# Vehicle Characterization and Performance Study of Toyota Camrys



VEHICLE RESEARCH AND TEST CENTER EAST LIBERTY OHIO 43319-0337

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16. Abstract

In response to incidents of unintended acceleration in Toyota vehicles, NHTSA VRTC conducted a Toyota Camry "Vehicle Characteristics and Performance Study" comprised of 20 Toyota Camrys. Nine of the Camrys tested were complaint vehicles purchased from consumers that allegedly experienced incidents of unwanted acceleration. Attributes and configurations of each vehicle's systems that could affect performance was documented and evaluated. Observations are stated in Section 5 of the report. Listed features and performance measures are included in the attached appendices. No safety defects in the acceleration control systems were found during these vehicle characterizations. Subsequent to testing, these vehicles were made available to NASA for further study of the electronic systems to discover whether a safety defect could be found.

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# **EXECUTIVE SUMMARY**

In response to incidents of unintended acceleration (UA) in Toyota vehicles, the National Highway Traffic Safety Administration's (NHTSA) Vehicle Research and Test Center (VRTC) conducted a Toyota Camry "Vehicle Characteristics and Performance Study" comprised of 20 Toyota Camrys. Nine of the Camrys tested were complaint vehicles purchased from consumers that allegedly experienced incidents of unwanted acceleration. Attributes and configurations of each vehicle's systems that could affect performance were documented and evaluated. Listed features and performance measures are included in the attached appendices. No safety defects in the acceleration control systems were found during these vehicle characterizations. Subsequent to testing, these vehicles were made available to the National Aeronautics and Space Administration (NASA) for further study of the electronic systems to discover whether a safety defect could be found.

The following observations were made during VRTC's Toyota Camry Vehicle Characterization and Performance Study:

- Beginning with the 2002 model year, the fully electronic throttle control was introduced in Toyota Camrys, which provided quicker engine responsiveness with less pedal displacement than cable driven throttles. Much of this increase in responsiveness appeared to be attributable to the reduction of slack normally found in mechanical accelerator systems. Increased responsiveness is a typical characteristic of electronic throttle control (ETC) over mechanical linkage accelerator control systems.
- 2. In the event of dual pedal applications, the faster throttle response of the ETC system may increase the likelihood of vehicle movement compared to mechanical throttle systems.
- 3. Starting with the 2002 model, the accelerator pedal force-versus-displacement effort changed and with measurement was found to be somewhat similar to the brake pedal force-versusdisplacement effort during the initial apply. The minimum brake pedal force and displacement required to hold a vehicle stationary became about the same as the accelerator pedal force and displacement required to command initial engine torque.
- 4. Based on a limited sample size of the vehicles tested, the lateral separation distance between the brake and accelerator pedal was closer to the steering wheel centerline in 2002 and newer Camrys, compared to the earlier generation Camrys. Lateral separation measured values

were not abnormal compared to other manufacturers' vehicles.

- 5. The step-over height between pedals in test vehicles slightly decreased beginning in 2002, though the limited sample size did not permit a statistical conclusion.
- 6. As vehicle model iterations were introduced, newer models were equipped with more powerful engines. The transmissions had more forward gears (4, 5, and later 6 gears) that optimized power and made stopping while applying engine power more difficult.
- 7. When braking was applied in one continuous motion where vacuum assist was operating normally and the engine was at full throttle, all tested Camrys either came to a stop or near stop from 65 mph with 112 lbs. or less of brake pedal force.
- 8. If the brakes were pumped more than once while the accelerator was depressed, vacuum was partially, if not fully depleted and would not regenerate until the throttle plate moved to a more closed position. Without vacuum, a significant increase in operator effort was required to stop the vehicle.
- 9. The amount of brake pedal force required to hold the test vehicles stationary with a wide open throttle ranged from 15.0 lbs. to 43.6 lbs with vacuum assist, well within the braking capabilities generated by the vast majority of, if not all, drivers. Without vacuum assist, the brake pedal force required to remain stationary increased substantially to a range from 86.7 lbs to 268.2 lbs., though evidence of stationary Camrys not having vacuum was not encountered in complaint searches.
- 10. Vehicles equipped with keyed ignitions provided a readily discernable means to instantaneously turn off engine ignition, whereas pushbutton functionality had no instantaneous emergency shutoff feature.
- 11. The ignition control button was labeled as "Engine Start/Stop" only. Specific operation was noted in the owner's manual; however it was described within the context that it was discouraged and could cause an accident.
- 12. Shifting the transmission was more complicated with the newer models. In 2002 and model years prior, moving the shifter from park to drive required only one longitudinal movement, and gear locations were intuitively labeled right next to the gear selector. By 2007, shifting to drive also required at least one lateral movement for four cylinder vehicles and two lateral movements for V6 Camrys; and the gear labeling may not be readily discernable to the driver in a panic situation.

13. In all test vehicles, the transmission shifter was mechanically linked to the transmission. Placing the vehicle into park or reverse at highway speeds and under acceleration did not cause any of the vehicles to engage those shift positions, nor wheel lockup, though this action caused both 2001 Camrys to stall.

# 1.0 INTRODUCTION/BACKGROUND

This program was performed to provide technical analysis, insight, and support data to the United States Department of Transportation (USDOT), National Highway Traffic Safety Administration (NHTSA), and the Office of Defects Investigation (ODI) in substantiating and evaluating claims of unintended acceleration (UA) in Toyota products. The purpose of this testing was to indentify, obtain, measure, and document characteristics of vehicles that were associated with allegations of unwanted acceleration, specifically focusing on Toyota Camrys manufactured from 2001 through 2009. Toyota was selected as the subject manufacturer because they exhibited the highest rate among manufacturers. Further supporting this decision, a preliminary keyword search of NHTSA's database indicated that Toyota Camrys:

- Exhibited a relatively high complaint rate in comparison to other Toyota vehicles with electronic throttle control system (ETCS);
- Exhibited the highest crash rates;
- Displayed a marked increase in complaint rate in the model year 2002 when a new generation of Camry was introduced that featured ETCS among a multitude of other changes;
- They were the subject of several inquiries by the Office of Defects Investigation where no defect was found.

The Vehicle Research and Test Center (VRTC) procured and tested 20 Toyota Camrys spanning three model iterations and eight model years from 2001 to 2009. Some of these were complaint vehicles while others were not the subject of a complaint but represented a year before or during a major model change.

# 2.0 APPROACH

Manufacturer-responsible vehicle defects may be traced to design deficiencies, manufacturing non-conformances, or both. Here, it was not known whether any design or manufacturing problems existed, so vehicle selection encompassed the potential for either. The appropriate test vehicles for these different alleged defect causes would not necessarily be the same vehicles, but also were not mutually exclusive. It was therefore foreseeable that there would be an overlap in vehicle test groups.

For design-based defects, engineering changes such as new model introduction and technology upgrades provide opportunities to address old problems with former designs, but also present opportunities to introduce new problems. In the alternate case of manufacturing defects, any given model in any year of production may perform well in testing but experience field failures due to substandard durability or build quality.

Three model life cycles, or generations, of Toyota Camrys were encompassed in this study. The first group was referred to as the MY1996-2001 Camrys with production spanning from model years 1996 through 2001. These vehicles were the last Toyota Camrys to use a mechanical linkage accelerator pedal. Among the procured vehicles were two 2001 Camrys, associated with relatively lower incidents of unwanted acceleration. Also included in this study were the 2002 through 2006 Camrys that were referred to as MY2002-2006 models. Finally, 2007-2009 Toyota Camrys were studied and were referred to in the report as MY2007-2009 models. While the complaints of UA associated with the MY1996-2001 Camrys were relatively low, the last year for this model was 2001, which was the model year that immediately preceded the significant increase in complaints of UA. Characterizing the attributes of the MY1996-2001 models provided valuable baseline information for documenting changes observed moving into subsequent models.

#### 2.1 <u>Test Vehicle Selection Methodology for a Design-Based Defect</u>

The logic used as a basis for vehicle selection in search of a design-based defect included:

• Determining and acquiring vehicles associated with relatively high rates of unintended acceleration.

- Determining and acquiring the first build year for model generations exhibiting high rates of unintended acceleration. Unintended acceleration rates for the Toyota Camry exhibited a significant increase in rates of complaints at the time the MY2002-2006 model was introduced in 2002 and again when the MY2007-2009 model was introduced in 2007, implying that the model changes could relate to causes of unintended acceleration. The first year MY2002-2006 model beginning (2002) Toyota Camry and the first year MY2007-2009 Toyota Camry (2007) were included in this group.
- Determining and acquiring the last build years for model generations adjacent to models that demonstrated high rates of unintended acceleration to encompass all mid-model upgrades and changes associated with a specific generation. This included the last year of the MY1996-2001 Toyota Camry (2001) and the last year for the MY2002-2006 Toyota Camry (combined 2005 & short build year 2006).
- Selecting both four-cylinder (L4) and six-cylinder (V6) engines from each model to encompass differences in wiring, grounding, components, and powertrain performance.
- Selecting vehicles that have been reprogrammed with brake override software to compare them to the same models that do not have the software revision. The MY2007-2009 Toyota Camry (2007) was included in this group because brake override software was not available in previous model years.

## 2.2 <u>Test Vehicle Selection Methodology for a Manufacturing Based Defect</u>

The logic used as a basis for vehicle selection in search of a manufacturing-based defect included:

- Analyzing vehicle complaint data from vehicle owner questionnaires (VOQs) and other sources to identify possible candidate vehicles.
- Contacting owners of selected vehicles to further explore the details of the alleged incidents. This included some site visits and in-person interviews.

- Selecting vehicles to obtain for testing and evaluation. Selection criteria included vehicles for which floor mat entrapments and "sticky pedals" were eliminated by the complainant as potential causes. Ideal incident vehicles included those that had any or all of the following:
  - Multiple drivers, having experienced an unintended acceleration event that could reduce the possibility of a single driver's error;
  - Multiple incidents, that would increase the probability of a vehicle again demonstrating the problem during testing;
  - Recent incidents, where crash data recorders still retained incident records; and where drivers' accounts of the events were more complete;
  - Limited damage/unrepaired incidents, where potentially defective relevant components, such as throttle bodies and pedal assemblies had not been replaced with new components. If essential electronic components had been replaced, those vehicles would have been disqualified from testing; and
  - Drivable vehicles, where vehicles and vehicle systems were intact and able to be used for testing.
- Including vehicles that were repaired under the Toyota recall and subsequently allegedly experienced an unwanted acceleration event.

## 2.3 Procurement and Logistics Activities of Vehicles

Procurement and logistic activities included:

•

- 1. Identifying vehicles suitable for testing.
- Acquiring vehicles & repair history documentation. Test vehicles are pictured in Appendix D.
- 3. Transporting vehicles to the NHTSA VRTC.
- 4. Completing VRTC inspection and the Vehicle Characterization and Performance Study according to the test matrix.
- 5. Transporting vehicles to the NASA sites as required for additional electronics testing outside the scope of VRTC's performance study.

# 3.0 TEST METHODOLOGY

Test vehicles had various features and capabilities measured to discover whether factors other than electronics, studied separately, may contribute to instances of unintended acceleration.

All acquired vehicles were subjected to all characterization tests. Vehicle characterization efforts were divided into eight modules. Some modules documented vehicle history and confirmed fitness for test use. Other modules tested braking and acceleration performance under changing conditions. A central document file was created in both paper and electronic form. Module completion was tracked on a master matrix. Testing was completed on schedule. A copy of the schedule can be found in Appendix F. A copy of each blank test form used by technicians for all modules can be found in Appendix G.

## 3.1 <u>Module 1 - Level 1-Preliminary Inspection and Visual Verification</u>

This module began the processing of each vehicle and verified the basic information and condition of the vehicle. Vehicle features and options were documented along with a multitude of other visually verifiable items. Examples include but were not limited to: make, model, year, color, trim level, engine, vehicle identification number, mileage, tire type/tread depth, etc. Documentation from this module also identified whether the vehicle was acquired because it was a complaint vehicle (denoted with a "C") or a vehicle acquired for a design change comparison (denoted with a "D"). If it was identified as a complaint vehicle, this triggered the collection of other documents associated with the incident. In the event that a vehicle was exhibiting a malfunctioning or abnormal condition, this was recorded for corrective action in Module 2, 3, or 4.

## 3.2 <u>Module 2 - Level 2- Comprehensive Inspection and Electronic Interrogation</u>

In this module, significant interrogation of vehicle systems took place and results were recorded. Event data recorders (EDR) (installed in many supplemental restraint system [SRS] electronic control units) were downloaded and main electronic control unit (ECU) records were downloaded. Technical service bulletins repairs and recall fulfillment were verified. Accelerator pedal position sensor voltages and rates were measured. Transmission specifications, including mounting locations were documented. Repair history was researched. Functionality of vehicle systems was confirmed by a certified mechanic. Malfunctioning or abnormal conditions were either corrected during this module or they were scheduled for repair in Module 4 – Repairs and Restoration.

### 3.3 <u>Module 3 – Drivability Fitness</u>

Each vehicle was subjected to a test drive by a certified mechanic to determine if the vehicle was performing adequately. This included all relevant systems on the vehicle, with special emphasis on systems that were given authority over the accelerator control system, such as cruise control. If the vehicle was in the population receiving brake override reprogramming, then the presence of brake override was confirmed. Any deficiencies found would cause the vehicle to be scheduled for repair in Module 4 – Repairs and Restoration, unless it was a complaint vehicle that would need to be preserved in its original state. Examples of deficiencies would have been: worn wheel bearings, poor alignment, braking problems, electrical charging problems, etc.

#### 3.4 <u>Module 4 – Repairs and Restoration</u>

This module addressed all known deficiencies in a given vehicle that would otherwise have invalidated or compromised the performance of the vehicle during testing. Successful completion of the module confirmed that the vehicle was safe and nominally functional for testing. Had a vehicle been beyond reasonable repair, it would not have been approved for dynamic performance and electronics testing.

## 3.5 <u>Module 5 – Acceleration and Braking Assessment</u>

This module contained the dynamic portion of the testing that measured the effect of full throttle acceleration on the performance of braking. Here each vehicle underwent acceleration and braking performance tests to quantify the effectiveness of brake systems with and without the assistance of vacuum. Parking lot "drive-in" tests were also conducted to see whether additional engine power caused by the air conditioner compressor affected controllability. These parking lot tests showed no significant consequence to acceleration.

For the acceleration and brake testing, each vehicle was instrumented with a data acquisition system as shown in Figure 1 and Figure 2. The system recorded vehicle speed, vehicle longitudinal acceleration, brake pedal force, and brake pedal travel. Calibration certificates for test equipment used can be found Appendix I. In MY1996-2001 vehicles that utilized a cable

operated throttle, the output voltage of the throttle position sensor (TPS) was recorded. In MY2002-2006 and MY2007-2009 vehicles with ETCS, the output voltages generated by both the TPS sensors and the accelerator pedal position sensors (APPS) were recorded. This data acquisition system was used for all dynamic tests except for the cruise control tests.

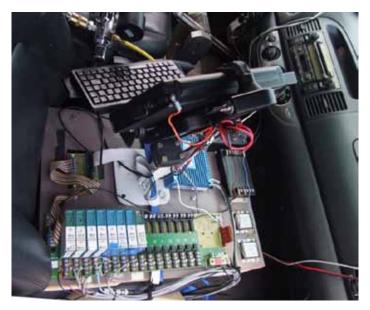


Figure 1 - Data Acquisition Equipment - Top View



Figure 2 - Data Acquisition Equipment - Side View

For the brake tests, each vehicle was fitted with a pneumatic brake actuation system installed to apply the brake pedal to a set force. The set point of the force was varied by changing the nitrogen pressure supplied to the pneumatic ram. The ram and force load cell were connected to the brake pedal by a magnet. This connection allowed for the driver to disengage the brake actuation system at any time in case of an emergency. The brake actuation system is shown in Figure 3 and Figure 4. This brake actuation system was installed for all dynamic tests except for the cruise control tests. This system was used to activate the brakes in most tests that required brake application except for the 100 - 0 mph panic stops. Manual braking by the driver was used during panic stops for safety reasons.



Figure 3 - Pneumatic Brake Ram Used in Testing



Figure 4 - Nitrogen Supply Tank and Solenoid Valves Used for Pneumatic Brake Ram Actuation

In every test the vehicle carried two technicians, a driver and a recorder. The driver maintained control of the vehicle and the recorder operated data logging test equipment and recorded test results.

#### 3.5.1 Acceleration Tests

Baseline acceleration test were conducted to measure the time and distance required by each vehicle accelerate from 0 - 100 mph under wide open throttle (WOT). Each vehicle had this baseline test conducted three times to allow for the variations in the one-half percent slope of the test surface.

#### 3.5.2 Acceleration Tests with Brakes Applied

A series of acceleration tests from 0 - 70 mph with the brakes applied was conducted for each vehicle. These tests were conducted using forces of the following values: 0 lbs., 15 lbs. (67N), 50 lbs. (222N), 112 lbs. (500N), and 225 lbs (1,000N).<sup>1</sup>

With the vehicle in a stationary condition, the nitrogen pressure of the brake actuation system was adjusted to obtain the desired brake apply force from the actuator. The data acquisition system was activated and the brake actuator applied. The transmission was then shifted to drive and accelerator was rapidly depressed to WOT. Technicians were instructed to terminate any given test if the vehicle failed to accelerate or if the vehicle began decelerating after forward movement had started. This was to prevent unnecessary damage to the transmission that would make the vehicle unavailable for the remaining performance tests.

#### 3.5.3 Braking Tests

Braking tests were conducted using brake pedal forces of the following values: 0 lbs., 15 lbs. (67N), 50 lbs. (222N), 112 lbs. (500N), and 225 lbs (1,000N) to measure stopping distances of each vehicle traveling at 65 miles per hour. These tests were conducted with 1) no acceleration, with and without vacuum assisted braking, 2) full acceleration with vacuum assisted braking, and 3) full acceleration without vacuum assisted braking.

<sup>&</sup>lt;sup>1</sup> 112 lbs (500N) is used as a standard maximum achievable braking force in CFR49 571.135. This value was adopted in part, for international harmonization of standards as noted in FR Volume 60/No. 22.

The tests were conducted with the driver controlling the accelerator pedal position and the recorder controlling the brake actuator system. The tests were started with a countdown to synchronize the accelerator and brake applications required for each test. Technicians were instructed to terminate any given test if stopping distance was indefinite (where the vehicle was not decelerating), to prevent unnecessary damage to the brakes.

Prior to each test, the brake temperatures were measured using an infrared thermometer and recorded to ensure that brakes did not have an initial temperature in excess of 300 degrees Fahrenheit. A cool down period between test runs was conducted if necessary to maintain maximum nominal brake performance without biasing from excessive heat.

- 1) **No Acceleration:** With the vehicle stopped, the nitrogen pressure of the brake actuation system was set to achieve the desired force. The vehicle was driven until speed was stabilized at approximately 70 mph. The data acquisition system was triggered to record, and a countdown was started. On the drivers signal, the brake system actuator was applied. To compensate for variances in stopping initiation timing, reported stopping distance measurements begin from a speed of 65 mph.
- 2) **Full Acceleration with Vacuum Assisted Braking:** With the vehicle stopped, the nitrogen pressure of the brake actuation system was set to achieve the desired force. The vehicle was driven until speed was stabilized at approximately 70 mph. The data acquisition system and countdown were started. On the drivers signal, the accelerator was fully depressed and the brake system actuator was applied.
- 3) **Full Acceleration without Vacuum Assisted Braking:** The source vacuum line was disconnected from the brake booster and plugged. The brake pedal was activated several times to deplete the brake booster of vacuum. This was done to simulate loss of vacuum caused by pumping the brake pedal several times with the throttle plate open. As the throttle plate opens, the engine in less able to replenish vacuum as would be the case with a UA event. With the vehicle stopped, the nitrogen pressure of the brake actuation system was set to achieve the desired force. The vehicle was driven until speed was stabilized at approximately 70 mph. The data acquisition system and countdown were

started. On the drivers signal, the accelerator was fully depressed and the brake system actuator was applied.

