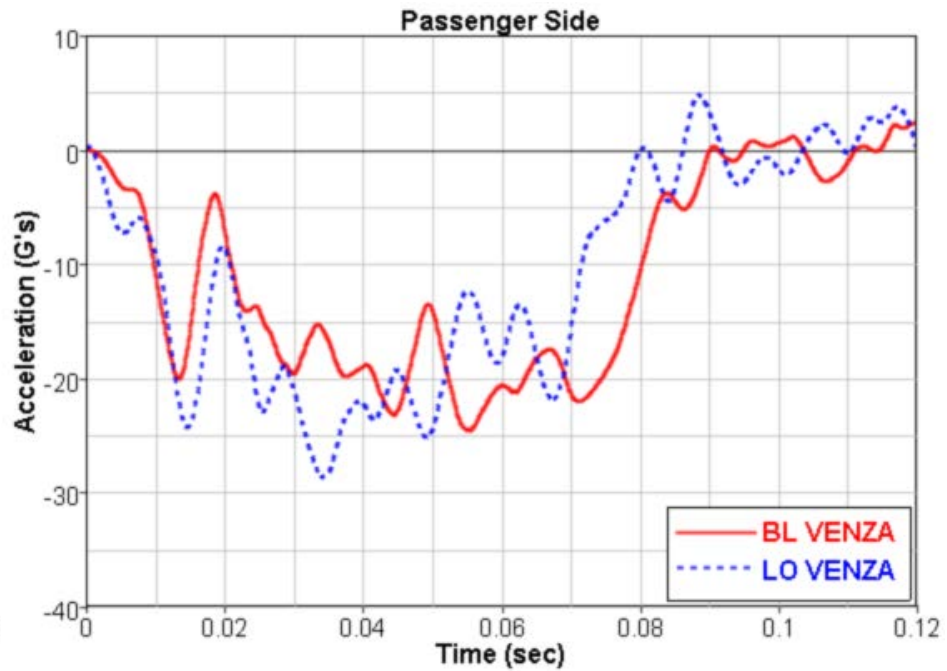
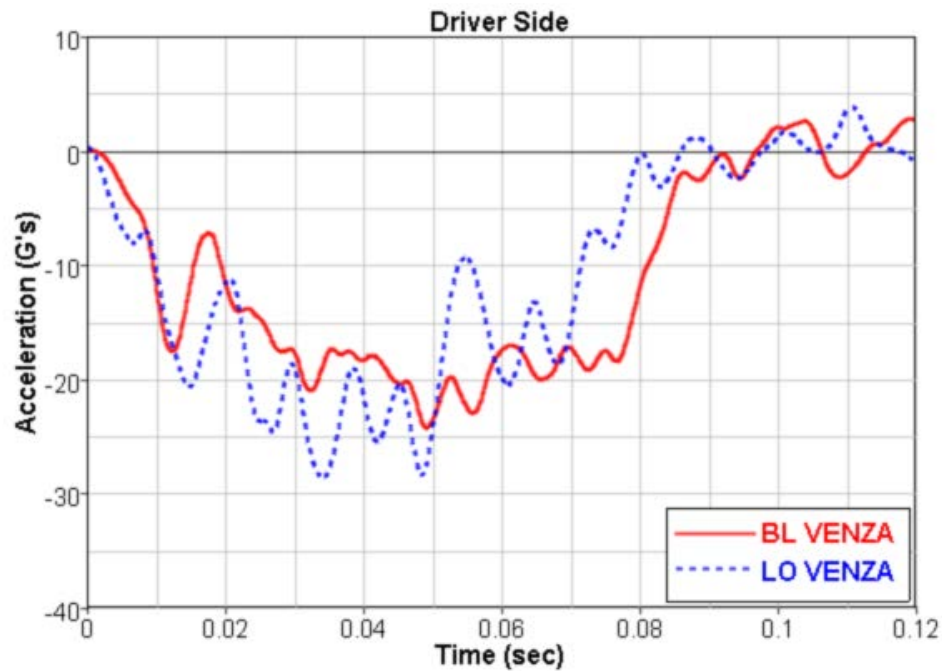