Braking tests were conducted on the "D" design change comparison vehicles using new friction materials and rotors, and these had been processed through appropriate burnishing procedures. Braking test conducted on the "C" complaint vehicles utilized the as received brake parts after passing a mechanical inspection. The rationale for this was to ensure each complaint vehicle was preserved in an as-received condition. Five of the vehicles submitted for testing were purchased subsequent to reprogramming by Toyota with brake override. This offered the opportunity to measure the software effectiveness in aiding the braking system when attempting to slow the vehicle during a full throttle event, though this feature was intentionally disabled (by disconnecting one brake switch wire) for some of the brake tests to measure maximum braking capabilities.

#### 3.5.4 <u>100 – 0 mph Panic Stop Tests</u>

At the beginning of each vehicle's brake test module and again at the end of the module, a 100-0 mile per hour panic stop was conducted to measure the permanent effect of the repeated brake tests on stopping capability. The brake actuator was not used for safety reasons. The vehicle was driven until speed was stabilized at approximately 100 mph. The data acquisition system was activated. The driver applied as much force to the brake pedal as possible, unless the vehicle was not equipped with an anti-lock brake system (ABS), in an attempt to stop the vehicle in the shortest amount of time.

#### 3.5.5 Brake Hold Tests

Another brake test performed was a brake hold test. A given amount of brake force was applied to a stationary vehicle. The accelerator was fully depressed, and brake force was slowly released until the vehicle began to move. The minimum brake force required to hold the vehicle stationary was recorded. This test was repeated with and without vacuum assist to the brakes.

#### 3.5.6 Cruise Control Tests

Functionality of the cruise control/speed control system was tested on every Camry in the test fleet. This test evaluated and documented the vehicle cruise control activation switch, as well as the set, cancel, and resume commands.

#### 3.6 <u>Module 6 – Gearshift Lever/Transmission Operation</u>

The ability to quickly disengage engine power from the wheels can be a valuable countermeasure to unwanted acceleration. Increased complexity in achieving neutral would not be helpful to a driver unfamiliar with the change in complexity. The gearshift pattern and required movements to achieve drive, neutral, reverse, and park were measured, photographed, and documented. Extra efforts, such as squeezing a button on the shifter to place the vehicle into any gear were also recorded. Transmission features, such as the number and type of mounts were also noted, and the numbers of forward gears were identified.

#### 3.7 <u>Module 7 – Ignition Switch Control Functionality</u>

The functions of the keyed ignition have remained relatively unchanged over the years, but a pushbutton ignition requires a driver to learn new procedures, not all of which are intuitive. With regard to an unwanted acceleration event, the most relevant of these new procedures is the emergency shutdown operation, because it offers the ability to remove the ignition source from a vehicle producing unwanted power. Complainants in some Toyota unwanted acceleration situations stated they were unable to turn off the engine. Therefore, the study identifies whether each vehicle used a traditional keyed ignition or a pushbutton ignition. Owner's manual instructions on the operation of each were verified. The functionality of the ignition switch control system was documented to assist in understanding its operation.

#### 3.8 <u>Module 8 – Pedal Positioning</u>

Module 8 measured the orientation, location, and operation of the accelerator and brake pedals in relation to the driver. Pedal interaction with the floor pan was characterized. Data included operator seating position relative to the steering wheel, pedals, and floor pan in the vehicle for comparison between model years.

Brake and accelerator pedal position measurements included the static step-over distance between the brake and accelerator pedal. Also measured was the critical vertical offset (CVO), which measures the maximum displacement where the vehicle will remain stationary with a given level of brake pedal force.

#### 3.8.1 Brake and accelerator pedal position

Accelerator and brake pedal locations were measured with respect to adjacent features of the vehicle including: other pedals, the floor pan, the steering column center line, the seat cushion centerline, the left vertical floor pan wall, and the right vertical floor pan wall. These measurements were recorded on all subject model years for comparison.

#### 3.8.2 Pedal Application Force versus Displacement

A pedal application robotic apparatus was constructed to actuate and displace the brake or accelerator pedal while measuring the linear displacement (see Figure 5 and Figure 6). The forces required to displace the accelerator and brake pedals were not linear, so dynamic force was also measured.



Figure 5 - Setup of Brake Pedal Force versus Displacement Device in a Typical Test Vehicle



Figure 6 - Setup of Brake Pedal Force versus Displacement Device in a Typical Test Vehicle - Close-up

## 3.8.3 Step-over Distance

Static step-over was measured in all test vehicles using the three-dimensional FARO scanning tool.<sup>2</sup> The scanning tool can be seen in Figure 7 and Figure 8. A profile of pedal locations was developed using the scanning tool for each vehicle with a resolution of approximately 0.052 mm.



Figure 7 - FARO Laser Scan Arm - Close-up



Figure 8 - FARO Laser Scan Arm Operating in Vehicle

<sup>&</sup>lt;sup>2</sup> Vehicle pedal dimensions were taken with a laser scan tool and then digitized to acquire all critical dimensions. The laser scan tool is illustrated in figures in this section of the report. The scan tool is trade named FARO Arm. The FARO Arm is m/n P10, rev 22.7 s/n: P010-05-06-04789, Two different laser probes were used in the project: Version 2, m/n Na, s/n: LLP000602501 and Version 3, m/n Na, s/n: LLP000804330 (no Model No. available). The software used to do the scanning, take the dimensions, and create the layouts was Polyworks Version 11 (InnovMetric Software).

#### 3.8.4 Critical Vertical Offset (CVO)

CVO is determined in a dynamic test that dimensionally compares the actuation of the brake pedal to the actuation of the accelerator pedal. Like the static step-over, it is a measure of the distance from the brake pedal face to the accelerator pedal face, but unlike the static step-over, the CVO also quantifies the effects of dual pedal applications by measuring the amount of pedal displacement, determined when the engine torque overcomes the brake torque.

The procedure involved placing a plate over the brake pedal. The plate extended to just above the accelerator with a threaded rod protruding from the plate down towards the accelerator. The device is shown in Figure 9 and Figure 10.



Figure 9 - Critical Vertical Offset Device with Brake Pedal Force Load Cell Attached



Figure 10 - Critical Vertical Offset Device Clamped on Brake Pedal with Offset Device Contacting Accelerator Pedal - Close-up

The stationary vehicle was placed into gear and the brake was initially depressed with a constant 20 pounds of force. The threaded rod was adjusted to push into the accelerator pedal until the vehicle began to move. At this point, the CVO distance was recorded as a positive value. The test was repeated with 40 and 60 pounds of brake force. The CVO device was limited to measuring a minimum of 0.5 inches and a maximum of 2.5 inches in 0.25 inch increments. Therefore any value of 0.5 inches indicated a value CVO that was 0.5 inches or less. If a CVO was negative, this device was unfortunately not capable of reading below 0.5 inches. The tests were conducted in both drive (1<sup>st</sup> gear) and in reverse. Documentation also included pedal construction and material.

#### 3.8.5 Floor Pan Contours

Contours and dimensional measurements of the floor pan and associated protective materials and pedal interaction with the floor pan were described and documented. These measurements were also performed using the three-dimensional FARO scanning tool.<sup>3</sup> The propensity for the interaction between the floor pan and accelerator pedal to lead to pedal entrapment was evaluated

<sup>&</sup>lt;sup>3</sup> Vehicle pedal dimensions were taken with a laser scan tool and then digitized to acquire all critical dimensions. The laser scan tool is illustrated in figures in this section of the report. The scan tool is trade named FARO Arm. The FARO Arm is m/n P10, rev 22.7 s/n: P010-05-06-04789, Two different laser probes were used in the project: Version 2, m/n Na, s/n: LLP000602501 and Version 3, m/n Na, s/n: LLP000804330 (no Model No. available). The software used to do the scanning, take the dimensions, and create the layouts was Polyworks Version 11 (InnovMetric Software).

using a series of attributes that are believed to mitigate or aggravate instances of pedal entrapment including:

- Spring return force;
- Pedal hinging methods;
- Geometric interaction with the floor pan; and
- Positive backstop location.

Original carpeted floor mats and all-weather floor mats were placed in various orientations in the driver's foot well area to determine whether an interference condition with the accelerator pedal actuation could occur.

## 4.0 <u>RESULTS</u>

## 4.1 <u>Results Module 1 - Level 1-Preliminary Inspection and Visual Verification-Master</u> <u>Matrix</u>

The Toyota Camrys selected and procured for testing are listed in Table 1 below. Pictures of test vehicles are available in Appendix D. Appendix E1 lists the status of each vehicle with regard to Module 1.

Vehicle Identifier C = Complaint	Vehicle	Vehicle							
D = Design	Location Status	Model Year	Vehicle Model	Trim Level	Vehicle Color	Engine	VIN	ODI VOQ#	Mileage
1D	VRTC	2002	Camry	SE	Silver	V6	4T1BF30K02UXXXXXX	No	125331
2D	VRTC	2002	Camry	XLE	Dark Gray	L4	4T1BE32K82UXXXXXX	No	69721
3D	VRTC	2001	Camry	LE	White	L4	JT2BG22KX10XXXXXX	No	94006
4D	VRTC	2007	Camry	SE	Red	L4	4T1BE46K574XXXXXX	No	89964
5D	VRTC	2006	Camry	LE	Silver	L4	4T1BE32K96UXXXXXX	No	55319
6D	VRTC	2007	Camry	LE	Green	L4	4T1BE46K57UXXXXXX	No	161690
7D	Goddard	2005	Camry	XLE	Gray	L4	4T1BE32K65UXXXXXX	No	69634
8D	VRTC	2001	Camry	XLE	Champaign	V6	4T1BF28K31UXXXXXX	No	88651
9D	VRTC	2005	Camry	LE	Charcoal	V6	4T1BF32K55UXXXXXX	No	69649
10D	VRTC	2007	Camry	LE	Green	V6	4T1BK46K97UXXXXXX	No	53322
11D	Goddard	2005	Camry	XLE	Silver	V6	4T1BF30K55UXXXXXX	No	65199
12C	EMI Facility	2007	Camry	XLE	Burgundy	V6	JTNBK46K073XXXXXX	10319201	44673
13C	EMI Facility	2002	Camry	XLE	Champaign	V6	4T1BF30K92UXXXXXX	10319308	195266
14C	EMI Facility	2004	Camry	XLE	Champaign	V6	4T1BF30K34UXXXXXX	10321093	77739
15C	EMI Facility	2003	Camry	XLE	Deep Purple	L4	4T1BE32K33UXXXXXX	10283433	52773
16C	VRTC	2009	Camry	NA	Blue	L4	4T1BE46K39UXXXXXX	10326631	23763
17C	VRTC	2004	Camry	LE	Champaign	L4	4T1BE32K64UXXXXXX	10316061	47776
18C	EMI Facility	2004	Camry	LE	Blue	L4	4T1BE32K04UXXXXXX	10327490	61039
19C	EMI Facility	2007	Camry	LE	Gray	L4	4T1BE46K27UXXXXXX	10326416	37385
20C	VRTC	2004	Camry	LE	Tan	L4	4T1BE32K64UXXXXXX	10290867	54822

**Table 1 - Test Vehicles and Identification Key** 

Included in this table were identifiers for vehicle year, trim level, color, and engine size. The vehicle identification number was partially redacted to protect personal identification of the former consumers. Additional information in the table included the inventory number, where a

"C" indicated the vehicle was a complaint vehicle in the NHTSA database. If the vehicle was associated with a complaint, the NHTSA complaint number was provided. A "D" indicated the vehicle was procured because it was the first or last year of a major model or technology change. Vehicles denoted with a "D" had no history associated with a specific complaint of unwanted acceleration. The table also lists mileages at the time of acquisition. Table 2 indicates Camry model changes, along with corresponding engine and transmission information.

<b>a</b>		i in this Report
Generation	Designation/Production	Engine/Transmission/Remarks
(GEN)	Model Year	
4	Camry (V20) 1996-2001	133 HP, L4-2.2L (5S-FE), A/T A140E
		192 HP, V6-3.0L (1MZ-FE), A/T A541E
5	Camry (V30) 2002-2006	157 HP, L4-2.4L (2AZ-FE), A/T U250E
		192 & 210 HP V6-3.0L (1MZ-FE), A/T U151E
		225 HP, V6-3.3L (3MZ-FE), A/T U151E
		Introduction of Electronic Throttle Control
6	Camry (V40) 2007-	158 HP, L4-2.4L (2AZ-FE), A/T U250E
	Present	268 HP, V6-3.5L (2GR-FE), A/T NR
		Introduction of Controller Area Network Bus

Table 2 - Engines, Transmissions, and Nomenclature for Toyota CamrysUsed in this Report

# 4.2 <u>Results Module 2 - Level 2- Comprehensive Inspection and Electronic Status</u> <u>Interrogation</u>

All published records such as technical service bulletins (TSB), safety recalls, and repair campaigns that were identified as potentially related to accelerator control systems or that could affect engine performance were collected and researched. Figure 11 lists the associated document titles. Appendix E2 lists the status of each vehicle with regard to Module 2.

Safety Recalls and Technical Service Bulletins Relating to Vehicle Acceleration Performance 01V012000 10V012000 NHTSA01V012000 90L SB0001-1-O2 CIRCUIT SB0064-10 REFLASH SB039709R1 CARPET GROMMET SCA0A Accelerator Pedal Sticking Special Service Campaign 10A Special Service Campaign AOA SS002-07 Engine Reflash SS002-07 01-08 All SS00207 Tech Stream Reflash Program SSC90L Floor Mat/Accelerator Pedal SSC90L Floor Mat Pedal Interference TSB0064-10 ECU Reflash Procedure TSB0373 0 All

Figure 11 - Technical Service Bulletins (TSBs), Safety Recalls, and Repair Campaigns

#### 4.3 <u>Results Modules 3 and 4 -Drivability Fitness/Repairs and Restoration</u>

No significant drivability deficiencies were found in any of the vehicles that would disqualify them from testing. Tires were replaced on two non-complaint vehicles to assure safety during high-speed testing. For non-complaint vehicles, brake components and friction material conditions were unknown, therefore non-complaint vehicles were replaced with new materials and a standard brake burnish procedure was performed to assure best-case conditions. No changes were made to complaint vehicles however, to preserve them in their as-received condition. Appendix E3 and E4 list the status of each vehicle with regard to Modules 3 and 4. Burnish and repair information is listed by vehicle below in Table 3.

	Brakes and I	Burnish	Did a	epair?			
TF106	Were brake components replaced prior to burnish?	Was a brake burnish completed?	Engine	Drivetrain	Electrical	Body	Was any normal service required?
1D	Yes	Yes	No	No	No	No	No
2D	Yes	Yes	No	No	No	No	No
3D	Yes	Yes	Yes	No	No	No	No
4D	Yes	Yes	No	No	No	No	No
5D	Yes	Yes	No	No	No	No	No
6D	Yes	Yes	No	No	No	No	No
7 <b>D</b>	Yes	Yes	No	No	No	No	No
8D	Yes	Yes	No	No	No	No	No
9D	Yes	Yes	No	No	No	No	No
10D	Yes	Yes	No	No	No	No	No
11D	Yes	Yes	No	No	No	No	No
12C	No	No	No	No	No	No	No
13C	No	No	No	No	No	No	No
14C	No	No	No	No	No	No	No
15C	No	No	No	No	No	No	No
16C	No	No	No	No	No	No	No
17C	No	No	No	No	No	No	No
18C	No	No	No	No	No	No	No
19C	No	No	No	No	No	No	No
20C	No	No	No	No	No	No	Yes - Oil change

 Table 3 – Burnish and Repair Information

## 4.4 <u>Results Module 5 – Acceleration and Braking Assessment</u>

Following are the results for performance of the cruise control, acceleration, and braking systems.

## 4.4.1 <u>Cruise Control Testing</u>

The complete matrix of test results can be found in Appendix E5D. The following are the results of the cruise control functionality testing:

- 1. The master cruise switch illuminated and extinguished the cruise light when depressed.
- If the cruise light was on and the ignition was turned off, the cruise light turned off in MY2001-2006 and MY2007-2009 and would not turn back on. In MY1996-2001 Camrys, the cruise light turned back on with the ignition.

- 3. Unless the master cruise switch was enabled, no cruise functions had an effect on the vehicle.
- 4. All tested vehicles disengaged cruise control immediately when the brakes were depressed.
- 5. All tested vehicles disengaged cruise control immediately after the "Cancel" feature was commanded.
- 6. All tested vehicles resumed to the set 60 mph value after tapping the brake, slowing to 35 mph, and depressing "Resume".
- 7. Most cruise control resume functions were sufficiently aggressive to downshift into a lower forward gear when resuming to 90 mph from 60 mph.
- 8. When the "Accel" function was commanded after having set the cruise control, all vehicles capable of reaching 120 mph achieved that speed. At least one vehicle, 3D was not capable of this speed.
- 9. When shifted to neutral, cruise control disengaged on all vehicles.
- 10. When downshifted, cruise control disengaged on all vehicles.
- 11. While maintaining a set cruise control speed of 50 mph, then accelerating to 60 mph, followed by a coast down, the cruise control automatically resumed when the vehicle slowed to 50 mph and maintained the speed in all test vehicles.
- 12. After setting cruise control to 60 mph, then turning the master cruise switch off and back on, pressing "Resume" did not resume cruise control.

#### 4.4.2 Brake Hold Test

The results, given in Table 4, indicate that vacuum multiplied the effective force with a gain of approximately 5-6 times, with some reaching much higher gains. Also noted is whether the brake pedal lever was one of two configurations found on Toyota Camrys: single linkage or double linkage.

Vehicle Information								Brake Hold at Wide Open Throttle		
<b>Engine</b> Transmission								Brake Pedal Force Required (lbs.)		
Veh. ID.	Model	Trim Line	MY	Config.	Displacement	Fwd Speeds	Brake Pedal Single or Double Linkage	Full Vacuum	No Vacuum	
1D	CAMRY	SE	2002	V6	3.0L	4	S	26.2	154.5	
2D	CAMRY	XLE	2002	L4	2.4L	4	D	22.0	141.8	
3D	CAMRY	LE	2001	L4	2.2L	3	S	25.5	147.5	
4D	CAMRY	SE	2007	L4	2.4L	5	S	24.9	193.0	
5D	CAMRY	LE	2006	L4	2.4L	5	D	15.4	234.3	
6D	CAMRY	LE	2007	L4	2.4L	5	S	25.3	138.1	
7D	CAMRY	XLE	2005	L4	2.4L	5	D	29.8	167.1	
8D	CAMRY	XLE	2001	V6	3.0L	4	S	32.5	158.1	
9D	CAMRY	LE	2005	V6	3.0L	5	D	43.6	268.2	
10D	CAMRY	LE	2007	V6	3.5L	6	S	30.9	217.8	
11D	CAMRY	XLE	2005	V6	3.0L	5	S	25.7	236.0	
12C	CAMRY	XLE	2007	V6	3.5L	6	S	22.1	148.6	
13C	CAMRY	XLE	2002	V6	3.0L	4	S	22.3	173.2	
14C	CAMRY	XLE	2004	V6	3.0L	5	S	17.8	167.9	
15C	CAMRY	XLE	2003	L4	2.4L	4	D	27.9	152.3	
16C	CAMRY	-	2009	L4	2.4L	5	S	15.0	86.7	
17C	CAMRY	LE	2004	L4	2.4L	4	D	21.1	153.8	
18C	CAMRY	LE	2004	L4	2.4L	4	D	29.9	176.8	
19C	CAMRY	LE	2007	L4	2.4L	5	S	28.3	192.0	
20C	CAMRY	LE	2004	L4	2.4L	4	D	28.1	197.9	

Table 4 –	Brake	Hold	Test	Results
1 aute 4 –	DIANC	HUIU	1 C31	ICSUILS

#### 4.4.3 Braking Tests From 65 MPH

Tests were conducted to measure the ability to stop a vehicle from high speeds under different circumstances such as: loss of vacuum, full engine power, and differing levels of brake pedal force. There were test situations when the accelerator was being fully depressed during braking and the applied brake force was insufficient to stop the vehicle and the test was suspended. This

was also the case when the vehicle reached a slow enough speed to downshift to first gear, where the engine torque was sufficient to overcome the prescribed brake force.

With full vacuum, all test vehicles were able to be stopped, or nearly stopped, from a wide open throttle condition with 112 pounds or less of brake pedal force. These tests also revealed that in extreme situations where the vacuum booster was depleted (where the brakes were pumped more than once) and the engine was producing power (the throttle plate was open), a driver sometimes was unable to stop the vehicle, depending on physical capability and braking technique. Stopping distances under multiple circumstances for each vehicle were measured. Appendices E5A and E5B contain tables and graphs of the performance of each vehicle in each circumstance. An example of the comparison of the effects of these variables in a single test vehicle (with brake override disabled) can be seen in terms of stopping time in Figure 12 below. Figures in Appendices E5a and E5B list stopping distance rather than stopping time because the distance traveled better illustrates the physical, positional effects on the vehicle.

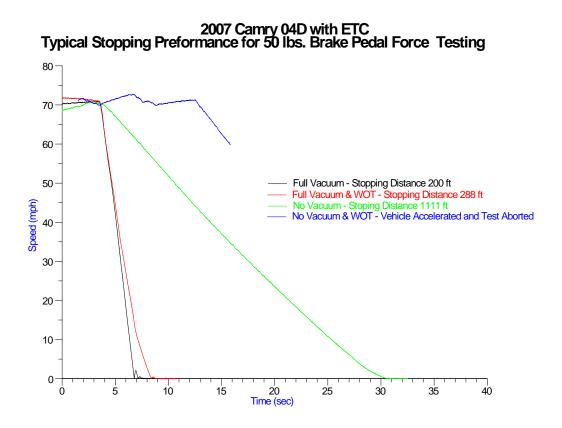


Figure 12 - Comparison of the Effects of Variables in a Single Test Vehicle

Five of the tested vehicles were reprogrammed with "Brake Override" software (Camrys: 4D, 6D, 10D, 16C, and 19C). This programmed function used the brake pedal switch to detect the application of the brake. In the event the accelerator pedal was also already being applied, the program electronically reduced engine power by lowering throttle plate voltage, regardless of accelerator pedal application, until the brake pedal was released. The event was illustrated in Figure 13 below involving a test of Camry 19C, a 2007 L4 Toyota Camry. Approximately 0.4 seconds after the brake pedal was applied, the throttle voltage was reduced to a minimum even though the accelerator pedal was still depressed and commanding full acceleration. This feature was effective at mitigating extended stopping distances during full throttle testing with no vacuum. Brake override in these test vehicles was sequence dependent. In the event the brake was applied prior to the accelerator pedal application, the brake override software did not execute. This conditional functionality would allow for situations where the driver would need to hold the car with the brake while accelerating, in cases such as hill starts. In stopping distance testing from 65 mph, brake override was intentionally disabled in vehicles 6D, 16C, and 19C in order to measure baseline performance without the brake override feature. Vehicles 4D and 10D were tested both with and without brake override to compare stopping distances among single vehicles. When brake override was activated, stopping distances were predictably shorter than without brake override. Refer to Appendix E5B for graphical illustrations of stopping distances. It should be noted that in brake tests where the accelerator pedal was depressed, the rate of deceleration was reduced, and sometimes reversed, when the vehicles shifted to lower gears capable of producing greater wheel torque.

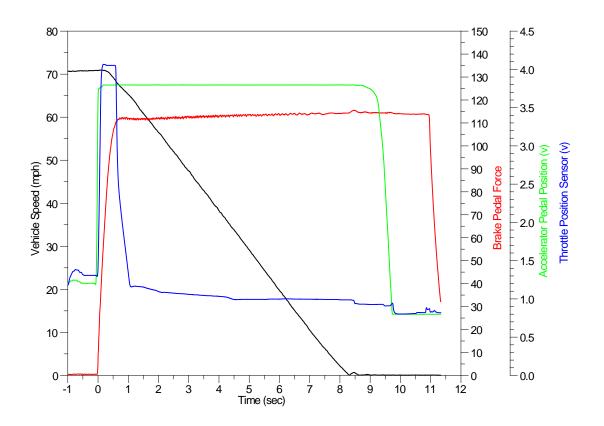


Figure 13 – 70 to 0 mph Brake Stop with 112 lbs Brake Pedal Force and Accelerator Command Wide Open Throttle (WOT)

#### 4.4.4 0-70 MPH Acceleration Performance Tests

Vehicle accelerations with varying levels of brake efforts were recorded. As expected, increasing amounts of brake force caused an increasing amount of time required to reach 70 mph, though some vehicles were not capable of reaching 70 mph with the given brake pedal force being applied. The graphical results of these tests can be seen in Appendix E5B.

#### 4.4.5 Four Percent, Five Degree Throttle Open Test

The VRTC conducted tests on four Toyota Camrys to determine the effects of a five degree increase in throttle with the vehicle stopped, with and without the brake pedal depressed. Five degrees is also equivalent to four percent of the five volt reference voltage measured at VTA1, which is the voltage returning from the throttle body. For the tests where the brake pedal was

depressed, the force on the brake pedal was adjusted to a value just sufficient to prevent vehicle movement. The effects measured and reported were peak longitudinal acceleration, followed by instantaneous longitudinal acceleration and distance traveled at three time intervals (1, 2 and 3 seconds) after the throttle increase. Results can be seen in Table 5 below.

To conduct the testing, an adjustable mechanical device was attached to the accelerator pedal that functioned as a travel limiter. With the vehicle in drive, the device was adjusted so that the throttle would open an additional 5 degrees when the pedal was depressed.

The tests were conducted to determine what brake pedal force was required to prevent vehicle movement on Camry 12C (2007 V6) with the 5 degree throttle increase, and the force threshold was found to be 8.5 pounds.

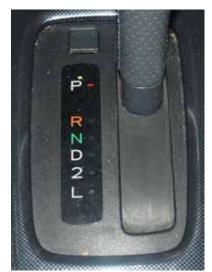
				From 0	mph with	brake					From 0	mph witho	ut brake			Peak Accel
	Peak	Brake		Distance	•		Accel		Peak		Distance			Accel		from 30 mp
Vehicle ID	Accel	pedal force	at t=1 sec	at t=2 sec	at t=3 sec	at t=1 sec	at t=2 sec	at t=3 sec	Accel	at t=1 sec	at t=2 sec	at t=3 sec	at t=1 sec	at t=2 sec	at t=3 sec	without brake
	(2)	(Ibs)	(feet)	(feet)	(feet)	(c)	(c)	(c)	(4)	(feet)	(feet)	(feet)	(4)	(c)	6	(g)
Cam07D '05 L4	0.12	4	1	5	11	0.11	0.07	0.05	0.22	3.8	13	25	0.16	0.1	0.08	
Com110-05-V61	0.19	*	4.4	8	20	0.17	6.3	0.16	0.33	3.1	13	37	0.19	0.19	0.16	
Cam04D '07 L4	0.16	5	1.6	6.7	14	0.13	80.0	0.05	0.24	3.6	12	24	0.14	0.09	0.05	
Cam12C '07 V6	0.17	4	1.5	6.8	15	0.13	0.1	0.07	0.23	3.7	13	25	0.17	0.12	0.09	0.054

 Table 5 –4%/5 Degree Throttle Increase Effects

#### 4.5 <u>Results Module 6 – Gearshift Lever/Transmission Operation</u>

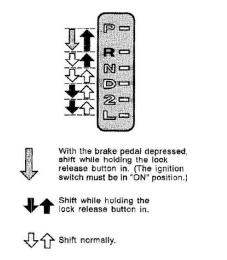
With the introduction of the new model in 2002, the Toyota Camry V6 automatic transmission shifting pattern changed. Figures 14, 15, and 16 illustrate the gearshifts and shift patterns. Beginning in 2007, instead of requiring a button press to release the vehicle from park, the operator was now required to move the shifter in a lateral direction, followed by the traditional longitudinal motion. A manual sport shift gate was introduced in some 2006 models. In 2007, the shift pattern became increasingly complex by introducing another required lateral motion. In test vehicles, the four cylinder vehicles did not feature an incremental shift gate (sport shift) and remained there unless the driver moved it back into drive. From the detente sport shift gate, it was not possible to shift the vehicle to neutral or park with only a longitudinal movement. The

gearshift needed to first be moved laterally, back to drive, where it could then be moved longitudinally into neutral.



Gear Shift Gate

MY1996-2001

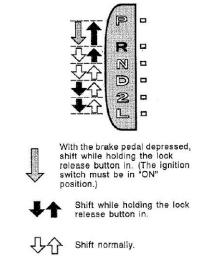


4 and 6 Cylinder Shifting Instruction

Figure 14– MY1996-2001 L4 and V6 Engine, Automatic Transmission Gearshift and Shift Patterns

#### MY2002-2006





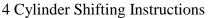
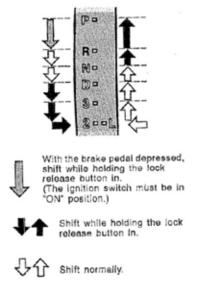


Figure 15 – MY2002-2006, L4 Engine, Automatic Transmission Gearshift and Shift Pattern







The results showed that unlike MY1996-2001 Camrys and L4 MY2002-2006 Camrys, the gear position labels were not immediately adjacent to the position of the gearshift when placed in the corresponding gear for all MY2002-2006 V6 Camrys and all MY2007-2009 Camrys. Again, this can be seen in Figures 17 and 18.

#### MY2007-2009



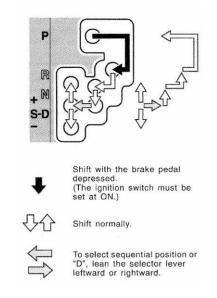
4 Cylinder Gear Shift Gate

Shift with the brake pedal depressed. (The ignition switch must be set at ON.)

4 Cylinder Shifting Instructions

Figure 17 - MY2007-2009, L4 Engine, Automatic Transmission Gearshift and Shift Pattern





6 Cylinder Gear Shift Gate 6 Cylinder Shifting Instructions Figure 18 - MY2007-2009, V6 Engine, Automatic Transmission Gearshift and Shift Pattern

Test findings include that all cars tested: 1) disengaged the engine from the transmission and drive wheels in less than one second when placed in neutral; 2) required a brake application to shift out of park; 3) used a mechanical linkage between the shifter and transmission, and 4) did

not change the direction of rotation in the drive train when the shift lever was placed in reverse. Additional results regarding operation of the transmission are summarized in Table 6 below.

		Model year	
	1996 - 2001	2002 - 2006	2007 - 2009
Gear position labels adjacent to shifter position	Yes	Yes	No
Type of mechanism to shift from park	Pushbutton	Pushbutton	Gate
Brake required to shift out of park	Yes	Yes	Yes
Gear engagement time	< 1 sec	< 1 sec	< 1 sec
Mechanical connection of shift lever to transmission	Yes	Yes	Yes
Shift to neutral at 20 mph	< 1 sec	< 1 sec	< 1 sec
Gear engaged when shift to reverse at 20 mph	Reverse	Neutral	Neutral
Engine stall with shift to reverse at 20 mph	Yes	No	No
No. of engine mounts	5	4	4
Rubber mounts	2	2	1
Fluid mounts	2	2	3

 Table 6 – Operation of Automatic Transmission Summary

### 4.6 <u>Results Module 7 – Ignition Switch Control Functionality</u>

The ignition control mechanisms changed with the introduction of the 2007 model year equipped with an optional pushbutton ignition (See Figure 19). With a traditional key, the driver was able to turn the key counterclockwise one detent position to the accessory position to immediately cause ignition to cease, consequently depowering the engine. With the introduction of the pushbutton ignition, a conditional functionality was introduced. The pushbutton turned the engine on and off nearly instantly, but only if the vehicle was not in motion. If the vehicle was in motion, as it would be during an unwanted acceleration event, the vehicle computer would ignore the pushbutton tap request. Rather, an alternate procedure required the pushbutton be depressed for three seconds. While this was explained in the manual, it was stated in the context of a caution, advising the operator against the action. It should be noted that not all encountered situations on the road afford three seconds to wait for the engine to cease power.



# Figure 19 - Pushbutton Ignition Option in 2007 Toyota Camry

Other ignition control characteristics are listed below in Table 7 that highlight the functional changes accompanying the introduction of the pushbutton as it is compared to the traditional key.

		Mode	l Year		
	1996 - 2001	2002 - 2006	2007 - 2010	2007 - 2010	
Ignition Type	Key	Key	Key	Pushbuttor	
Engine Start in Park w/o Brake	Yes	Yes	Yes	No	
Engine Start in Neutral	Yes	Yes	Yes	Yes	
Engine Start in Neutral w/o Brake	Yes	Yes	Yes	No	
Engine Start in Drive	No	No	No	No	
Engine Start in Reverse	No	No	No	No	
Key Can Be Removed in Gear	No	No	No	N/A	
Alarm on Door Open – Running	No	No	No	No	
Alarm on Door Open - Not running	Yes	Yes	Yes	No	
Wheel Locked With Key Off in Park	No	No	No	N/A	
Wheel Locked With Key Off in Gear	No	No	No	N/A	
Vehicle Restart in Drive – Moving	No	Yes	Yes	No	
Vehicle Restart in Neutral – Moving	Yes	Yes	Yes	Yes*	
Wheel Locked with Button Pushed to Off in Park		N/A		Yes	
Wheel Locked with Button Pushed to Off if other than Park		N/A		No	
Engine Start with Single 1-sec Button Push in Park		N/A		Yes	
Engine Stop with Single 1-sec Button Push in Park		Yes			
Engine Stop with Single 1-sec Button Push in Drive -		Yes			
Engine Stop with Single 1-sec Button Push in Drive -		No			
Engine Stop with Single 3-sec Button Push in Drive -		Yes			
Key Fob Required to be Inside Passenger Compartment		N/A			
Ignition Functions Operate with Key Fob Outside After		No			
Ignition Functions Operate with Key Fob Outside After		N/A			
All Ignitions Functions Detailed in Owner's Manual		Yes∧			
Button Functions Correspond to Owners's Manual		N/A			

**Table 7 – Documented Functional Changes** 

\* = Brake pedal must be at least lightly applied.

^ = Shutdown procedure states "Do not touch..."

N/A = Not Applicable

#### 4.7 <u>Results Module 8 – Pedal Positioning</u>

Parameters were measured and evaluated to determine if any scenarios exist that could cause a dual pedal application or a pedal misapplication, where the driver applies either both pedals or the wrong pedal.

The potential for pedal entrapment, specifically due to interference from objects such as floor mats was evaluated using a series of attributes that are believed to mitigate or aggravate instances of pedal entrapment including: spring forces, pedal hinging methods, geometric interaction with the floor pan, and pedal positive backstop location.

Parameters that were measured are evaluated in the following sections:

- 1. Evaluation of static step-over
- 2. Evaluation of critical vertical offset (CVO)
- 3. Evaluation of lateral separation of pedals as a function of model
- 4. Changes in accelerator pedal responsiveness
- 5. Changes in accelerator pedal "force versus deflection" curves
- 6. Potential for accelerator pedal interaction with various floor mats & entrapment potential
- 7. Evaluation of dimensional change between models with respect to with respect to driver position

#### 4.7.1 Evaluation of Static Step-over

Static step-over is the at-rest distance between the brake pedal face and the accelerator pedal face. A larger difference in these values serves to mitigate the propensity for the driver to apply both pedals with a single foot. A high step-over also requires the driver to retract their foot farther to apply the brake than to apply the accelerator. However, an excessively large step-over value can also extend braking reaction time. An example of the measured pedals image in one of the test vehicles is shown in Figure 20. In this vehicle, the pedals were not parallel, but the average measurement at the center of the pedals yielded essentially the same value. Fourteen of the 20 test vehicles exhibited a brake pedal that was slightly twisted toward the left, which was presumed to have been caused by the brake test fixture used during the panic stop testing, where forces exceeded 400 pounds. Despite this twisting plastic deformation, static step-over values are accurate because they measured the average height of the surface of the pedal, which remained near to the neutral axis of the bend. Table 8 lists the static step-over values for each

vehicle. The average static step-over value for MY1996-2001 was 41.5 mm, MY2002-2006 was 35.7 mm, and MY2007-2009 was 39.5 mm,

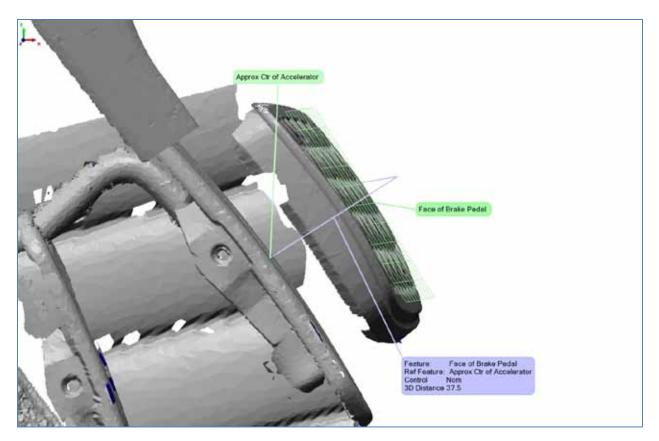


Figure 20 - Measured Pedal Image Illustrating Static Step-over Dimension for Vehicle 1D

Vehicle	Year/Engine	Static Step-over (mm)
1D	02v6	37.5
2D	02L4	40.2
3D	01L4	45.5
4D	07L4	35.1
5D	06L4	34.7
6D	07L4	34.9
7D	05L4	34.3
8D	01v6	37.5
9D	05v6	38.8
10D	07v6	43.4
11D	05v6	39.5
12C	07v6	42
13C	02v6	35.9
14C	04v6	39.9
15C	03L4	21.4
16C	09L4M	41.7
17C	04L4	33.4
18C	04L4	33.8
19C	07L4	39.6
20C	04L4	39.5

**Table 8 – Static Step-over** 

#### 4.7.2 Evaluation of Critical Vertical Offset and Lateral Separation

A higher CVO dimension indicated that the operating ranges of the accelerator and brake pedals were farther apart and therefore less likely to result in dual pedal application. This would be expected to reduce the potential for unwanted acceleration events caused by dual pedal applications. The test was repeated with 20, 40, and 60 pounds of brake force. The CVO device was limited to measuring a minimum of 0.5 inches and a maximum of 2.5 inches in 0.25 inch

increments. Therefore any value of 0.5 inches indicated a CVO value that was 0.5 inches or less. If a CVO was negative, this device would not have been capable of indicating the negative value. The tests were conducted in both drive (1<sup>st</sup> gear) and in reverse. The results are shown in Figure 21, Figure 22, and Figure 23 for 20, 40, and 60 pounds of brake pedal force respectively, which were plotted against the lateral separation of the two pedals. Lateral separation was measured as the open-space distance from the right edge of the brake pedal to the left edge of the accelerator pedal. A small lateral separation distance would increase the potential to have a one-foot, dual pedal application or pedal misapplication. A large lateral separation could reduce reaction time during normal brake applications. In Figures 21, 22, and 23 it can be seen that Toyota Camrys typically exhibited a 0.5 inch or less CVO with 20 pounds of brake force. With 40 and 60 pounds of brake force, the CVO on the test vehicles increased.