LO



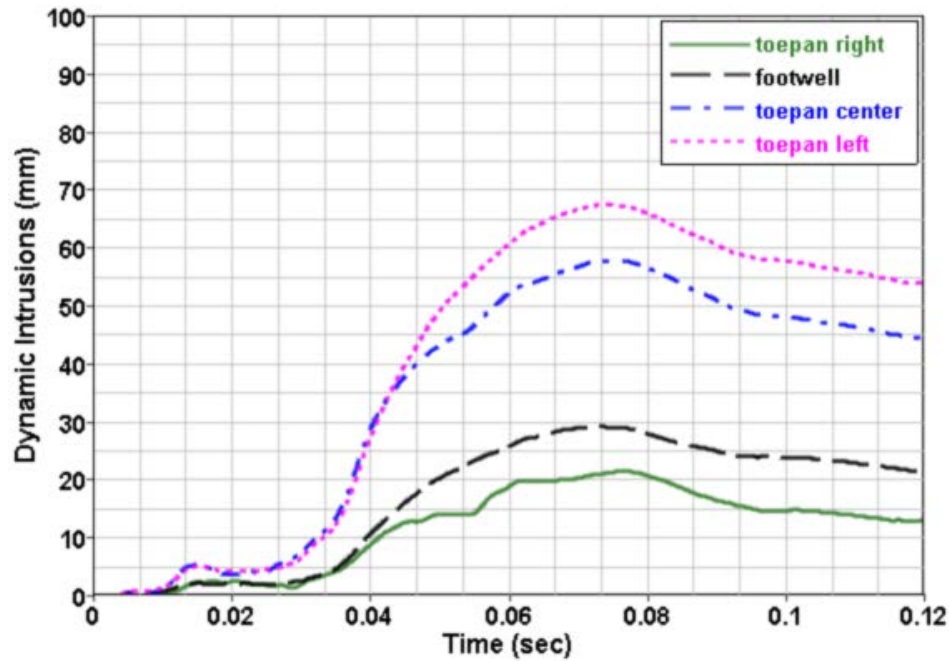
Full Frontal Impact Comparison @ 25 mph

Comparison – BL vs LO (Frontal 25 mph)

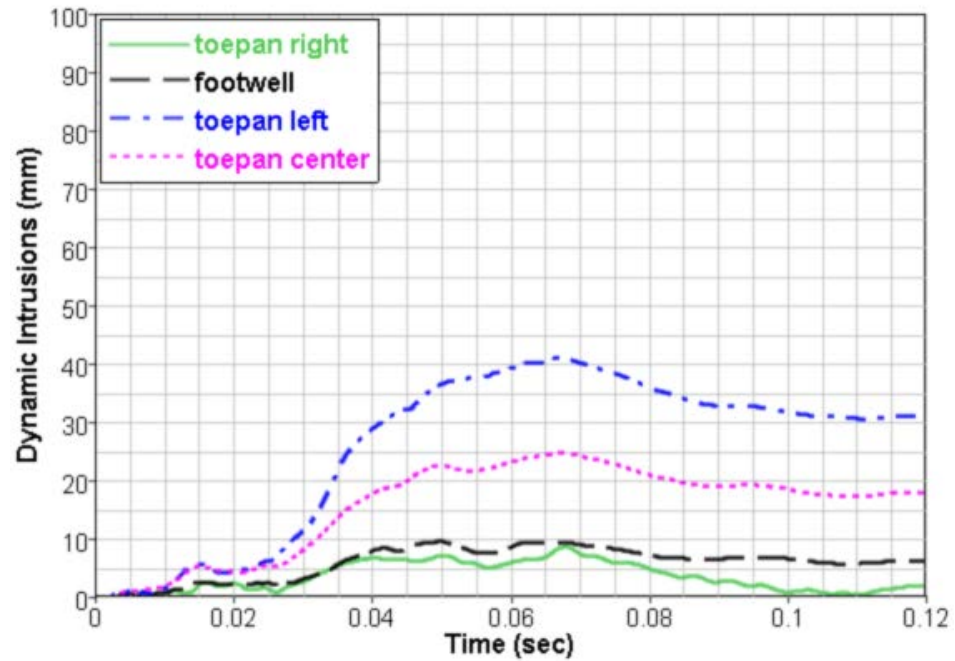


Intrusion Comparison – BL vs LO (Frontal 25 mph)