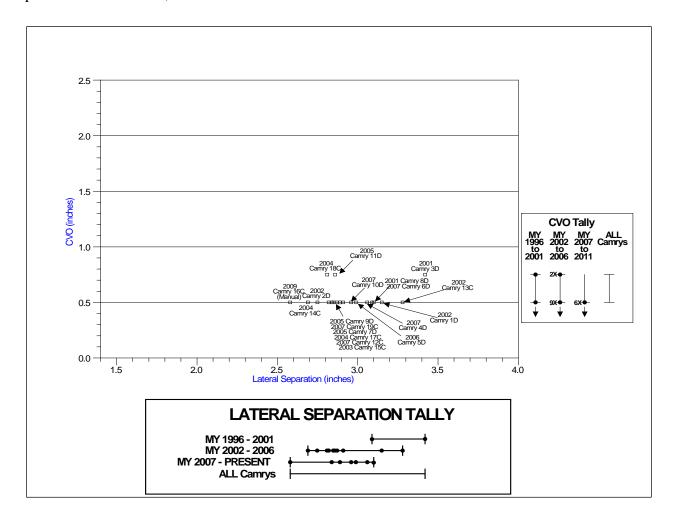


Figure 21 - 20 Pounds of Brake Pedal Force - Critical Vertical Offsets and Lateral Separations

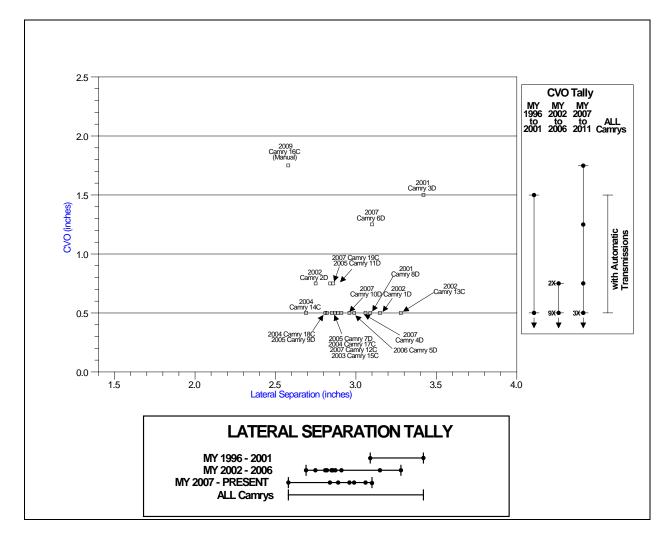


Figure 22 - 40 Pounds of Brake Pedal Force - Critical Vertical Offsets and Lateral Separations

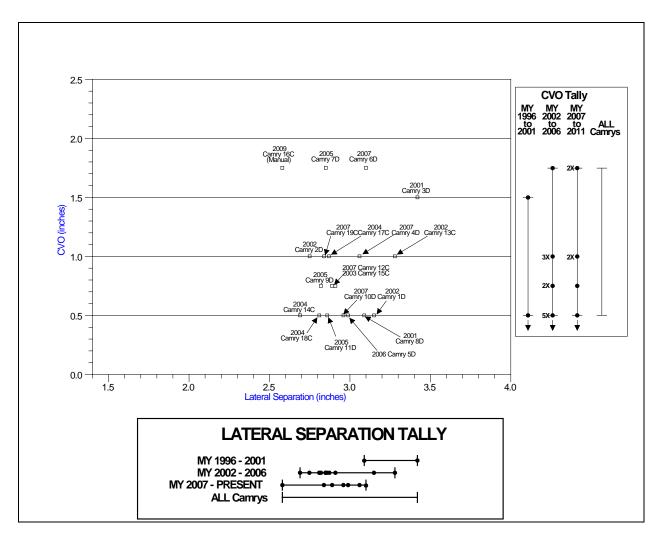


Figure 23 - 60 Pounds of Brake Pedal Force - Critical Vertical Offsets and Lateral Separations

In addition to pedal dimensions, brake and accelerator pedal responsiveness both change the CVO value. While brake pedal responsiveness remained largely unchanged from model year to model year, accelerator pedal responsiveness increased significantly, with the largest incremental change occurring in 2002 with the introduction of the electronic accelerator pedal.

Lateral separations for each vehicle are listed below in Table 9. Table 10 groups and averages these values by model generation. From the group of test vehicles, the average lateral separation was reduced from 3.25 inches in 2001 vehicles to 2.87 inches in MY2002-2006 test vehicles for an average change of 0.38 inches. MY2007-2009 test vehicle averages increased over MY2002-2006 by 0.10 inches. In relation to the center of the steering column, brake pedal lateral location has not changed significantly. However, accelerator pedals in MY2002-2006 test vehicles did on average move closer to the steering center by 0.67 inches from MY1996-2001vehicles as can

be seen in Table 11. Average measured MY2007-2009 vehicle accelerator pedals were similar to MY2002-2006 vehicles with only a 0.04 inch increase in distance from the steering center.

Vehicle	Right Edge of Brake Pedal to Left Edge of Accelerator Pedal in			
	Millimeters	Inches		
3D 2001 Camry LE L4	86.9	3.42		
8D 2001 Camry XLE V6	78.4	3.09		
13C 2002 Camry XLE V6	83.3	3.28		
1D 2002 Camry SE V6	80.0	3.15		
2D 2002 Camry XLE L4	69.8	2.75		
15C 2003 Camry XLE L4	74.0	2.91		
14C 2004 Camry XLE V6	68.2	2.69		
18C 2004 Camry LE L4	71.3	2.81		
20C 2004 Camry LE L4	63.1	2.48		
17C 2004 Camry LE L4	72.9	2.87		
7D 2005 Camry XLE L4	72.4	2.85		
11D 2005 Camry XLE V6	72.6	2.86		
9D 2005 Camry LE V6	71.6	2.82		
5D 2006 Camry LE L4	75.9	2.99		
6D 2007 Camry LE L4	78.8	3.10		
12C 2007 Camry XLE V6	73.3	2.89		
4D 2007 Camry SE L4	77.7	3.06		
10D 2007 Camry LE V6	75.1	2.96		
19C 2007 Camry LE L4	72.1	2.84		
16C 2009 Camry NR L4/Manual	65.5	2.58		

 Table 9 - Lateral Offset Spacing from Brake Pedal Edge to Accelerator Pedal Edge<sup>4</sup>

<sup>&</sup>lt;sup>4</sup> Note that vehicle 15C had no brake pedal cover as tested.

Offset by Generation	Average (inches)	Minimum (inches)	Maximum (inches)	Range (inches)	Average Change from Previous Generation (Inches)
MY1996-2001	3.25	3.09	3.42	0.33	-
MY2002-2006	2.87	2.48	3.28	0.79	-0.38
MY2007-2009	2.97	2.84	3.10	0.26	+0.10

Table 10-Average and Range of Lateral Offset Spacing by Generation

# Table 11 - Test Vehicle Accelerator Pedal Lateral Distance to Center of Steering Wheel (Inches)

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		Left Edge of Accelerator Pedal to Centerline of Steering Wheel (in Inches)	Average By Generation (Inches)	Average Change From Previous Generation (Inches)	
AY1996-		5.01			
2001	3D 6D	<u>5.91</u> 5.84	5.88		
	012	5.01	2.00		
1Y2002-					
2006	1D	5.61			
	2D	5.25			
	5D	5.07			
	7D	4.81			
	9D	5.18			
	1D	4.95			
	13C	5.67			
	14C	5.17			
	15C	5.23			
	17C	5.41			_
	18C	5.26			_
	20C	4.91	5.21	+0.67	(Closer)
AY2007-					1
2009	4D	5.02			
	6D	5.31			
	10C	5.23			
	12C	5.36			
	16C	5.37			
	20C	5.24	5.25	-0.04	(Relatively no Change

Seat centerline to steering centerline was measured and compared between model years. Variation was generally limited to about six millimeters among models and no significant change was found between model years. The centerline dimensions are listed below in Table 12.

Vehicle	Steer CL t	o Seat CL
venicie	( <b>mm</b> )	(inch)
3D 2001 Camry LE L4	-9.0	-0.4
8D 2001 Camry XLE V6	-1.8	-0.1
13C 2002 Camry XLE V6	-6.3	-0.2
1D 2002 Camry SE V6	-4.4	-0.2
2D 2002 Camry XLE L4	1.7	0.1
15C 2003 Camry XLE L4	-10.6	-0.4
14C 2004 Camry XLE V6	-8.0	-0.3
18C 2004 Camry LE L4	-12.9	-0.5
20C 2004 Camry LE L4	-3.0	-0.1
17C 2004 Camry LE L4	-6.5	-0.3
7D 2005 Camry XLE L4	11.2	0.4
11D 2005 Camry XLE V6	-2.0	-0.1
9D 2005 Camry LE V6	0.0	0.0
5D 2006 Camry LE L4	-2.8	-0.1
6D 2007 Camry LE L4	8.2	0.3
12C 2007 Camry XLE V6	10.9	0.4
4D 2007 Camry SE L4	-6.2	-0.2
10D 2007 Camry LE V6	-0.5	0.0
19C 2007 Camry LE L4	6.5	0.3
16C 2009 Camry NR L4/Manual	-3.0	-0.1

Table 12 - Steering Wheel Centerline to Seat Centerline

#### 4.7.3 Force Versus Deflection Curves in Accelerator and Brake Pedals

The MY1996-2001 Camry used a conventional cable connection through 2001, referred to as a Bowden cable, to open the throttle to command acceleration. When the MY2002-2006 Camry was introduced in 2002, electronic accelerator pedals were installed. These pedals used variable resistive potentiometers with varying voltage potentials to measure the displacement of the pedal by the driver's foot. This voltage was relayed to the engine control module where it electronically actuated the throttle and fuel injectors to accelerate the vehicle. In 2007, the MY2007-2009 Camry changed the electronic pedal by replacing the potentiometer sensors with Hall-effect sensors, which measured voltage potentials across permanent magnets and amplified those values using operational amplifiers. The three generations of pedals can be seen in Figure

24, where the pedal at the top of the picture is the MY1996-2001 mechanical pedal, the middle pedal is the MY2002-2006 electronic pedal, and the pedal on the bottom is the MY2007-2009 Hall-Effect sensor pedal (manufactured by Denso Corporation).



Figure 24 – Three Pedal Generations, Cable driven (top), Potentiometer (center), Hall Effect (bottom)

Pedal characteristics changed with the introduction of electronic throttle control that included but were not limited to: shape, material, construction, spring force, responsiveness, and displacement (i.e. deflection). These all affect the "feel and feedback" of the pedal for the operator. Efforts were undertaken to quantify and compare these characteristics.

**<u>Responsiveness</u>** - The responsiveness of the accelerator pedal is the rate at which the accelerator produces throttle actuation for a given displacement (deflection). The displacement is plotted on the abscissa, and throttle opening voltage is plotted on the ordinate to create a "throttle voltage versus deflection" curve. A comparison of the throttle body voltage produced for the ETC MY2002-2006 and MY2007-2009 Camry accelerator pedals to the non-ETC, mechanical throttle-controlled MY1996-2001 Camry pedal is shown in Figure 25. It illustrates that the ETC accelerator pedals commanded earlier throttle opening and engine power than the MY1996-2001 mechanical accelerator pedals with less pedal displacement.

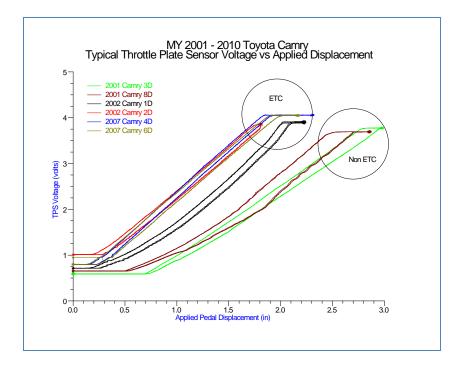


Figure 25 – Throttle Response Rate Comparison Between ETC and Non-ETC Test Camrys

**Force Versus Deflection** – When the brake and accelerator pedals were actuated (deflected); they deflected with non-linear forces as compliances in each system reached constraints. The displacement was plotted on the abscissa and the required pedal force was plotted on the ordinate. As the pedals were released, the amount of force required to prevent them from returning to an at-rest position was less than the force that was required to deflect them. This is due to a hysteresis effect that can be seen in the next several figures. When the 2001, non-ETC pedal was displaced, the mechanical compliance was measurable. In MY1996-2001 Camrys 3D and 8D, four pounds of force deflected the accelerator pedals between 0.5 inches and 0.75 inches (See Figure 26) and the pedals deflected a total of about three inches. The hysteresis effect shows the return of each of the pedals as the same colored, lower force line.

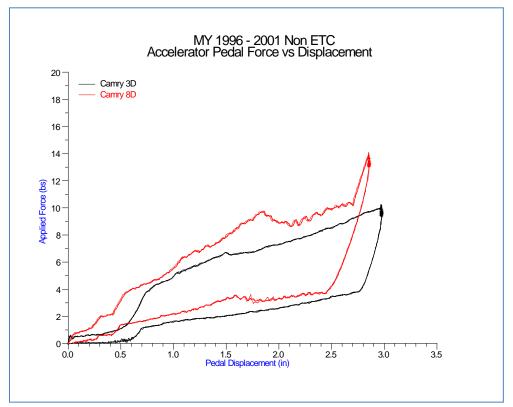


Figure 26 – Pedal Displacement vs. Applied Force for MY1996-2001 Camry

With the introduction of the MY2002-2006 ETC Camry, four pounds of force repeatedly produced about 0.1 inches of deflection (See Figure 27). The overall displacement was reduced to between 1.75 and 2.5 inches, depending on the thickness of the floor pan and carpet that acted as positive back stops for the pedals.

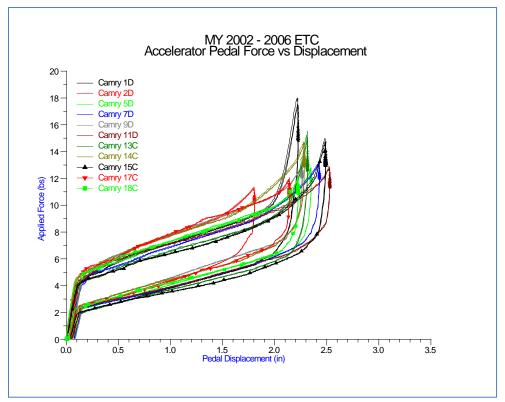


Figure 27 - Pedal Displacement vs. Applied Force for MY2002-2006 Camry

For the MY2007-2009 test Camrys, the force versus deflection curves appeared to have a more linear response range, but four pounds still produced about 0.10 inches of deflection (Figure 28).

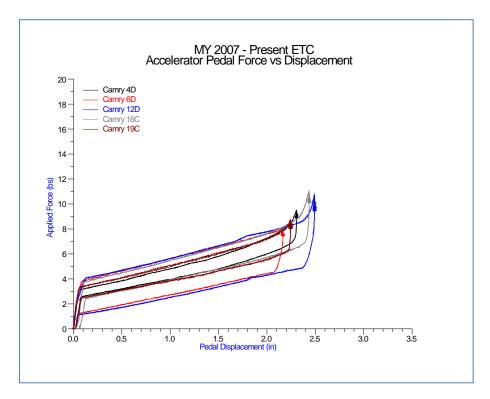
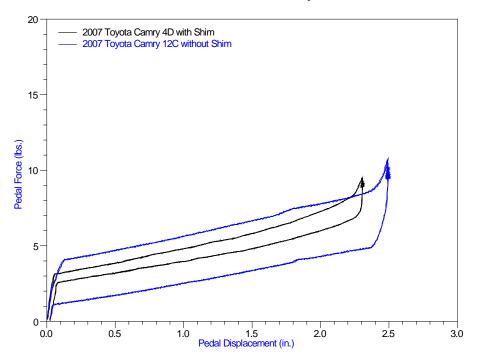


Figure 28 - Pedal Displacement vs. Applied Force for MY2007-2009 Camry

Additionaly, when the test was performed on a pedal that had received a shim in accordance with the safety recall (NHTSA 09V388/Toyota Recall 90L), the shim reduced the friction of the pedal. The result was less resistance to returning the pedal to the home position, as evidenced by the lessened effect on hysteresis, as seen in Figure 29.



#### Accelerator Pedal Force vs Displacement

Figure 29 – Pedal Displacement vs. Applied Force

**Brake and Accelerator Comparison** - The pedal robot was connected to the brake pedal to measure force versus deflection curves encountered with a normally operating, vacuum assisted power brake system. The vehicles were operating at idle in park for this test. For the MY1996-2001, non-ETC mechanical throttle Camrys, four pounds of pedal force produced approximately 0.2 inches of displacement. The accelerator pedal and brake pedal curves were overlaid in Figure 30. The curves did not appear to be similar, with particular focus on the first four pounds, which was the approximate amount necessary to maintain a stationary position with an at-idle vehicle.

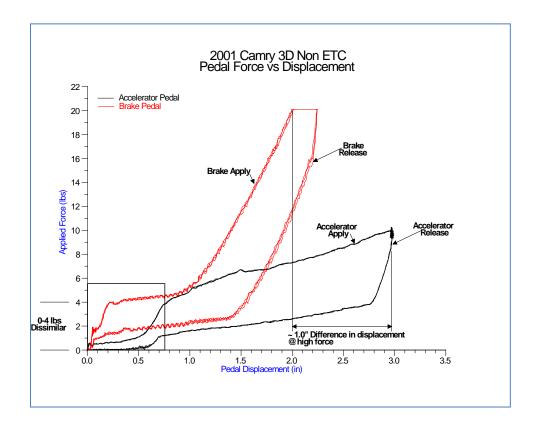


Figure 30 - Comparing Accelerator and Brake Pedal Displacement vs. Applied Force for MY1996-2001 Camry

For the MY2002-2006 Camry, four pounds of brake pedal force results in 0.1" of deflection, just as it did for the accelerator pedal. The force versus displacement curves for the brake and accelerator pedals appeared much more similar to each other, and they intersect several times through a similar displacement of 2.2 inches for the accelerator and 2.5 inches for the brake (See Figure 31).

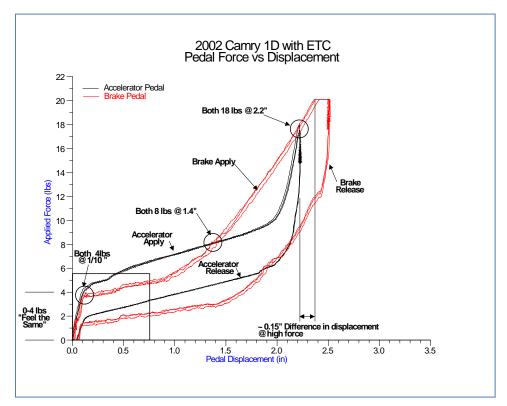


Figure 31 - Comparing Accelerator and Brake Pedal Displacement vs. Applied Force for MY2002-2006 Camry

The MY2007-2009 test Camrys brake and accelerator curves were slightly less similar than the MY2002-2006 test Camrys (See Figure 32).

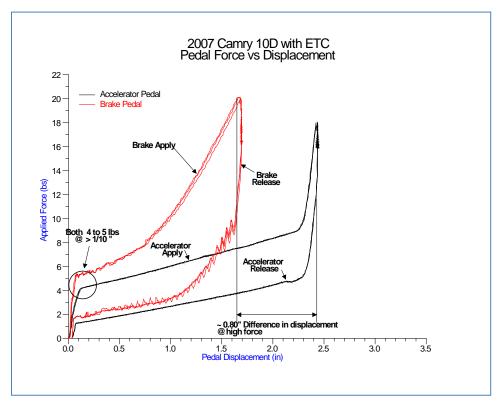


Figure 32 - Comparing Accelerator and Brake Pedal Displacement vs. Applied Force for MY2007 Camry

#### 4.7.4 <u>Potential for Accelerator Pedal Interaction with the Floor Pan and Potential</u> <u>Entrapment with Floor Mats</u>

Some Toyota Camry/Lexus ES-350 All-Weather floor mats were recalled in 2007 due to a high propensity for pedal entrapment when interacting with the accelerator pedal (See Figure 33). These mats were used as "worst case" objects because they are known to cause pedal entrapment when incorrectly installed in many Toyota vehicles. Figure 34 shows the interference condition in MY2007-2009 Toyota product. Table 13 lists the results of placing this mat into each test vehicle and intentionally orienting it in such a way to facilitate pedal interference. Only one test vehicle, a 2007 Toyota Camry that had not yet received the recall remedy for pedal reshaping, was able to capture the accelerator pedal with the floor mat.



Figure 33 - Floor Mat Design Used to Evaluate Potential for Pedal Entrapment Test



**Figure 34 – Pedal Entrapment with Incorrectly Installed Mat** 

#### Table 13 – Potential for Pedal Entrapment Using Recalled Toyota Camry All-Weather Floormat

Floormat					
Vehicle	Pedal Entrapment Facilitated Using All- Weather Mat (Yes/No)				
3D 2001 Camry LE L4	No				
8D 2001 Camry XLE V6	No				
13C 2002 Camry XLE V6	No				
1D 2002 Camry SE V6	No				
2D 2002 Camry XLE L4	No				
15C 2003 Camry XLE L4	No				
14C 2004 Camry XLE V6	No				
18C 2004 Camry LE L4	No				
20C 2004 Camry LE L4	No				
17C 2004 Camry LE L4	No				
7D 2005 Camry XLE L4	No				
11D 2005 Camry XLE V6	No				
9D 2005 Camry LE V6	No				
5D 2006 Camry LE L4	No				
6D 2007 Camry LE L4 (Post-Recall	No				
12C 2007 Camry XLE V6 (Pre-Recall)	Yes				
4D 2007 Camry SE L4 (Post-Recall)	No				
10D 2007 Camry LE V6 (Post-Recall)	No				
19C 2007 Camry LE L4 (Post-Recall)	No				
16C 2009 Camry NR L4/Manual (Post-Recall)	No				

## 4.7.5 Other Pedal Characteristics

- 1. Other pedal characteristics that were documented include:
  - Manufacturer (supplier) seen below In Figure 35 the pedal on the left was manufactured by CTS Corporation (CTS) and the pedal on the right was manufactured by Denso Corporation (Denso) Both are original equipment suppliers to Toyota Motor Corp.
  - b. Pedal modified by recall
    - i. Trimmed (See Figure 36)
    - ii. Shimmed
  - c. Pedal pivots on arm
  - d. Pedal mount method (suspended lever or floor mount) Note that all test Camrys used suspended levers.



Figure 35 – Manufacturer Pedals (CTS on the left /Denso on the right)



Figure 36 – Modified Pedals (NHTSA Recall 09V388/Toyota Recall 90L)

Table 14 summarizes the accelerator attributes for each test vehicle.

Tuble	14 meee		uui i ui ui	neter bu	innui y it	n Each venicle	
Vehicle	Mfg. A- Pedal	Mod A- Pedal Trimmed	Mod A- Pedal Shimmed	A-Pedal Pivots (Yes/No)	B-Pedal Pivots (Yes/No)	Mount Type Accelerator Pedal	Mount Type Brake Pedal
3D 2001 Camry LE L4	Aisan	No	No	No	No	A-Pedal Pendant	<b>B-Pedal Pendant</b>
8D 2001 Camry XLE V6	Aisan	No	No	No	No	A-Pedal Pendant	B-Pedal Pendant
13C 2002 Camry XLE V6	Aisan	No	No	No	No	A-Pedal Pendant	<b>B-Pedal Pendant</b>
1D 2002 Camry SE V6	Aisan	No	No	No	No	A-Pedal Pendant	<b>B-Pedal Pendant</b>
2D 2002 Camry XLE L4	Aisan	No	No	No	No	A-Pedal Pendant	B-Pedal Pendant
15C 2003 Camry XLE L4	Aisan	No	No	No	No	A-Pedal Pendant	<b>B-Pedal Pendant</b>
14C 2004 Camry XLE V6	Aisan	No	No	No	No	A-Pedal Pendant	<b>B-Pedal Pendant</b>
18C 2004 Camry LE L4	Aisan	No	No	No	No	A-Pedal Pendant	B-Pedal Pendant
20C 2004 Camry LE L4	Aisan	No	No	No	No	A-Pedal Pendant	B-Pedal Pendant
17C 2004 Camry LE L4	Aisan	No	No	No	No	A-Pedal Pendant	B-Pedal Pendant
7D 2005 Camry XLE L4	Aisan	No	No	No	No	A-Pedal Pendant	<b>B-Pedal Pendant</b>
11D 2005 Camry XLE V6	Aisan	No	No	No	No	A-Pedal Pendant	<b>B-Pedal Pendant</b>
9D 2005 Camry LE V6	Aisan	No	No	No	No	A-Pedal Pendant	<b>B-Pedal Pendant</b>
5D 2006 Camry LE L4	Aisan	No	No	No	No	A-Pedal Pendant	<b>B-Pedal Pendant</b>
6D 2007 Camry LE L4	CTS	Yes	Yes	No	No	A-Pedal Pendant	<b>B-Pedal Pendant</b>
12C 2007 Camry XLE V6	Denso	No	No	No	No	A-Pedal Pendant	B-Pedal Pendant
4D 2007 Camry SE L4	CTS	Yes	Yes	No	No	A-Pedal Pendant	B-Pedal Pendant
10D 2007 Camry LE V6	Denso	Yes	NR	No	No	A-Pedal Pendant	B-Pedal Pendant
19C 2007 Camry LE L4	CTS	Yes	Yes	No	No	A-Pedal Pendant	B-Pedal Pendant
16C 2009 Camry NR L4/Manual	CTS	Yes	Yes	No	No	A-Pedal Pendant	B-Pedal Pendant

 Table 14 - Accelerator Pedal Parameter Summary for Each Vehicle

#### 5.0 **OBSERVATIONS**

The following observations were made:

- Beginning with the 2002 model year, the fully electronic throttle control was introduced in Toyota Camrys, which provided quicker engine responsiveness with less pedal displacement than cable driven throttles. Much of this increase in responsiveness appears to be attributable to the reduction of slack normally found in mechanical accelerator systems. Increased responsiveness is a typical characteristic of ETC over mechanical linkage accelerator control systems.
- 2. In the event of dual pedal applications, the faster throttle response of the ETC system may increase the likelihood of vehicle movement compared to mechanical throttle systems.
- 3. Starting with the 2002 model, the accelerator pedal force-versus-displacement effort changed and with measurement was found to be somewhat similar to the brake pedal force-versus-displacement effort during the initial apply. The minimum brake pedal force and displacement required to hold a vehicle stationary became about the same as the accelerator pedal force and displacement required to command initial engine torque.
- 4. Based on a limited sample size of the vehicles tested, the lateral separation distance between the brake and accelerator pedal was closer to the steering wheel centerline in 2002 and newer Camrys, compared to the earlier generation Camry. Lateral separation measured values were not abnormal compared to other manufacturers' vehicles.
- 5. The step-over height between pedals in test vehicles slightly decreased beginning in 2002, though the limited sample size did not permit a statistical conclusion.
- 6. As vehicle model iterations were introduced, newer models were equipped with more powerful engines. The transmissions had more forward gears (4, 5, and later 6 gears) that optimized power and made stopping while applying engine power more difficult.
- 7. When braking was applied in one continuous motion where vacuum assist was operating normally and the engine was at full throttle, all tested Camrys either came to a stop or near stop from 65 mph with 112 lbs. or less of brake pedal force.
- 8. If the brakes were pumped more than once while the accelerator was depressed, vacuum was partially, if not fully depleted and would not regenerate until the throttle plate moved to a more closed position. Without vacuum, a significant increase in operator effort was

required to stop the vehicle.

- 9. The amount of brake pedal force required to hold the test vehicles stationary with a wide open throttle ranged from 15.0 lbs. to 43.6 lbs with vacuum assist, well within the braking capabilities generated by the vast majority of, if not all, drivers. Without vacuum assist, the brake pedal force required to remain stationary increased substantially to a range from 86.7 lbs to 268.2 lbs., though evidence of stationary Camrys not having vacuum was not encountered in complaint searches.
- 10. Vehicles equipped with keyed ignitions provided a readily discernable means to instantaneously turn off engine ignition, whereas pushbutton functionality had no instantaneous emergency shutoff feature.
- 11. The ignition control button was labeled as "Engine Start/Stop" only. Specific operation was noted in the owner's manual; however it was described within the context that it was discouraged and could cause an accident.
- 12. Shifting the transmission was more complicated with the newer models. In 2002 and model years prior, moving the shifter from park to drive required only one longitudinal movement, and gear locations were intuitively labeled right next to the gear selector. By 2007, shifting to drive also required at least one lateral movement for four cylinder vehicles and two lateral movements for V6 Camrys; and the gear labeling may not be readily discernable to the driver in a panic situation.
- 13. In all test vehicles, the transmission shifter was mechanically linked to the transmission. Placing the vehicle into park or reverse at highway speeds and under acceleration did not cause any of the vehicles to engage those shift positions, nor wheel lockup, though this action caused both 2001 Camrys to stall.

# **APPENDIX A - Acronyms**

# Table 15 – Acronym List

Acronym	Description			
ABS	antilock brake system			
AWD	all wheel drive			
CID	cubic inches displacement			
CG	center of gravity			
DOT	Department of Transportation			
DTC	diagnostic trouble code			
ECU	electronic control unit			
ESC	electronic stability control			
GAWR	gross axle weight rating			
GVWR	gross vehicle weight rating			
LLVW	lightly loaded vehicle weight			
MY	model year			
NA	not applicable			
NHSTA	National Highway Traffic Safety Administration			
OBDII	on-board diagnostics generation two			
OEM	original equipment manufacturer			
RF	right front			
RR	right rear			
VIN	Vehicle Identification Number			
WOT	Wide Open Throttle position			
VOQ	Vehicle Owner Questionnaire			
VRTC	Vehicle Research and Test Center			
VSC	Vehicle Stability Control			

# **APPENDIX B - Definitions**

# **Table 16 – Definitions**

Term	Definition
Acceleration	The rate of change of velocity with respect to time
Accelerator	a device (as a pedal) for controlling the speed of a motor vehicle engine
Accelerator	a device (as a pedal) for controlling the speed of a motor venicle engine
Anti-lock braking system (ABS)	A braking system that prevents the wheels from locking up during braking. Even under strong braking, the driver can better control and steer the car, potentially avoiding obstacles without having to release the brakes first.
Average deceleration	Average value taken from the initiation of the pedal force until completion of the stop.
Cruise control	An electronic device in a vehicle that controls the throttle so as to maintain a constant speed. This electronic aid keeps the car moving at a constant speed, reducing stress on the driver particularly where speed limits must be observed, when towing a trailer, and on long trips. The system stores and maintains the speed selected by the driver. The set speed can also be manually increased or decreased. The cruise control can be deactivated with the "off" switch or by pressing the brake or clutch pedal.
Deceleration	to reduce the speed of : slow down
Electronic stability control system	A system that has all the following attributes: (1) That augments vehicle directional stability by applying and adjusting the vehicle brake torques individually to induce a correcting yaw moment to a vehicle; (2) That is computer controlled with the computer using a closed-loop algorithm to limit vehicle over steer and to limit vehicle under steer; (3) That has a means to determine the vehicle's yaw rate and to estimate its side slip or side slip derivative with respect to time; (4) That has a means to monitor driver steering inputs; (5) That has an algorithm to determine the need, and a means to modify engine torque, as necessary, to assist the driver in maintaining control of the vehicle, and (6) That is operational over the full speed range of the vehicle (except at vehicle speeds less than 20 km/h (12.4 mph), when being driven in reverse, or during system initialization).
Gross axle weight rating	Maximum weight an axle is rated to carry by the manufacturer. Includes both the weight of the axle and the portion of a vehicle's weight carried by the axle
Gross vehicle weight	The total weight of a fully equipped vehicle and its payload.
Gross vehicle weight	The standard or rating of a vehicle's carrying capacity. It includes the weight of the vehicle, fuel,
rating	fluids, and full payload.
Hydraulic brake system	A system that uses hydraulic fluid as a medium for transmitting force from a service brake control to the service brake and that may incorporate a brake power assist unit, or a brake power unit.
Idle position	Position of the throttle at which it first comes in contact with an engine idle speed control appropriate for existing conditions according to the manufacturer's recommendations. These conditions include, but are not limited to, engine speed adjustments for cold engine, air conditioning, and emission control, and the use of throttle setting devices.
Lateral acceleration	The component of the vector acceleration of a point in the vehicle perpendicular to the vehicle's x axis (longitudinal) and parallel to the road plane.
Lightly loaded vehicle weight (LLVW)	Unloaded vehicle weight plus the weight of a mass of 180 kg (396 pounds), including driver and instrument.
Speed proportional power steering	A type of power-assisted steering which is light at low speeds and increasingly heavier at higher speeds, giving the driver more feel.
Stopping distance	The distance traveled by a vehicle from the point of application of force to the brake control to the point at which the vehicle reaches a full stop.
Throttle	Component of the fuel metering device that connects to the driver operated accelerator control system and that by input from the driver-operated accelerator control system controls the engine speed.
Traction control	A means of preventing wheel spin due to acceleration, either by braking the spinning wheel or reducing engine power.
Tread depth	The measurement from the bottom cm of the tread groove to the top of the tread expressed in millimeters or 32nds of an inch. The legal minimum amount of tread is 1.6 mm (2/32") across three-

Term	Definition
	quarters of the tire width
Wheel lockup	100 percent wheel slip.
Wide open throttle	Position of the throttle at the maximum point of travel of the accelerator control system when actuation
position (WOT)	force is applied.

#### **APPENDIX C - Report References**

Number	Report Name
INCLA-EA07010-39520p.pdf	Final Report 2007 Lexus ES-350 Unintended Acceleration

#### Table 17 – Report Referenced

**APPENDIX D - Photos of Test Vehicles** 

## 2002 Camry 1D (with 3.0L V6 engine)





#### 2002 Camry 2D (with 2.4L L4 engine)





## 2001 Camry 3D (with 2.2L L4 engine)





## 2007 Camry 4D (with 2.4L L4 engine)





## 2006 Camry 5D (with 2.4L L4 engine)





2005 Camry 6D (with 2.4L L4 engine)





## 2005 Camry 7D (with 2.4L L4 engine)





## 2001 Camry 8D (with 3.0L V6 engine)





2005 Camry 9D (with 3.0L V6 engine)





## 2007 Camry 10D (with 3.5L V6 engine)





## 2005 Camry 11D (with 3.0L V6 engine)





2007 Camry 12C (with 3.5L V6 engine)





## 2002 Camry 13C (with 3.0L V6 engine)





## 2004 Camry 14C (with 3.0L V6 engine)





## 2003 Camry 15C (with 2.4L L4 engine)





#### 2009 Camry 16C (with 2.4L L4 engine and Manual Transmission)





## 2004 Camry 17C (with 2.4L L4 engine)





2004 Camry 18C (with 2.4L L4 engine)





## 2007 Camry 19C (with 2.4L L4 engine)





## 2004 Camry 20C (with 2.4L L4 engine)





#### **APPENDIX E - Module Summary Data**

Detailed results data for individual modules are summarized in the following sections:

- E1 Module 1 Level 1 Preliminary Inspection and Visual Verifiction
- E2 Module 2 Level 2 Comprehensive Inspection and Electronic Interrogation
- E3 Module 3 Drivability Fitness
- E4 Module 4 Repairs and Restoration
- E5A Module 5 Acceleration and Braking Summary
- E5B Module 5 Acceleration and Braking Stopping Distance Tables
- E5C Module 5 0-100 and 100-0 MPH Brake Performance Tests Before and After Brake Testing
- E5D Module 5 Cruise Control Testing Vehicles 1-20
- E6 Module 6 Gearshift Lever and Transmission
- E7 Module 7 Ignition Switch Control Functionality
- E8 Module 8 Pedal Positioning