BL

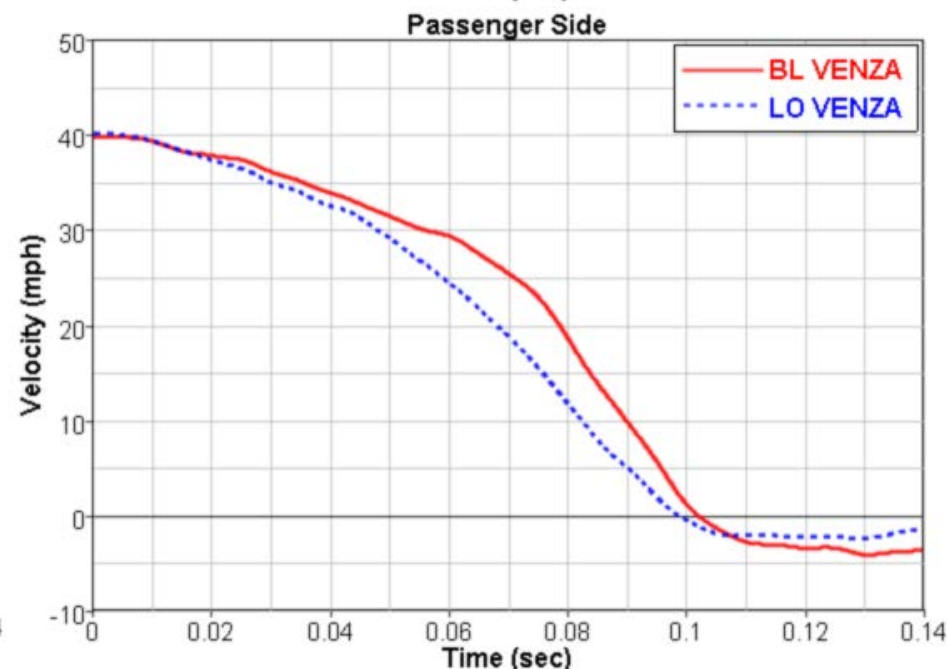
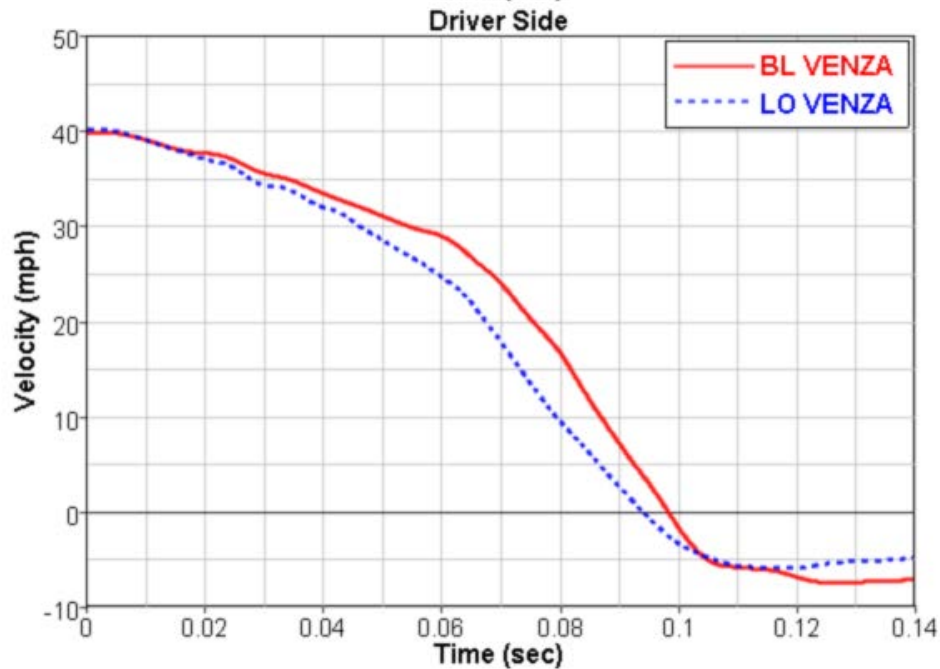
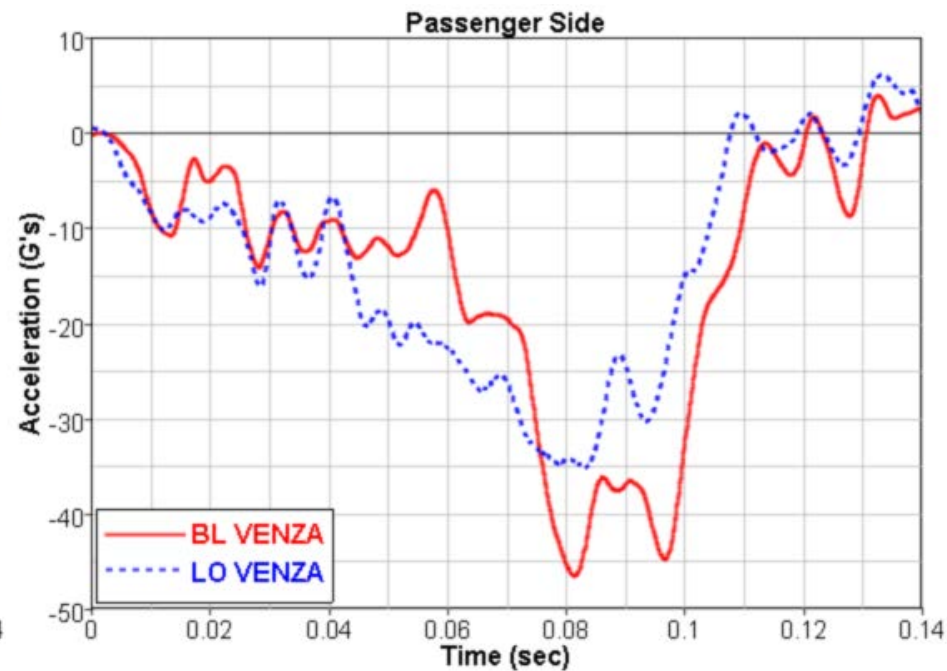
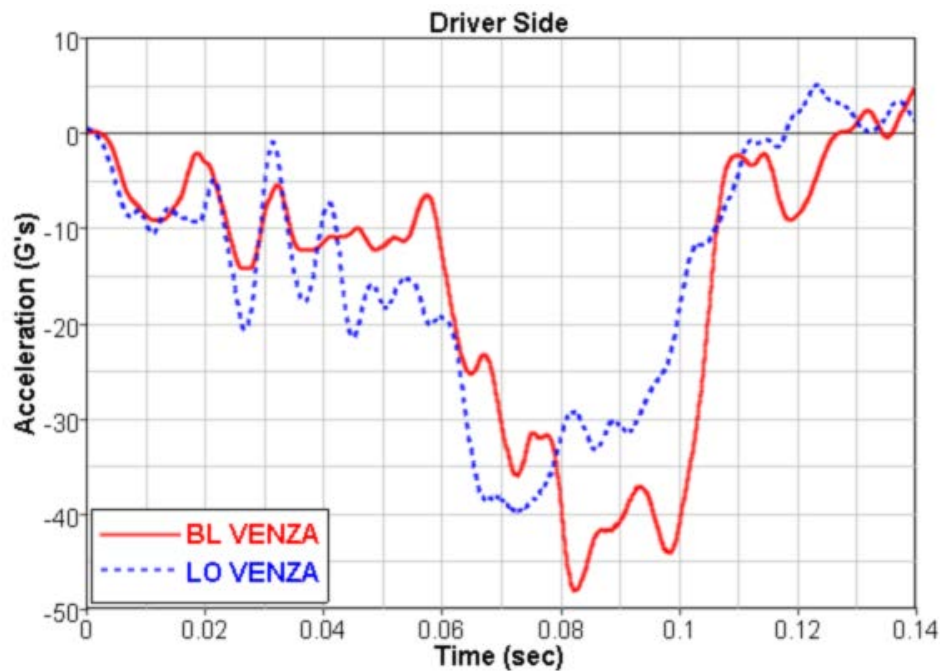


LO



Frontal ODB Impact Comparison @ 40 mph

Comparison – BL vs LO (ODB 40 mph)



LO Venza Robustness & Trend Analysis Simulations

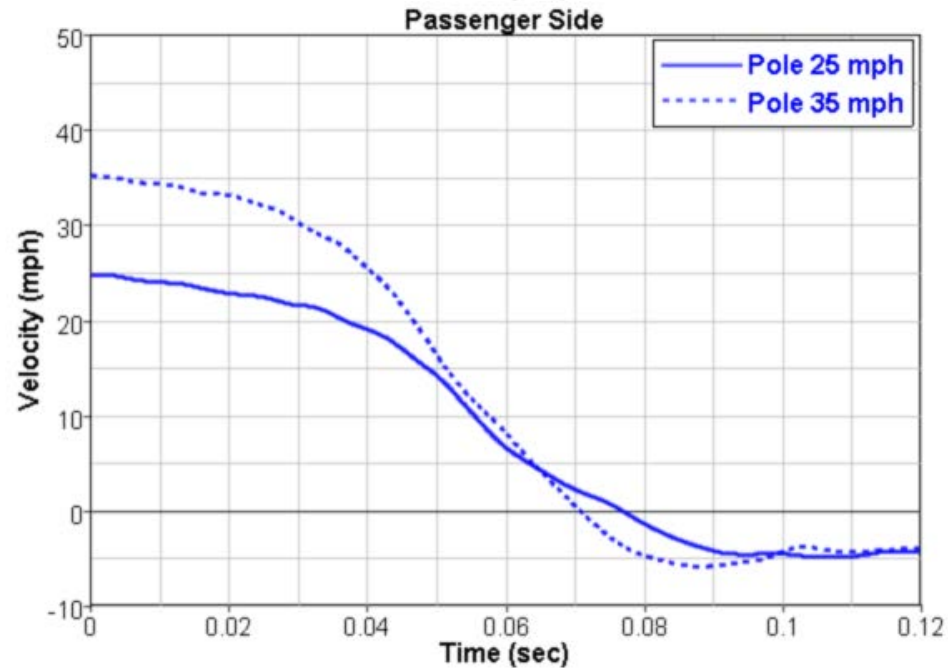