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VIN	4T18F30K02U023715			4T18E45E57U041135		41188458570524737		4T18F28K31U967545		
Mfr. Cate	3/02		12/2000	06/2005	(2/2006	04/2005	01/2005	07/2001	06/2005	05/2007
Model Year (EPA label)	2002	2002	2001	2007	2005	2007	2005	2001	2005	2007
Make	Toyofa	Toyota	Toyota	Toyota	Toyota	Toyota	Toyota	Teyota	Toyota	Toyota
Model	Carry	Camry	Carry	Carry	Carry	Carry	Carry	Camry	Carry	Carry
Engine type:	VI6	1.4	14	1.4	14	1.4	1.4	V6	116	V6
Displacement	10.	2.41	2.36	2.41	2.41.	2.41.	2.4L	10.	3.00	1.SL
Transmission type	Automatic	Automatic	Automatic	According	Advention	a domatic	A domatic	Automatic	Automatic	Advantic
Speeds Field	4	4	1		5		8	4	4	6
	2100	two	2W0	2WD	2WD	240	24/0	2WD	28/0	2WD
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Power Brakes	Vec	Yes	Yest	Vec	Yes	Vec	Vec	Tes	Yes	Vec
Assist type if applicable	Varuum Assist	Vacuum Assist	Vacuum Assist	Varuum Assist	Vacuum Assist	Versum Assist	Versum Assist	Vacuum Assist	Vacuum Assist	Vacuum Assist
NBS	Yes	Yec	No	Yec	Yes	Yec	Vec	Yes	Yec	Vec
CU Cap Number if appliciable	445-00-83060	897-6490	N/S.	580(5280306085	476.4271005085	\$8018080106085	47612061104	687.YF80	47644060405085	\$80(6270107085
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Wheelbase length	107 [inches]	107 [inches]	305 [inches]	100 [inches]	307 [inches]	100 [inches]	\$07.1 [inches]	105 [inches]	107.1 [inches]	109.3 [inches]
loof height	\$8.7 [inches]	\$7.9 [inches	SS [inches]	57.5 [inches]	58.7 [inches]	\$7.5 [inches]	58.7[inches]	\$5.4[inches]	S8.7(inches)	\$7.5[inches]
Istimated Center of Gravity (CC, 40% Baof Height)	23.5 [inches]	23.1 [inches]	22 [inches]	28 [inches]	28.5 [inches]	28 [inches]	28.5 [inches]	22.2 [inches]	23.5 [inches]	28 [inches]
Port Track width	60.7 [inches]		61 [inches]	62 [inches]	60.8 [inches]	62 [inches]		61 (inches)	60.8 (inches)	62 [inches]
ear Track width	60.8 [inches]	60.4 [inches]	60 [inches]	61.6 [inches]	60.4 [inches]	61.6[inches]		60 [inches]	60.4 [inches]	61.6[inches]
	10	16.2	17.0	14.4	30.7	1		16	54.4	14.1
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unis weight Left Front Wheel	2033 [16]	003 [b]	\$85 [lb]	1028 [16]	078 [B]	1005 [16]	988 [16]	1010 [6]	2048[8]	\$074 [16]
urb weight Right Front Wheel	1048 (H)	946 [b]	508 (Ib)	979 [lb]	S08 (Ib)	972 [16]	961 [15]	1012 [b]	1001 (Ib)	1051 [lb]
urb Weight teft Rear Wheel	094 [Ib]	441 [b]	612[8]	674 [19]	652 [86]	660 [lb]		644 [Ib]	671 [b]	664 [b]
Curb weight Right Rear Wheel	657 [16]	676 [b]	640 (Ib)	094 [15]	663 [Ib]	658 [15]	682 [15]	G44 [Ib]	656 (Ib)	601 [b]
urb weight Total	3435 [[b]	3279 [6]	3175[16]	3370 [16]	3231 [6]	3297 [16]	3313 [16]	3310 [b]	3408[8]	3471 [la]
Wit	4347 011			Laana (ta)		anar mu				
	4387 [lb]	4109[b]	4180 (Ib)	4400 [15]	4200 (lb)	4345 [16]	4244 [16]	4275 [b]	4376 [Ib]	4490 [15]
Hert GAAR	2660 [16]	2668 [b]	2400 [Ib]	2668 [16]	2668 [%]	2568 [16]	2568 [16]	2665 [9]	2668[8]	2068 [16]
car GAWR	2668 [16]	2668 [ b]	2400 (Ib)	2359 [15]	2202[16]	2359[b]	2282 [16]	2665 [b]	2282 [16]	2359 [lb]
chicle Mfr.'s recommended inflation pressure: Front chicle Mfr.'s recommended inflation pressure: Rear	29 [psi] 29 [psi]	19 [ps] 19 [ps]	29 [ps]	32 (poi) 32 (poi)	29 [psi] 29 [psi]	30[psi] 30 [psi]	29 (psi) 29 (psi)	32 [ps/] 32 [ps/]	29 (pa) 29 (pa)	30 [asi] 30 [asi]
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Vid the Ressure Maritan Vid the Ressure Maritan Vid the Ressure Maritan Video Control	102 1783 1785 1785 1785 1785 1785 1785 1785 1785	92 192 195 195 195 195 195 195 195 195 195 195	802 1983 1985 1985 1985 1985 1985 1985 1985 1985	Yes Yes No. Yes Yes No. No. No. No. Yes Yes Yes No. Yes No. No. Yes Yes Yes No.	ND ND ND ND ND ND ND ND ND ND ND ND ND N	Yes Yes Yes No. Yes No. No. No. No. No. Yes Yes Yes No. No. No. No. No. Yes Yes Yes No.	NO 745 745 NO 745 NO 745 NO 745 NO 745 745 745 745 745 745 745 745 745 745	92 195 195 195 195 195 92 93 93 93 93 93 93 93 93 93 93 93 93 93	60 195 195 195 195 195 195 195 195 195 195	NC           YHS           YHS           NC           YHS           NC           YHS           NC
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Public Pressure Monitori In Condition million Invasi Controll Actima Assist Votes usi archagi: Ber Seffost Ber Seffost Ber Seffost Brinder Britol Vote Mont Advertin Seffost Dear Educational Power Steering Outri Informational Power Steering Outri Informational Power Steering Outri Informational Power Steering Outri Information Dear Education Dear	92 193 195 195 195 195 195 195 195 195 195 195	NO           YEL           YEL           YEL           NO           NO           NO           NO           NO           NO	No	Yes Yes Yes No Yes Yes Yes No No No No No No No No No No	№0           №0	Yes Yes Yes No Yes No No No No No No No No No No	NO	92 195 195 195 195 195 195 195 195 195 195	60 195 195 195 195 195 195 195 195 195 195	NC           YR5           YR5           YR6           YR6           YR5           NC           YR5           NC           NC           NC           YR5           NC           NC           NC           YR5           YR6           YR7           YR6
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Put the Pressure Monitori Ir standsomer Truse Contol ad Line Asis II Vote ual Anthesis et al Orfindi et a	N2 TRS TRS TRS TRS TRS TRS N2	No           Yell           Yell           Yell           Yell           No           Yell           No           No           Yell           No           Yell           No	NG. NG. NG. NG. NG. NG. NG. NG.	Yes Yes Yes No Yes Yes No No No No No No No No No No	№2           №3           №3           №3           №3           №2           №3           №2           №3	Yes Yes Yes Yes No No No No No No No No No No	NO. Y45. Y45. NO. Y55. NO. Y55. NO. NO. NO. NO. NO. NO. NO. NO. NO. NO	¥2 155 155 155 155 157 157 158 159 159 159 159 159 159 159 159	60 195 195 195 195 195 195 195 195 195 195	NC           YR5           YR5           YR5           YR5           YR5           NC           OX           OX           NOK
Put the Pressure Monitor Put the Pressure Monitor Putes Condition mit Putes Condition mit Putes Condition mit Putes Porton	N2 TRS TRS TRS TRS TRS TRS N2	No           Yes           Yes           No           No           No           No           No           Yes           Yes           Yes           Yes           Yes           Yes           Yes           Yes           No	No	Yes Yes Yes Yes No No Yes No	№2           №3           №3           №3           №3           №2           №3           №2           №3	195 195 195 195 195 195 195 195 195 195	NO. Y45. Y45. NO. Y55. NO. Y55. NO. NO. NO. NO. NO. NO. NO. NO. NO. NO	92 195 195 195 195 195 195 195 195 195 195	60 195 195 195 195 195 195 195 195 195 195	NC           YHS           YHS           NC           NC           YHS           NC
Vid the Pressure Norvisci Vid the Pressure Norvisci Video Control Ecologia Social Video exit Archage El Phone Processor Video	N2 TRS TRS TRS TRS TRS TRS N2	No           Yell           Yell           Yell           Yell           No           Yell           No           No           Yell           No           Yell           No           Yell           No	NG NG NG NG NG NG NG NG NG NG	Yes Yes Yes No Yes Yes No No No No No No No No No No	№2           №3           №3           №3           №3           №2           №3           №2           №3	Yes Yes Yes Yes No No No No No No No No No No	NO. Y45. Y45. NO. Y55. NO. Y55. NO. NO. NO. NO. NO. NO. NO. NO. NO. NO	¥2 155 155 155 155 157 157 158 159 159 159 159 159 159 159 159	60 195 195 195 195 195 195 195 195 195 195	NC           YR5           YR5           YR5           YR5           YR5           NC           OX           OX           NOK
Vid the Pressure Norvisci Vid the Pressure Norvisci Video Control Ecologia Social Video exit Archage El Phone Processor Video	N2 TRS TRS TRS TRS TRS TRS N2	No           Yell           Yell           Yell           Yell           No           Yell           No           No           Yell           No           Yell           No	NG. NG. NG. NG. NG. NG. NG. NG.	Yes Yes Yes No Yes Yes No No No No No No No No No No	№2           №3           №3           №3           №3           №2           №3           №2           №3	Yes Yes Yes Yes No No No No No No No No No No	NO. Y45. Y45. NO. Y55. NO. Y55. NO. NO. NO. NO. NO. NO. NO. NO. NO. NO	¥2 155 155 155 155 157 157 158 159 159 159 159 159 159 159 159	60 195 195 195 195 195 195 195 195 195 195	NC           YR5           YR5           YR5           YR5           YR5           NC           OX           OX           NOK
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Vid the Pressure Maritan Vid the Pressure Maritan Vide Condition Maritan Vide Condition Maritan Let Offond Let Offond Le	N2 TRS TRS TRS TRS TRS TRS N2	No           Yell           Yell           Yell           Yell           No           Yell           No           No           Yell           No           Yell           No           Yell           No	NG NG NG NG NG NG NG NG NG NG	Yes Yes Yes No Yes Yes No No No No No No No No No No	NO           NB           NB           ND	Yes Yes Yes Yes No No No No No No No No No No	NO NO YES YES YES NO NO NO NO NO NO NO NO YES	¥2 155 155 155 155 157 158 159 159 159 159 159 159 159 159	60 60 60 60 60 60 60 60 60 60 60 60 60 6	NC           YR5           YR5           YR5           YR5           YR5           NC           OX           OX           NOK
Vid the Pressure Marinton Vid the Pressure Marinton Vid the Pressure Marinton Video Control Video Vide	N2 TRS TRS TRS N2 N3 N3 N3 N3 N3 N3 N3 N3 N3 N3	No           Yes           Yes           No           No           No           No           No           Yes           No           No           Yes           No           Yes           No           Yes           No           Yes           No           Yes           No           No <tr< td=""><td>No</td><td>Yes Yes Yes No Yes No No No No No No No No No No</td><td>№0           №8           №0</td><td>Yes Yes Yes No No No No No No No No No No</td><td>NO NO YES YES YES NO NO NO NO NO NO NO NO YES YES YES YES YES YES YES YES YES YES</td><td>92 93 94 95 95 95 95 95 95 95 95 95 95 95 95 95</td><td>60 195 195 195 195 195 195 195 195 195 195</td><td>NC           YR5           YR5           NC           YR5           NC           YR5           NC           NC</td></tr<>	No	Yes Yes Yes No Yes No No No No No No No No No No	№0           №8           №0	Yes Yes Yes No No No No No No No No No No	NO NO YES YES YES NO NO NO NO NO NO NO NO YES	92 93 94 95 95 95 95 95 95 95 95 95 95 95 95 95	60 195 195 195 195 195 195 195 195 195 195	NC           YR5           YR5           NC           YR5           NC           YR5           NC
be allocations outputs and an analysis of the	N2 TRS TRS TRS N2 N3 N3 N3 N3 N3 N3 N3 N3 N3 N3	No           Yes           Yes           No           No           No           No           No           Yes           No           No           Yes           No           Yes           No           Yes           No           Yes           No           Yes           No           No <tr< td=""><td>No. No. No. No. No. No. No. No.</td><td>Yes Yes Yes No Yes No No No No No No No No No No</td><td>№0           №8           №0</td><td>Yes Yes Yes No No No No No No No No No No</td><td>NO NO YES YES NO NO NO YES YES YES YES YES YES YES YES YES YES</td><td>92 93 94 95 95 95 95 95 95 95 95 95 95 95 95 95</td><td>60 195 195 195 195 195 195 195 195 195 195</td><td>NC           YR5           YR5           NC           YR5           NC           YR5           NC           NC</td></tr<>	No. No. No. No. No. No. No. No.	Yes Yes Yes No Yes No No No No No No No No No No	№0           №8           №0	Yes Yes Yes No No No No No No No No No No	NO NO YES YES NO NO NO YES	92 93 94 95 95 95 95 95 95 95 95 95 95 95 95 95	60 195 195 195 195 195 195 195 195 195 195	NC           YR5           YR5           NC           YR5           NC           YR5           NC

#### APPENDIX E1 - Module 1 - Level 1-Preliminary Inspection and Visual Verification <u>Cont.(Vehicles 11-20)</u>

00	e 11D	120	130	140	15C	16C	1/C	18C	190	200
VN	4T18/30k55U107020	JTN5K46K073004749	4T18F30K92U017965	4118730K34U071178	471863243300645132	4T1NE46K39U286597	4T18E32K64U905452	4715632K04U315003	4T18E46627U177089	471063286408483
Mfr. Date	05/2005	04/2006	12/2001	01/2004	09/2002	03/2008	04/2004	01/2004	06/2007	01/2004
Model Year (EPA label)	2005	2007	2002	2004	2008	2009	2004	2004	2007	2004
Make	Toyota	Teyeta	Toyota		Tevela	Teyeta	Toyota	Teyeta	Teveta	Teyeta
				Toyota				- eyes		Campone
Madel	Camry	Carry	Camry	Carry	camry	Camry	Camry	Canry	Camry	Camry
Ingine type:	V6	VE	/6	VE	14	14	14	14	14	14
Displacement	5.0L	5.5L	5.0.	5.0L	2.4L	2.4L		2.4L	2.4L	2.4L
Transmission type	Automatic	Automatic	Automatic	Automatic	Automatic	Manual	Automatic	Automatic	Automatic	Automatic
Speeds Fund	5	6	4	5	4	5	4	4	5	4
Orive type	2WD	21/0	2WD	21/0	2WD	2WD	2WD	2W0	1WD	2//0
Power Brakes	Yes	Yes	103	Ves	Ves	Yes		Yes	Yes	Yes
Assist type if applicable	Vecuum Assist	Vecuum Assist	Vecuum Assist	Vecuum Adsist	Vacuum Assist	Vecuum Assist		Vecuum Assist	Vacuum Assist	Vecuum Assist
ANI CONTRACTOR	165	Yes	Tes	Yes	Ves	Yes	Tes	No	Yes	Yes
ICU Cap Number if appliciable	44540-33070	44540-33050	44540-33060	44540-33070	44510-06050	44510-060608	476.2220204	N/A	530 L6 190307 085	4761308110308
Number of Wheel speed sensors	4	4	4	4	4	4	4	0	4	4
front Brake type	Rotor	Antor	Rotor .	Rotor	Ratar	Rotor	Rotor	Rotor	Rotor	Rater
fear Brake type	Refer	Bater	Eeler .	Bater	Batar	Datar	Drum	Orum	Drum.	Drum
Farking Brake type	Drum.	Orum	Drum	Orum	Orum.	Drum	Drum	Orum	Orum	Orum
Parking Brake Accuator type	Foot	Foot	Foot	Foot	Root	Hand	Hand	Hend	Foot	Hend
	307.3 [inches]	109.5 [inches]	307 [inches]	107.1 [inches]	107 [inches]	109.5 [inches]	107.1 [inches]	107.1 [inches]	109.3 [inches]	107 [inches]
Wheelbase length food balant	58.7[inches]	57.5 [inches]	57.9 [inches]	57.9 [inches]	57.9 [inches]	57.9 [inches]	57.9 [inches]	57.9 [inches]	57.5[inches]	57.9 [inches]
Roof height								prov (moneta)		
Estimated Center of Gravity (CO, 40% Roof Height)	23.5 [inches]	23 [inches]	23.2 [inches]	23.2 [inches]	23.2 [inches]	23.2 [inches]	23.16 [inches]	23.16 [inches]	23 [indies]	23.16 (inches)
Front Track width	60.8 [inches]	62 [inches]	60.7 [inches]	60.8 [inches]	607 [inches]	62 [inches]	60.8 [inches]	60.8 inches	62 [inches]	60.8 [inches]
Rear Track width	60.4[inches]	61.6 [inches]	60.4 [inches]	60.4 [inches]	60.4 [inches]	61.6 [inches]	60.4 [inches]	60.4 [inches]	61.6 [inches]	60.4 [inches]
Sallons of fuel added to tank	2.4	none	10	11	7	0	4.1	5	5.7	13.5
Curb weight Left Front Wheel	1080 [15]	1083 [6]	1068 [Is]	1077 [6]	084 [16]	958 [Ib]	966 [16]	968 [lb]	1008 [16]	968[16]
Curb weight Right Front Wheel	2045 [15]	1048 [Ib]	3037 [15]	1035 [Ib]		957 [15]	947 [b]	916[0]	968 [Ib]	938 [b]
Curb Weight Left Rear Wheel	675 [b]	669 [16]	671 [b]	670 (Ib)	669 [Ib]	653 [15]	652 [lb]	649 (lb)	652 [lb]	615 [lb]
Curb weight Right Rear Wheel	683 [b]	095 [Ib]	678 [b]	098 [15]	679 [Ib]	637 [15]	645 [Ib]	654 [Ib]	654 [15]	625 [15]
Curb weight Total	8484 [15]	3405 [16]	3440 [b]	3482 [16]	8287 [b]	8226 [IF]	3215 [b]	3188 [Ib]	3284 [Ib]	3147 [Ib]
QVWR.	4442 [15]	4515 [b]	4587 [0]	4442 [0]	4233 [Ib]	4300 [lb]	4189 [b]	4189 [15]	4545 [b]	4189 [6]
Pront GAWR	2668 [15]	2668 [b]	2668 [lb]	2668 [Ib]	2658 (lb)	2668 [Ib]	2668 [b]	2968 (Ib)	(1968 (Ib)	2668 (lb)
Rear GAWR	2282 [15]	2359 [6]	2668 [lb]	2668 [b]	2658 (lb)	2359[b]	2668 (lb)	2968 (Ib)	2359 (b)	2568 (lb)
chicle Mfr.'s recommended inflation pressure: Front	29 [psi]	30 [esi]	29 (psi)	29 [894]	29 [pai]	32 [191]	29 [##4]	29 [psi]	\$0 [gsi]	29 [psi]
	29 (pol)	30 [poi]	29 [poi]	29 [poi]	29 [ps]	82 [poi]	29 [poi]	29 [pc/]	30 [pa]	29 [pci]
Vehicle Mfr 's recommended tire size	P215/60R16	P215/50R16	P215/60R16	P215/50R16	P215/60816	P215/60R16	P205/60R15	P205/65R15	P215/60R16	P205/65R15
01.										
Traction Control	145	Yes	165	Yes	NO.	No	Tes	No	NO	No
185 Braking	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Ves
ISC Stability Control System	Tes	No	Tes	Yes	no	No	No	No	NO	No
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Air Conditioning	195	Yes	Tesi		Yes					
Air Conditioning Cruise Control	Yes Yes	Yes	Yes .	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Air Conditioning Cruise Control	195	Yes					Yes			
Air Conditioning Cruise Control Sacking Assist Video	Yes Yes	Yes	Yes .	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Air Cenditioning Cruise Control Backing Assist Video Dual Airbags	Yes Yes No Yes	Yes Yes No Yes	tes No Tes	Yes No Yes	Nes No Yes	Yes No Yes	Tes No Tes	Yes No Yes	Yes No Yes	Yes No Yes
Air Conditioning Cruise Control Dauking Assist Video Qual Airbags Rear Defraat	Yes No Yes Yes	Yes Yes No Yes Yes	145 No 145 143	Yes No Yes Yes	Yes No Yes Yes	Yes No Yes Yes	Yes No Yes Yes	Yes No Yes Yes	Yes No Yes Yes	Yes No Yes Yes
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kir Conditioning Incise Control Iaskling Apolo Video Vari Arthogo Geo Defrast Eli Phone Vyucht Iyud	1155 1165 1165 1165 1165 1165 1165 1165	Yes Nov Yes Yes Nov Yes	Yes No Yes No No	Yes No Yes Yes No No	Yes No Yes Yes No No	Yes No Yes No No	Yes No Yes No No	Yes No Yes No No	Yes No Yes No No	Yes No Yes Yes No No
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Rir Conditioning fruise Control Serking Applied Video Usal Alfrags Bear Defrast Cell Phate NyvCh(DvO Reed System Reed System Rover Antenna Rover Antenna	Ves Ves No Ves Ves Ves Ves Ves Ves No No	Yes Yes Yes Yes No Yes Yes No No No No No No	Nes No No No No No	Yes No Yes No No No No No	Yes Nu Yes No No No No No	Yes No Yes No No No No	Yes 500 765 500 500 765 500 765 500 800	Yes No Yes No No Yes No	Yes No No No No	Yes No Yes No No No No No
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#### APPENDIX E2 - Module 2 - Level 2- Comprehensive Inspection and Electronic Interrogation (Vehicles 1-10)

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n Brete tallpå 7. High sound om blan	OK.	06	CR.	CR.	65	OK	06	OK	OK	-06
E WORTHWIDTING	- 80 -	0K 0K	OK OK	- 8	85	CK CK	- 0K	- 2	- X-	OK.
R Coortopa (all amhites) R Téograp	0K. 285	05 05 10	08.5%	OK OK NO	655 520	88.8	0K 000	500	- 08 - 00 - 00	0K
r Antoluria dat 2. Patrogizaria	40 04	4/5 04	140 Cali	A/S CH	10	46 Ca	82	10 CK	100	000 000
3. Pog lanter	-04/	Nash	1414	104	- 141A	和法	06	- Max	- NJ.	44
4. We specificates E. Rear Mill and unother	- CHA	04 184	CH NA	106 TRA	OK Jun	NA NA	OK NA	- 14 14	NX.	OK NA
Electronic agents Tableare manage	OK OK	01	OK OK	OK OK	05	OK OK	06 0K	. OK 	06	- 54
L Risor dettordet	OK.	05	OK.	ÇK.	04	OK.	06	OK.	QK	- 04
e Constitute E Constitut for 1. Barrow	- 24	16A	OK IVA	111	- M	- CR NA	N/A	- WA	, MA	11 A
1. Surrowit 2. Fluctures visitie respect	OK NO	AND DO	- CK 1935	0K 110	64	16	OK NC	04) 140	06	04
Antimited parliamental Antimited a standards	06	06	OK.	. CM	05	CW	0K	CR.	06	04
lech the following										
Chool angela sa Matempili bark Bull	- 0A (BK	05	CH CH	(8)	- CK DX	08	06	04	06	104
Macwai Raescribelan Turk.	微	1614	NIA INA	14A 14A	NUM NUM		NA.	197A	Na.h	NA.
E E Bererika Ruid (Assettinis)	No.	7904	16 A	7806	18/A	n A	744	NA	East,	54A
<ul> <li>Transfer same het stalandet)</li> <li>Lager e doceen</li> </ul>	11 × 23	94	NA YES	ALA OK	- NAA CK	R.A. CR	101	34A (0K	- <u>100</u> (%)	94. 36
4. Angel P. Stolert 1. Yilkee's maryn 2. Tif's skilleest sandline	15.9 OK	VES OC	153	155 0K	74,3 CK	113	V(3 0K	113	153	763
bate are tont think	191	- 296	(#	0.00	88	- Se	06	- 28	- 2-	18
<ol> <li>Beers and all de ceechor.</li> <li>Co président ceechor.</li> </ol>	OK.	06	CK CK	CH (H	OK OK	-CR. - (28)	CK OK	-CK (24)	06	04
<ul> <li>Colpetition from the college</li> <li>Contraction to other the college</li> <li>From the college pression</li> </ul>	OK DK	05	0K 0K	CR.	- 0X 6X	OK OK	8	08	8	04 04
5 31319 3012482-08	OK.	06	CK .	OK .	ÓK.	.04	08. 06	CH.	ÓK.	04
<ul> <li>Beering compositely</li> <li>Trebey balls (prove to accis)</li> </ul>	OK OK	0K		(H ÇA	- CK	04	06	8	- 8	04. 64
2. Tow-thanging insurance 3. Taiwe Inn	OK OK	06	CR. CK	CRE CRE	OK OK	- 28	06	- 28	06	OK.
A STAR MARK EXPERT WERKAGE	0K 0K 0R	05 05	08 08 08	0K 0K 0K	OK OK		06 06	8	8	0X 3X 08
5. English koton 5. Emilyahan anchen filosen	OK.	ÓK.	CK.	ČK.	ČK.	OK.		OK.	06	ÓK.
PREASANCY STANDARDS										
r Bludy pririte. 8. Fascilles	CIA.	05	Ch CK	CH CH	GK GK	08	06	04	06	08
<ul> <li>Cocial prevent remaining</li> </ul>	- 28 - 28	- <u>8</u> -	- 8	8	8	8	86	- 8	1 8	<u> 8</u>
t systematory touris	OH.	-04	ÇK.	CH.	ÚK.	OK	OK.	CA.	OK.	Gx.
P Demostrae telse contrae	446	190A -	164	3404	16/A	h/A	No.A	WA.	NA.	- WA
1 Instrument parlor	OK.	96	1 95	98	65	- OR.	06	25	95	05
a China panala Li Gending	8.83	0K 0K	- 22	CK UR UR	2003	8.55	86 86	885		0X 0X
h Headhrangeallagh tur Chagogo hanachteann	040	30	CK:	- 0K - 0K	CK OF	OK OK	06	OK OF	06	04
Capelin de Reir mate	OK.	OK VES	105	-OK	95	- 08 - 193	OIC		06	
e déletificase maile E Filine visad (nijité hersetje)	N0 N0	713	175	752	100	7E8 -	VH3 V53	76.0	VV3 V15	70.0
Wednesd tradictic	V23 N0	10	140	10 10	10	16	H0 H0	10	140	10
S Weindows ogerate	OM.	00		OK	68	108	CHG.	108.	06	- (DK)
A WINDOW HAR CONNECTION	NO NO	40 40	140	NG ON	100 6K	100	NO	10	10	10
5. Munificture 7. Fuga Dobbio: 8. Marchill, Anno 1998, Anno	NG OK	NO OK	140	NO	10	VE3 OK	NO OK	HCL OK	NO	161
Marriel, ALA, A. J. Lin Roome	HOLE	Nord.	CK NONE	Ok Kend	04 1614	CK ROAD	Area .	SK.	134	94 9394
arlar - Striamed and in Placer and Drokal score?	OWNER	ONPLE	0.74	OVAL	City Public	ONTRE	CHPLE	CHIFLE	OTFLE	ONFLE
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I'm publicite Rat Netto Buildhopeochit Sauk Him percarmed on this ustuat?	in the second se	and the second sec		100000				and the second		
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corded. It a Nechstream screet print is which with DTC's, capture this information										
them in a Anangland value in the site tends	10000		ROLEPHON AF							
FC's. Otherwise, result 070. If the passe is active that had to the 070 in interest, result	NO EDM EDT CODER, ABBURD	2	SENSOR HTR CROUT						1	
w   4.40	C1204 CORPERING OPEN/OPEN/INC	6	CLEARED CODE:							
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cent Tota Rectifier - Dissertial of an event with mode a FDS energy and take in the type which there is a point as a per comp for a which there.	10/8 //8	UNABLE TO	NA FRE DATES		part of	direction of the second				
with conside a FEDF progra and takes for the lipher vehicle facilities. Here print a chapter comp for	UWELE TO	100	NA FRE DATES FOR TOOL PROD DATE	NUA - URUCKIS TO COMMUNICATE		ABLE TO ACCESS				s ABLE TO ACCES