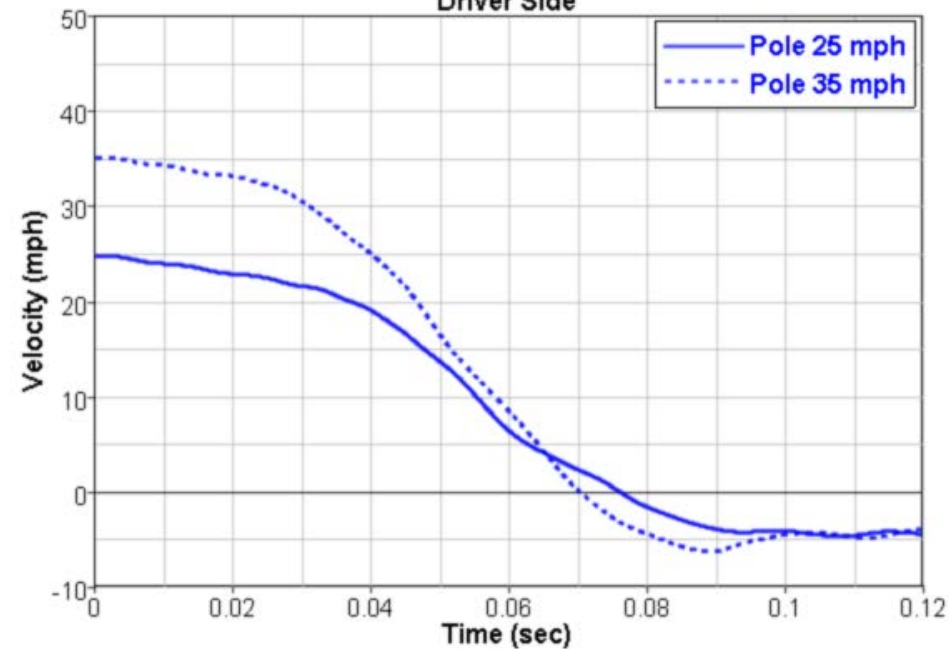
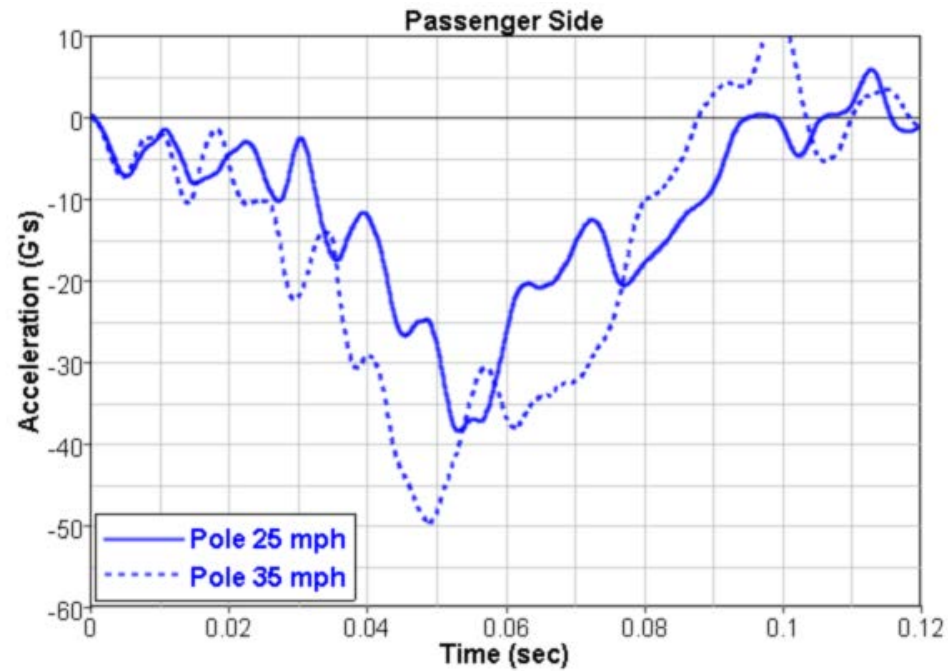
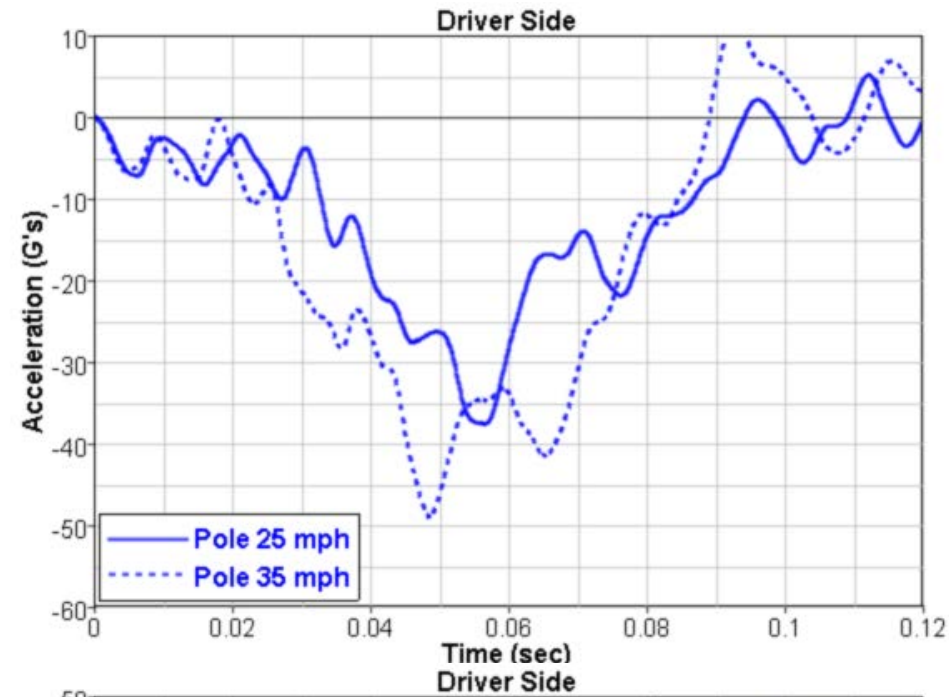
Robustness and Stability Analyses:

- Centerline impact into fixed 10" diameter pole & 35 mph
- 40% and Full overlap v-t-v impact into Silverado @ 35 mph

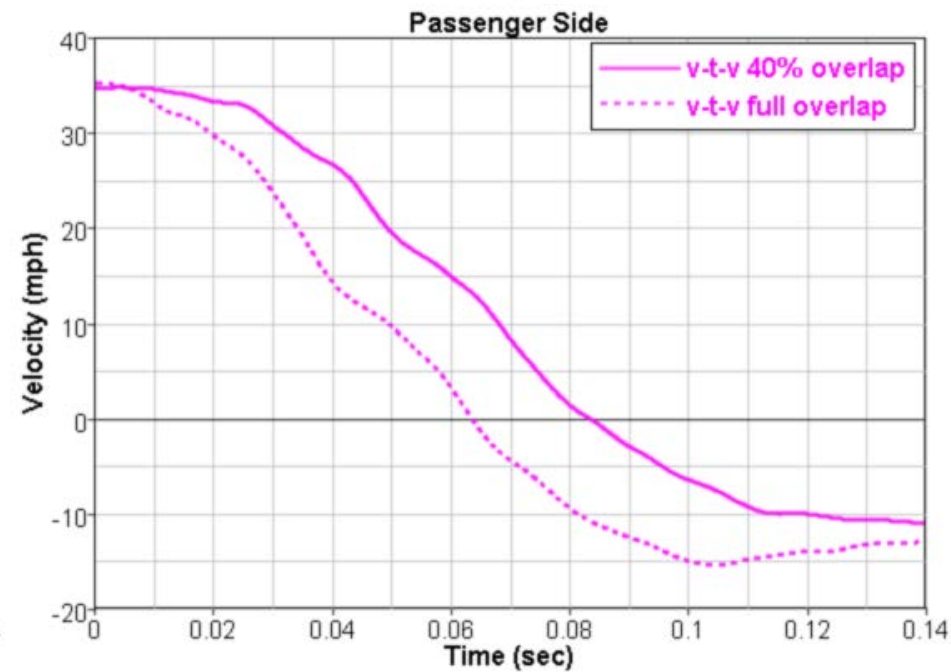
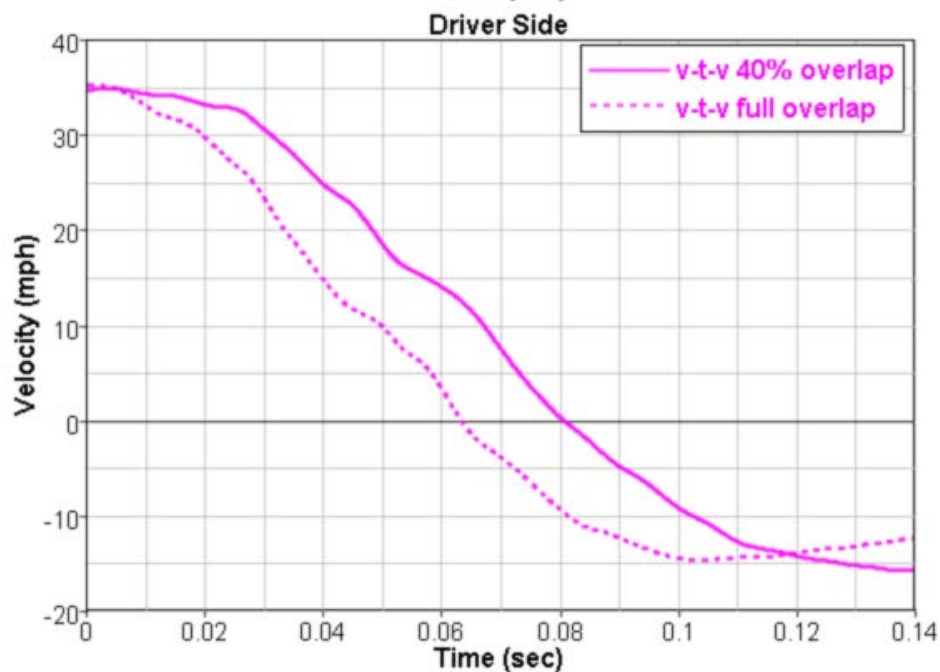
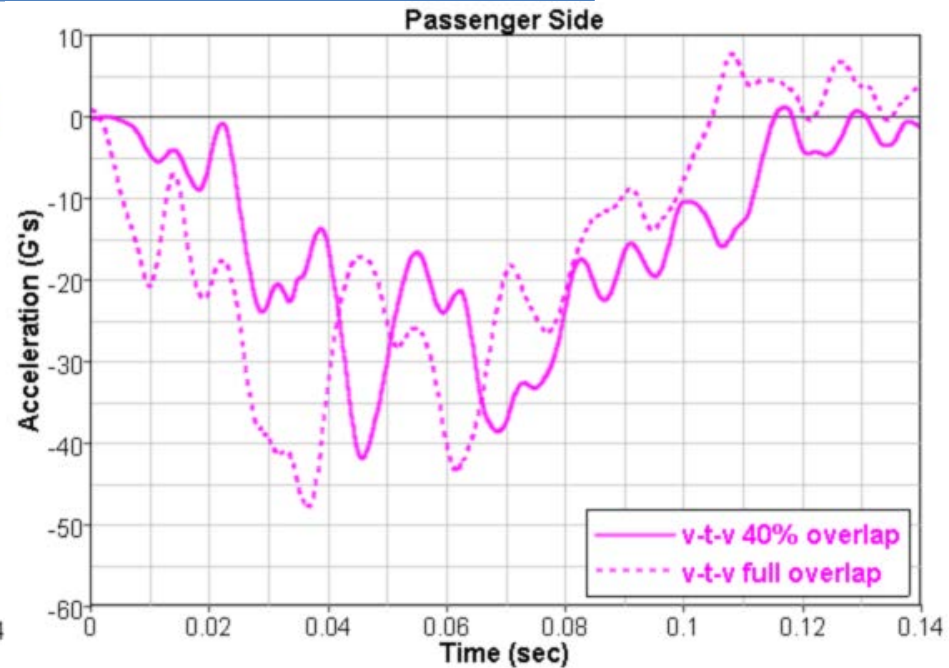
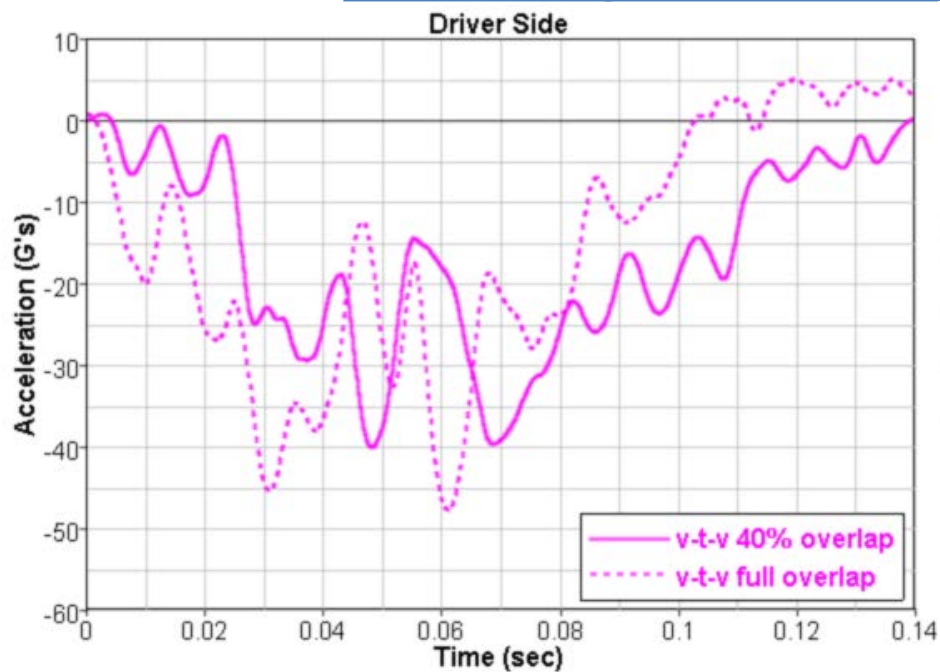
Trend Analysis:

- Full frontal impact into fixed barrier: 35 mph & 25 mph
- 40% overlap impact into deformable barrier: 40 mph & 25 mph
- Centerline impact into fixed 10" diameter pole: 35 mph & 25 mph

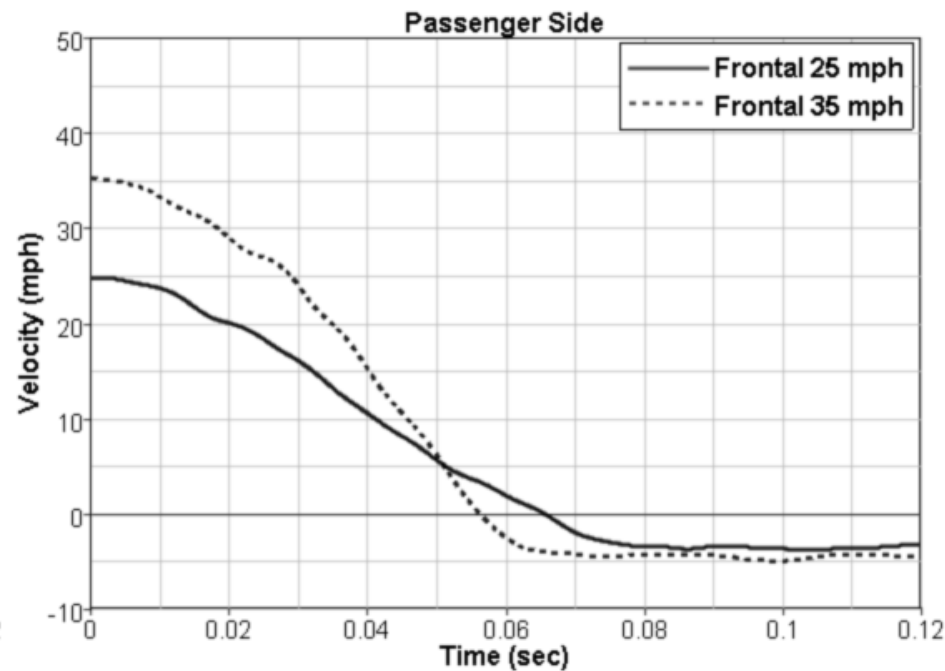
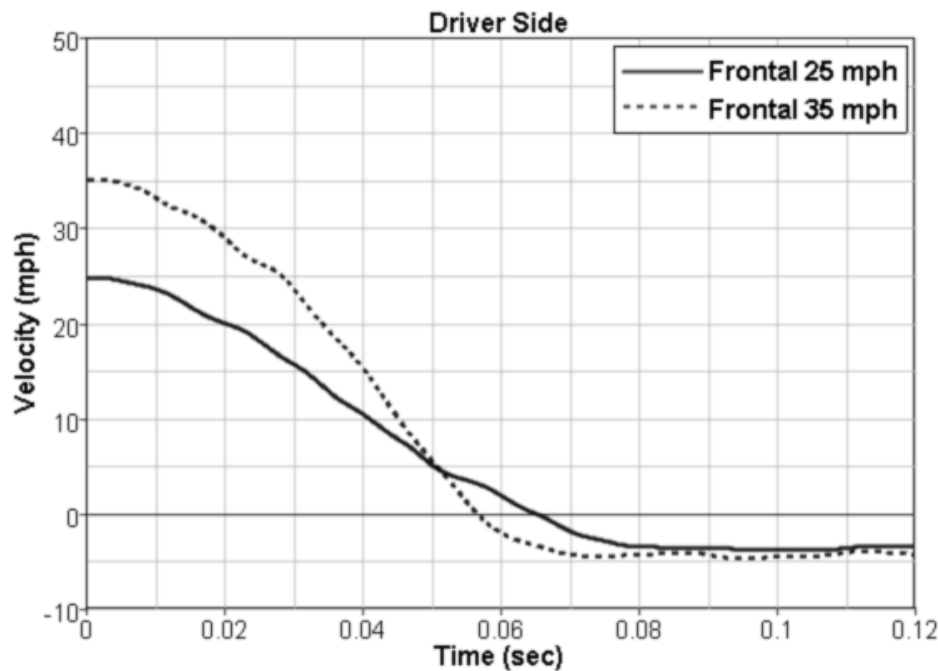
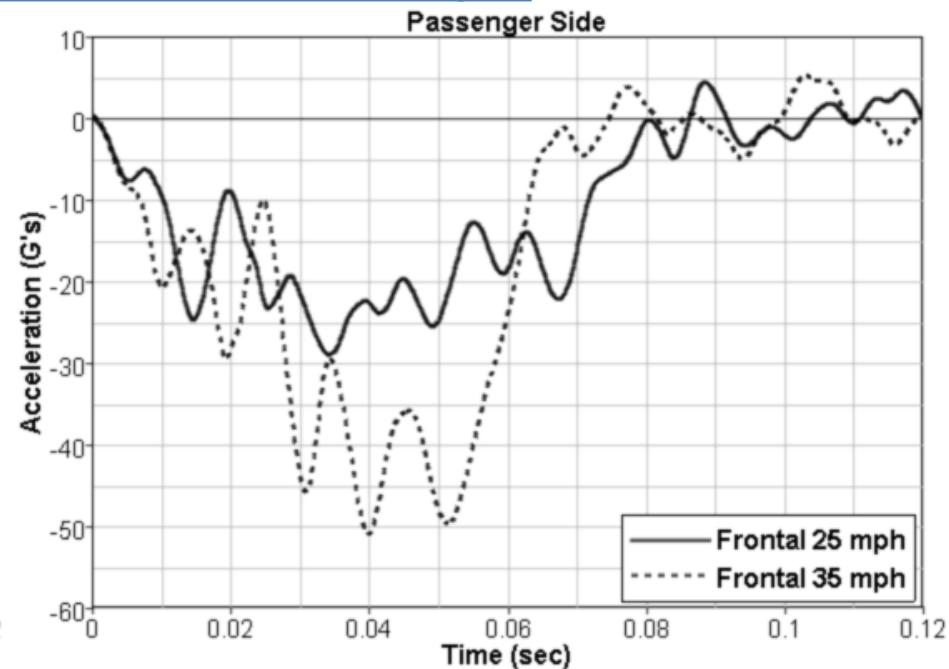
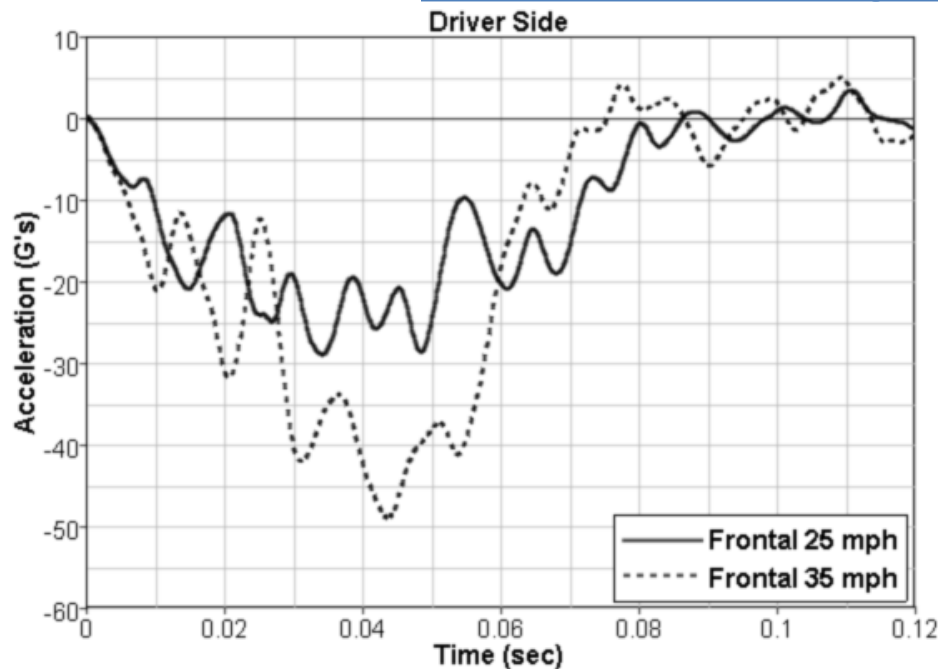
Centerline Impact into 10" pole @ 25 & 35 mph



V-t-V impact @ 35 mph with Silverado



Full Frontal Impact – 25 & 35 mph



40% overlap ODB @ 25 & 40 mph