#### APPENDIX E2 - Module 2 - Level 2- Comprehensive Inspection and Electronic Interrogation - Cont. (Vehicles 11-20)

AND PERTON STANDARDS	110	- 96	. 195	140	1 16	16	340	IK.	1 195	
FlatterUnit of Order#	0K 0K	- 8	- 35	85	3	8	8	85	0K	CH CH
Elada Overen Glana condition	0.4		040	416	. OK.	191	CNL	06	04	: DN
Alternative accessions AN Alternatives	100 NQ	N0 N0	40 NQ	1/0	10	147 140	8D 80	00 NQ	100 . NQ	- 90) - 140
ANA provide in address and an address in address in a	NO	NO	40	NO	165	NC	<u>k2</u>	N2	NO	140
Contents massuel Receivates	783	WB NO	VER NO	- WE3	113	BIN CHE	VIII NO	NEI NO	183	763
Net fills Other maintenance also arrents	12	N0 VC3 V23	6.006	400 9123 9125	100	90 90 90	NO NO YES	N2 YES NO	102 923 120	10) 1725 1728
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she Reed Presi Tellizion	66	- 04 04	DK.	04	ČK.	04	0K 0K			OK.
Prover steering territies	- 22	06	04 04	0× 0×	OK DK	0K (K	04	06	1 12	OK OK
Higher watcher hart blad Bather condition front beat	85	OK OK	OK OK	06	- DK - DK	OK OH	06	06	- 85	CN ON
Charging profest and allost Thriller briege speedhal	- 6K - 6K		08 08			34 34	86	00		ON OK
Prover cable routing historia	1			05	0A	(A)	8	8	1 2	3
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ignetos un acceleto uma. Destratgate exerte	OK	CASH ON	COLUMN DE	COLUMN	COLUMN	COLUMN	COLUMI	000000	COLLIMN OK	COLUMN
feet atgeter	OK OK	- 05 - 06	2	22	OR.	0H UK	2	00	OK OK	28
Theory course ad allo in the patient	8	- <u>8</u>	0K 0k		ČK.	OK OK	8	- 8	- 22	OK OK
Contract contine	04	01	186.	0K	16.8.	BuA .	Nuil.	TIPA.	16/4	- UN
Heating well id to AC Heater subdifier	- 85	- 25	- 21	05	X	OK	- 25	- 25		CH CH
45 percent Furth to gravitationing lientings	0K 0K	85	- 0K 06	05 05	ČK ČK	(K (K	OK OK		- <u>64</u>	CK CK
Fiare	04	01	241	EIK.	()#L	116	06	06	05	08
Brain lange Higt bearlift a bearl	- 85		-8	85	OK OK	Sk.	8	- 20	- 8	0%.
Printle Rends Caler Monte (of the Bolter)	OK OK	*	- 0K 54	0K	OK Sk	OK OK	06		- 0K - 0K	CK CK
Mohart Nobler In 190	0K N9	NO.	UNL HQ	04 NO	13K. 19Q	190	01	01	0K N9	- CM - NO
Paring bans Tigging	- 25 25	110 500 000	90 58	10 0K 0K	90 5K	90 3K	163 68 162	- 50 744	89 65	- 50 - 58 - 105
HUR apertition to over	OK OK	8	12A 36	0< 0× 194	0K 55	35	NeA OK NeA	797A (54) 192A	OK NA	DA CR BA
Regular initial contraint	85			0K 0K		Sk.	06 06		8% 8%	OK OK
Billione million Rear cettore	05	06	OK:	06	ČK.	OK .	05	06	05	OK .
Second Converting to:	0K 198	CKC TALA	- 06 844	05	CK.	OH	0% 548	OK TEA	OK NA	- OH NA
Terrori Fold sera solito mand		- 95 NO	OK NO	46	N/A. 190	114A NG	NA NO	NA NO	100 NO	11.34 740
Hid rootst pullateurus	OK	00	- 0K	80	a de	36	05	862		<u>6</u>
VARTENUICE STANEWARTS NCA The Aniversity		19.000		2 00	199 - 199 - 199		1)	3 . C.	<u></u>	<u>19</u> (20)
Check ongine cill ry/nemater trans fluet	OK OK	- 0K 19A	OK:	0K	OK OK	JAC. Not	86	06 86	OK OK	OK OK
Parcel Internation Net Ford (IR-and a Net) (6-4)	NA NA	79.A 79.A	AuA BuA	79.4 79.4	NA NA	SCALLO NA	toA teA	iya. Iya	NA NA	12
Differential Relation R(VVD)	197A.	14A	hite Mark	744A	iga NA	16A 34A	140A	19.0. 19.0.	N/A	813. 813.
Engre solari	08,	05	080	0K -	CH.	OK .	05	2001	08	CH .
Universities of condition	73 64	- 165 - 06	ON CH	OK .	913 Ok	VCS CH	V0.5 6%	3155	23	VED ON
Brane the condition topologic and an at contaction	85		0K 0K	0K	OK.	(K (K	0%	01	OK OK	OK GK
Crysen hist textilite Erheut schen	0K ÓK	06	04	OK.	DR. OK	OK.	06	05	0K 0K	CH OK
Front suspension	- 0%	05	Q41.	QK.	- 040	UH.	06	64	0%	CN.
Hag sets and in	85	8	0K 0k	- <u>65</u>	<u>8</u> .	- CK	8	8	85	- OK
Vitrael follo brigan to type: Transfranging management	OK OK	05 05 05		0× 0× 0×	DR. OR	0K (M (M)	0K 0K	0K 0K	0K 0K QK	08 192
Texas Co. Color Colle Agrittice Barriage	OK OK	06	OH.	0K 0K	- 28	OK OK	06	06	04	142 CK
Engine Nation Environment	0K 0K	00 00 00	34	0K 0K	85.5	08 08	8	06 06	0K 0X	- 0K 
VEARANCE ETAIDARDS				- 10 -	the states of the	-		1	- 10 -	
Area condition Rice parent	08	0	OH.	-0+	04	(H	00	0	08	00
Fanning Decale and Long Ten	04	05	OK OK	05	DK QK	OK OK OK	06	05	0K QK	OK.
Clausturg overs Intrementer swert	8	8	08. 08.		8	OK OK	0% 0%	0K 0K		OK OK
fecter in a	17A	1g.a.	lu-A	194	114	huð.	h-A	lan	1 YA	1.4
totrapid pare:	8	- 82	OK OK	1 8	Sk.		8	8	88	OK OK
Ever panels terring	OK OK	- 06	0K 0H	ČK ČK	OK OR	<u>(ж</u>	06	01	- OK	CK CK
Headawipadaga tej Juggaja congelteert	0K QK	00	04	0K 0K	DR.	(H (H	04	01 05	OK OK	OM OK
Cases in utilities in all	18	125	- 0K 153	0K 9E5	-5% 185	W.S.	105	06 VE5	783	- <u>CK</u> 185
From And Call Accepts	983 110	VER HO	100 100	10	10	V28	V28 F0	¥28.	10	168
Windows (separately)	80	80	10	hô	140	. NO	h0	hù	HiQ	.740
Mindows (per alle tembow mar gradestraps)	86	ok hū	1	05 10	- 00 00	0 <del>8</del> 90	NO NO		6K 80	58
Mindea wate Matiatizet	10	80 80	NO NO	140	10	NO. HOL	80	- NO. 100	10	740
Real Dehoal Roadh ann-505 Iwne	OK.	OK NOTE	CM. NONE	GK.	OK. NOAE	UN NOVE	OK NOT#E	OK. NOVE	OK.	ON NONE
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redet. En Fachettenen nonner pent of					GROECT POOP					
alabra with DTC's, capture the information No is a surreptaint vehicle, do not recet				1	CONTROL					
C6. Otherwhite, erent DFG. If the streets artises that bed to the DFIT is isomer, record				1	MODULE PERFORMANCE*					
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	ABLE TO ACCEL - EDRICHARTY	IN MODULE PTZE	ACCESS	ARLS TO ACCUS	ACCESS	ALLE TO ACCESS - EDRIEMPTY	EDITEMPTY	ARE TO ACCES	RECOVED'	ALLE TO ACCE

#### **APPENDIX E3 - Module 3 – Drivability Fitness**

5	1D	2D	3D	4D	5D	6D	7D	8D	9D	10D	11D	12C	13C	14C	15C	16C	17C	18C	19C	20C
QUALIFICATION STANDARDS Road Test	Response	Response	Response	Response	Response	Response	Response	Response	Response	Response	Response	Response	Response	Response	Response	Response	Response	Response	Response	Respon
1. Ease of starting		1	YES	×	~	<ul> <li>✓</li> </ul>	× 1	×	~	×	1	1	FAIR	OK	1	ОК	ОК	OK	ОК	1
2. Cold-idle quality		1	OK	1	1	1	1	1	1	1	1	1	OK	OK	1	OK	OK	OK	OK	×
3. Gear selector operation		1	OK	1	1	1	×	×	1	×	1	1	OK	OK	×	OK	OK	OK	OK	· ·
Steering performance														414			-	-		-
4. Power steering performance	×	×	OK	×	×	×	×	×	×	×	×	×	OK	OK	×	OK	OK	OK	OK	×
5. Power steering noise	×		OK	×	×	NO	×	×	1	NO	*	NO	NO	NO	✓ NO	OK	OK	OK	OK	1
5. Steering wheel alignment	OK	OK	OK	OK	ОК	OK	ОК	ОК	OK	OK	OK	OK	OFF	OK	OK	OK	OK	SHIMMY	OK	ОК
7. Vehicle tracking	OK	OK	0K	OK	OK	OK	OK	OK	OK	OK	OK	0K	OK	0K	OK	OK	OK	OK	OK	OK
8. Vehicle alignment	OK.	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	0K	OK	0K	OK	OK	OK	OK	PULLS	OK
Equipment operation																				
9. Cruise control – See TF108		× 1	ОК	OK	ОК	OK	ОК	OK	OK	ОК	OK	OK	See TF108	See TF108	OK	See TF108	See TF108	See TF108	See TF 108	See TF
10. Overdrive button		1	OK	N/A	OK	N/A	OK	OK	OK	N/A	OK	N/A	OK	OK	OK	N/A	OK	OK	N/A	OK
11. Gauges/instrument panel	ОК	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
12. MIL lamps on	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
13. Sound system	ОК	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Powertrain performance																				-
14. Acceleration performance	ОК	OK	ОК	OK	ОК	OK	ОК	ОК	OK	ОК	OK	ОК	OK	OK	OK	ОК	OK	ОК	ОК	ОК
15. Clutch operation (manual)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	OK	N/A	N/A	N/A	N/A
16. Upshifting performance	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	0K	OK	OK	OK	0K	OK	OK	OK	OK
17. Downshifting performance	OK OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK OK
18. Steady throttle perform	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
19. Transfer case performance	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
20. Hol-idle performance	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Braking performance	-	-		-						-		-	-		-		-			1
21. Brake booster performance	OK	OK	OK	OK	ОК	OK	ОК	OK	OK	ОК	OK	ОК	OK	OK	OK	ОК	ОК	ОК	OK	ОК
22. Vehicle tracking during Braking	OK	OK	NO	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
23. Antilock brake system	OK	OK	N/A	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	N/A	OK	OK
24. ESC System	OK	N/A	N/A	N/A	N/A	N/A	N/A	OK	N/A	N/A	OK	OK	OK	OK	N/A	N/A	N/A	N/A	N/A	N/A
25. Traction Control System	ÖK	N/A	N/A	N/A	N/A	N/A	N/A	ÖK	N/A	N/A	ÖK	ÖK	ÖK	OK	N/A	N/A	N/A	N/A	N/A	N/A
26. AWD Driver Selection	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
27. Overdrive Driver Selection	OK	OK	N/A	N/A	OK	N/A	OK	OK	OK	N/A	OK	N/A	OK	OK	OK	N/A	OK	OK	N/A	OK
28. Overall stopping perform	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
29. Brake Override equipped?	NO	NO	NO	YES	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	OK	NO	NO	NO
Post-Road Test	110		110	1.20		1 140	16.0	110				110	110		110		- UN		110	1 100
30. Hot restart performance	ОК	OK	ОК	OK	ОК	ОК	ОК	ОК	OK	ОК	OK	ОК	OK	OK	OK	OK	ОК	ОК	ОК	OK
31. Upshifting performance	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
32. Downshifting performance	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
33. Steady throttle perform	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK OK	OK	OK	OK	OK	OK	OK
34. Transfer case performance	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
35. Hot-idle performance	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
36. Hot restart performance	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	

6	1D	2D	3D	4D	5D	6D	7D	8D	9D	10D	11D	12C	13C	14C	15C	16C	17C	18C	19C	200
Brakes & Burnish																				
1. Were Brake components replaced prior to												NO	NC							
Burnish a Compliance Testing?	YES	NO	The second																	
2. Was Brake Burnish completed?	YES	NO	NC																	
Repair																				
3. Were any engine components repaired?	NO	NO	YES	NO	N															
4. Were any drivetrain components repaired?	NO	YES	NO	NO	NO	NO	NO	NO	N											
5. Were any electrical components repaired?	NO	N																		
6. Were any body components repaired?	NO	N																		
7. Was any normal service or maintenance																				
preformed?	NO	YE																		

**APPENDIX E4 - Module 4 – Repairs and Restoration** 

			Val											Modu							
			ven	icle Info	rmation			Full V		1				TF1	07				FII V	acuum	
																			Full V	acuum	
								Best	Effort				No Br	aking				Best	Effort	Best	Effort
					Engine	Transmission	Date	100-0 r	nph #1	0-100m	iph #1	0-100m	iph #2	0-100m	ph #3	0-70r	nph	100-0 n	nph #2	100-0 r	nph #3
Veh. ID.	Model	Trim Line	MY	Config.	Displacement	Fwd Speeds	Tested	File #	Dir.	File #	Dir.	File #	Dir.	File #	Dir.	File #	Dir.	File #	Dir.	File #	Dir.
1D	CAMRY	SE	2002	V6	3.0L	4	5/19/2010	1D008	S	1D009	N	1D010	S	1D011	N	1D013	S	1D040	S	1D041	N
2D	CAMRY	XLE	2002	L4	2.4L	4	5/20/2010	2D007	S	2D008	N	2D009	S	2D010	N	2D011	S	2D038	S	2D039	S
3D	CAMRY	LE	2001	L4	2.2L	3	5/14/2010	3D008	S	3D010	N	3D011	S	3D013	S	3D014	N	3D039	S	3D043	S
4D	CAMRY	SE	2007	L4	2.4L	5	5/25/2010	4D044	S	4D045	N	4D046	S	4D047	N	4D048	S	4D077	S	4D078	N
5D	CAMRY	LE	2006	L4	2.4L	5	5/25/2010	5D006	S	5D007	N	5D008	S	5D009	N	5D010	S	5D038	S	5D039	-
6D	CAMRY	LE	2007	L4	2.4L	5	5/27/2010	6D040	N	6D041	S	6D042	N	6D043	S	6D044	N	-	-	6D072	S
7D	CAMRY	XLE	2005	L4	2.4L	5	5/13/2010	7D015	S	7D016	N	7D017	S	7D018	N	7D019	S	7D046	S	-	-
8D	CAMRY	XLE	2001	V6	3.0L	4	5/10/2010	8D057	-	8D058	-	8D059	-	8D060	-	8D061	-	8D086	-	8D091	-
9D	CAMRY	LE	2005	V6	3.0L	5	6/18/2010	9D053	S	9D008	N	9D008	S	9D010	N	9D011	S	9D080	N	9D081	S
10D	CAMRY	LE	2007	V6	3.5L	6	6/14/2010	10D007	S	100D08	N	10D009	S	10D010	N	10D011	S	10D039	S	10D040	N
11D	CAMRY	XLE	2005	V6	3.0L	5	6/10/210	11D007	S	11D008	N	11D009	S	11D010	N	11D011	S	11D039	S	11D040	Ν
12C	CAMRY	XLE	2007	V6	3.5L	6	6/1/2010	12C008	S	12C009	N	12C010	S	12C011	N	12C012	S	12C041	S	12C042	N
13C	CAMRY	XLE	2002	V6	3.0L	4	6/2/2010	13C007	S	13C008	N	13C009	S	13C010	N	13C011	S	13C040	S	13C041	N
14C	CAMRY	XLE	2004	V6	3.0L	5	6/3/2010	14C007	S	14C008	N	14C009	S	14C010	N	14C011	S	14C037	S	14C039	N
15C	CAMRY	XLE	2003	L4	2.4L	4	6/4/2010	15C007	S	15C008	N	15C009	S	15C010	N	15C011	S	15C038	S	15C039	N
16C	CAMRY	-	2009	L4	2.4L	5	6/7/2010	16C007	S	16C008	N	16C009	S	16C010	N	16C011	S	16C038	S	16C039	N
17C	CAMRY	LE	2004	L4	2.4L	4	6/8/2010	17C007	S	17C008	N	17C009	S	17C010	N	17C011	S	17C038	S	17C039	N
18C	CAMRY	LE	2004	L4	2.4L	4	6/15/2010	18C011	S	18C007	S	18C008	N	18C009	S	18C010	N	18C016	S	18C040	Ν
19C	CAMRY	LE	2007	L4	2.4L	5	6/16/2010	19C011	S	19C003	S	19C004	N	19C005	S	19C006	Ν	19C038	S	19C039	N
20C	CAMRY	LE	2004	L4	2.4L	4	6/24/2010	20C007	S	20C008	N	20C009	S	20C010	N	20C011	S	20C039	S	20C040	N

#### APPENDIX E5A - Module 5 – Acceleration and Braking Summary (Page 1 of 2)

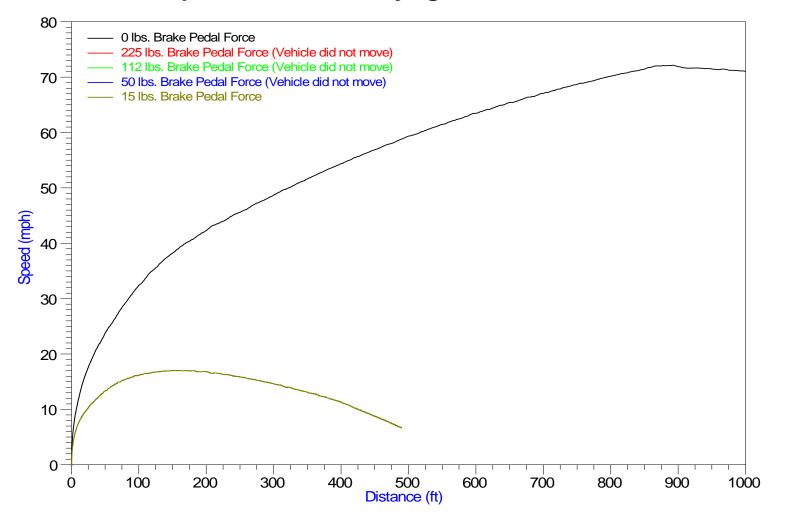
#### APPENDIX E5A - Module 5 – Acceleration and Braking Summary (Page 2 of 2)

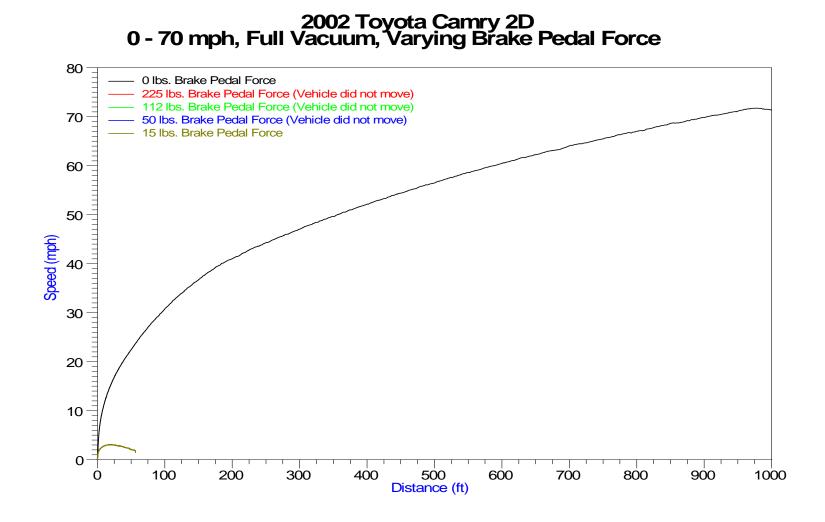
																				M	odule 5	5											
			Vehi	cle Info	rmation																TF107												
																				Ful	l Vacuu	m											
									225	bs. Brake	Pedal	Force			1121	bs. Brak	e Pedal	Force			50 lb	s. Brake	Pedal I	Force			15 II	s. Brake	Pedal	Force		Variable F	Pedal Force
					Engine	Transmission	Date	0.70	nph	70-0n	nph	70-0mp	h WOT	0.70	mph	70-0	mph	70-0mp	h WOT	0.70	nph	70-0n	nph	70-0mp	h WOT	0.70	mph	70-0	nph	70-0mp	h WOT	Stati	onary
Veh. ID.	Model	Trim Line	MY	Config.	Displacement	Fwd Speeds	Tested	File #	Dir.	File #	Dir.	File #	Dir.	File #	Dir.	File #	Dir.	File #	Dir.	File #	Dir.	File #	Dir.	File #	Dir.	File #	Dir.	File #	Dir.	File #	Dir.	File #	Direction
1D	CAMRY	SE	2002	V6	3.0L	4	5/19/2010		N	1D015	N	1D016	S	10017	N	1D018	N	1D019	S	1D020	N	1D021	N	1D022	S	1D025	N	1D023	N	1D046	1.1	10024	N
20	CAMRY	XLE	2002	L4	2.4L	4	5/20/2010	20012	N	20013	N	20014	S	2D015	N	2D016	N	2D017	S	2D018	N	2D019	N	2D020	S	20022	N	2D021	S	2D040	-	20023	N
30	CAMRY	LE	2001	L4	2.2L	3	5/14/2010	3D035	N	3D036	S	3D037	S	3D032	S	3D034	N	3D033	N	3D031	S	3D030	S	3D029	S	3D040	1.1	3D028	S	3D044		30038	N
4D	CAMRY	SE	2007	L4	2.4L	5	5/25/2010	4D049	S	40050	S	4D051	N	4D052	S	4D053	S	4D054	N	4D055	S	4D056	S	4D057	N	4D060	S	4D058	S	4D059	N	40061	S
50	CAMRY	LE	2006	L4	2.4L	5	5/25/2010	5D011	S	50012	S	50013	N	5D014	S	5D015	S	5D016	N	5D017	\$	5D018	S	5D019	N	5D022	1.1	5D020	s	5D021	N	50023	S
6D	CAMRY	LE	2007	L4	2.4L	5	5/27/2010	6D045	S	60C46	S	6D047	N	6D048	S	6D049	N	6D050	S	6D051	N	6D052	N	6D053	S	6D071	N	6D054	N	6D075	-	6D055	N
70	CAMRY	XLE	2005	L4	2.4L	5	5/13/2010	7D020	N	70021	N	70022	S	7D023	S	7D024	S	7D025	S	7D026	\$	7D027	S	7D028	N	1.1	1.0	7D029	N	7D030	S	70031	S
80	CAMRY	XLE	2001	V6	3.0L	4	5/10/2010	8D063	-	80064		8D065		8D066	-	8D067	-	8D068		8D069		8D070	-	8D071		8D087		8D072	-	8D094	-	80073	-
90	CAMRY	LE	2005	V6	3.0L	5	6/18/2010		S	90055	S	9D056	N	9D057	S	90058	S	9D059	N	9D060	\$	9D061	S	9D062	N	9D065	S	90063	s	9D064	N	90066	N
10D	CAMRY	LE	2007	V6	3.5L	6	6/14/2010	10D012	N	10D013	N	10D015	N	10D016	S	10D017	S	10D018	N	10D019	S	10D020	S	10D021	N	10D024	S	10D022	S	10D023	N	10D025	N
11D	CAMRY	XLE	2005	V6	3.0L	5	6/10/210	11D012	N	11D013	N	11D014	s	11D015	N	11D017	N	11D018	S	11D019	N	11D020	S	11D021	S	11D022	N	11D023	S	11D024	N	11D025	N
12C	CAMRY	XLE	2007	V6	3.5L	6	6/1/2010	12C013	S	12C014	S	12C015	N	12C016	N	12C017	N	12C018	S	12C019	N	12C020	N	12C021	S	12C024	N	12C022	N	12C023	S	12C026	N
13C	CAMRY	XLE	2002	V6	3.0L	4	6/2/2010	13C012	S	13C014	N	13C015	N	13C016	S	13C017	S	13C018	N	13C019	S	13C020	S	13C021	N	13C022	N	13C023	S	13C024	N	13C025	S
14C	CAMRY	XLE	2004	V6	3.0L	5	6/3/2010	14C012	N	14C013	N	14C014	N	14C015	N	14C016	S	14C017	S	14C018	S	14C019	S	14C020	N	14C021	N	14C022	N	14C038	S	14C023	N
15C	CAMRY	XLE	2003	L4	2.4L	4	6/4/2010	15C012	S	15C013	S	150014	N	15C015	S	15C016	S	15C017	N	15C018	5	15C019	S	15C020	N	150023	S	150021	S	15C022	N	15C024	S
16C	CAMRY	-	2009	L4	2.4L	5	6/7/2010	16C012	S	16C013	\$	16C014	N	15C015	S	16C016	S	16C017	N	16C018	\$	16C019	\$	16C020	N	16C023	S	16C021	S	16C022	N	16C024	S
17C	CAMRY	LE	2004	L4	2.4L	4	6/8/2010	17C012	N	17C013	N	17C014	S	17C015	N	17C016	N	17C017	S	17C018	N	17C019	N	17C020	S	17C021	S	17C022	S	17C023	N	17C024	S
18C	CAMRY	LE	2004	_L4	2.4L	4	6/15/2010		N	18C038	8	18C039	S	13C033	N	18C036	N	18C034	N	18C032	N	18C031	8	18C030	S	18C013	N	18C015	N	18C014	8	18C012	N
19C	CAMRY	LE	2007	L4	2.4L	5	6/16/2010		N	19C013	N	190014	s	19C015	N	19C016	N	19C017	S	19C018	N	19C019	N	19C020	S	190023	S	190021	s	19C022	N	19C024	S
20C	CAMRY	LE	2004	L4	2.4L	4	6/24/2010	20C013	S	20C014	S	20C015	N	20C016	S	20C017	S	20C018	N	20C019	\$	20C020	\$	20C021	S	20C024	S	20C022	S	20C023	\$	20C025	S

																					Module	5												
			Veh	icle Info	ormation																TF107													
								Full Vacuur													No	Vacuu	n											
								ble Pedal I		225 R	or. Brake	Podal	Force			112 lb	s. Brake	Pedal I	Force			50 Ib	s. Erako	Pedal I	Force			15 R	e. Brake	Pedal I	Force		Variable P	edal Force
					Engine	Transmission	Date	Stationary	0.70	noh	73-0	nph	70.0m;	h WOT	0.70	nph	70.0	nph	70-0mp	h WOT	0.70a	nph	70-0n	nph	70-0mp	h WOT	0.701	nph	70.0	nph	70-0mp1	h WOT	Stati	onary
Veh. ID.	Model	Trim	MY	Config	Displacement	Fwd Speeds	Tested	Direction	File #	Dir.	File#	Dir.	File #	Dir.	File #	Dir.	File #	Dir.	File #	Dir.	File #	Dir.	File #	Dir.	File #	Dir.	File #	Dir.	File #	Dir.	File #	Dir.	File #	Dir.
1D	CAMRY	SE	2002	V6	3.0L	- 4	5/19/2010	N	10025	- 8	10027	\$	10028	N	1D029	5	10030	- 5	10031	N	10032	\$	10033	3	1D034	N	1D038	N	10035	N	1D036	8	10037	N
20	CAMRY	XLE	2002	1.4	2.4L	4	5/20/2010	N	20024	s	20025	- 8	20026	N	20027	\$	20028	s	20029	N	20030	s	20031	N	20032	- 8	20035	N	20033	N	20034	s	20036	S
30	CAMRY	LE	2001	L4	2.2L	3	5/14/2010	N	30025	S	30025	\$	30024	S	3D023	N	30022	N	30021	S	30020	N	30019	S	3D018	S	3D041		30016	S	3D015	S	30027	S
4D	CAMRY	SE	2007		2.4L	5	5/25/2010	S	40062	S	4D053	- 5	4D064	N	4D065	S	4D066	s	40057	N	4D068	S	40069	S	4D070	N	4D075	s	40072	S	4D074	N	40075	N
5D	CAMRY	LE	2005	L4	2.4L	5	5/25/2010	8	50027	N	5D028	N	5D029	8	5D030	s	5D031	8	5D032	N	5D033	8	50034	8	5D035	N	5D024		5D025	N	5D026	8	50037	8
6D	CAMRY	LE	2007	L4	2.4L	5	5/27/2010	N	60055	S	6D057	S	6D058	N	6D059	S	60060	S	6D061	S	6D062	S	60063	S	6D065	N	6D069	s	60066	N	6D067	S	6D068	S
70	CAMRY	XLE	2005	L4	2.4L	5	5/13/2010	S	70032	S	7D033	\$	70034	N	7D035	\$	7D036	S	70037	N	7D038	\$	70039	S	7D040	N	7D044	s	70041	S	70042	N	70043	S
8D	CAMRY	XLE	2001	V6	3.0L	4	5/10/2010	-	80074	-	800/5	1.0	80076		80077		80078	-	80079		80080	-	80081	-	80082		80088	-	80083	-	480CB	-	80085	
90	CAMRY	L	2005	V6	3.0L	6	6/18/2010	N	90067	N	90068	N	90069	s	90070	N	90071	\$	90072	N	90073	s	90074	s	90076	N	90078	s	90076	s	\$0077	N	90079	N
10D	CAMRY	LE	2907		3.5L	6	6/14/2010	N	10D026	S	100027	- 5	100028	N	10D029	S	100030	s	10D031	N	10D332	s	100033	N	10D034	S	10D037	N	100035	N	10D036	S	10D038	S
11D	CAMRY	XLE	2005	V6	3.0L	5	6/10/210	N	11D026	N	11D027	N	110028	S	11D029	N	11D030	s	11D031	N	11D032	S	110033	N	11D034	S	11D035	N	11D035	S	11D037	S	11D038	S
120	CAMRY	XLE	2007		3.5L	6	6/1/2010	N	12C028	N	120829	N	120030	5	12C031	N	120032	3	12C033	N	12C034	5	120035	N	12C036	5	12C039	N	120037	N	12C038	3	12C040	N
13C	CAMRY	XI.E	2002		3.0L	4	6/2/2010	S	130026	S	130827	S	130028	N	13C029	S	130030	S	13C031	N	13C132	S	130033	S	13C034	N	13C038	N	130035	N	13C037	N	13C039	S
14C	CAMRY	XLE	2104	V6	3.0L	5	6/3/2010	N	14C024	S	14C825	S	14C026	S	14C027	S	140028	S	14C029	S	14C030	N	14C031	S	14C032	S	14C036	N	140033	N	14C034	S	14C035	N
15C	CAMRY	XLE	2003	L4	2.4L	4	6/4/2010	S	150025	S	15C826	S	150027	N	15C028	S	150029	S	15C030	N	15C031	S	150032	S	15C033	N	15C036	s	150034	S	15C035	N	15C037	N
16C	CAMRY	-	2009		2.4L	5	6/7/2010	5	16C025	- 6	160826	- 6	160027	N	16C028	\$	160029	- 6	16C030	N	160331	\$	160032	S	16C033	N	16C036	s	160034	6	160035	N	16C037	N
17C	CAMRY	LE	2104	1.4	2.4L	4	6/8/2010	S	17C025	S	17C026	\$	17C027	N	17C028	\$	170029	S	17C030	N	17C331	s	170032	S	17C033	N	17C034	N	170035	S	17C036	N	17C037	N
18C	CAMRY	LE	2004	L4	2.4L	4	6/15/2010	N	18C027	S	180828	\$	180029	N	18C026	N	180025	N	18C024	S	18C323	s	180022	N	19C021	N	18C020	s	180019	N	18C018	S	18C017	S
19C	CAMRY	LE	2007		2.4L		6/16/2010	s	19C025	5	190825	-5	190027	N	19C028	5	190029	5	19C030	N	190331	5	190032	5	19C033	N	19C036	N	190034	5	19C035	N	190037	N
20C	CAMRY	LE	2104	L4	2.4L	4	6/24/2010	S	20C026	S	20C027	S	200028	S	20C029	8	20C030	S	20C031	S	20C032	S	200033	S	20C034	S	20C037	N	200035	N	20C036	S	20C038	S

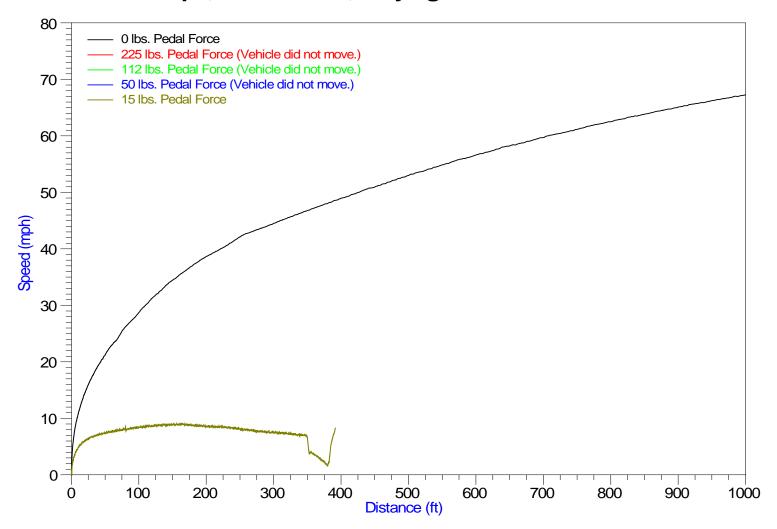
# 0 to 70 mph Acceleration With Full Vacuum And Varying Brake Pedal Force Testing

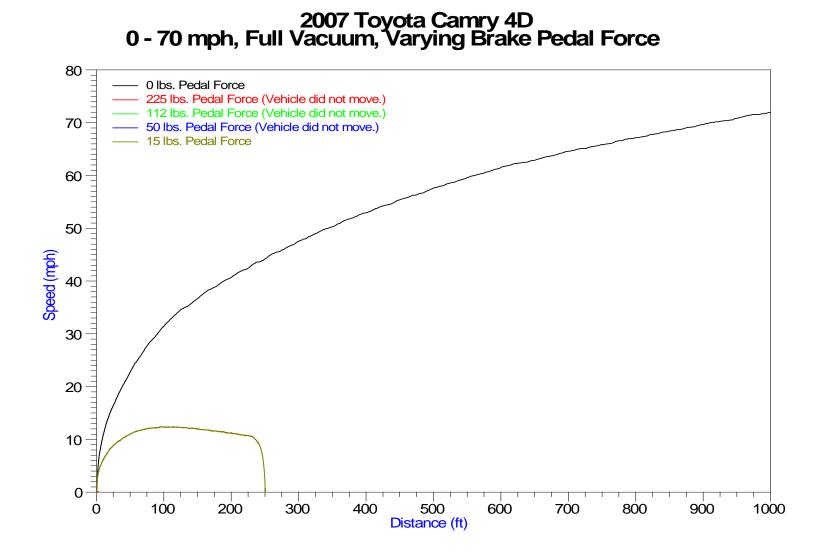
2002 Toyota Camry 1D 0 - 70 mph, Full Vacuum, Varying Brake Pedal Force



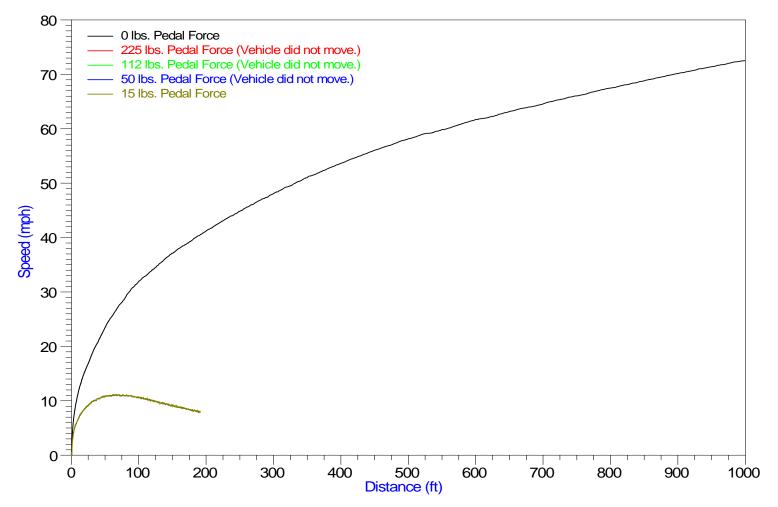


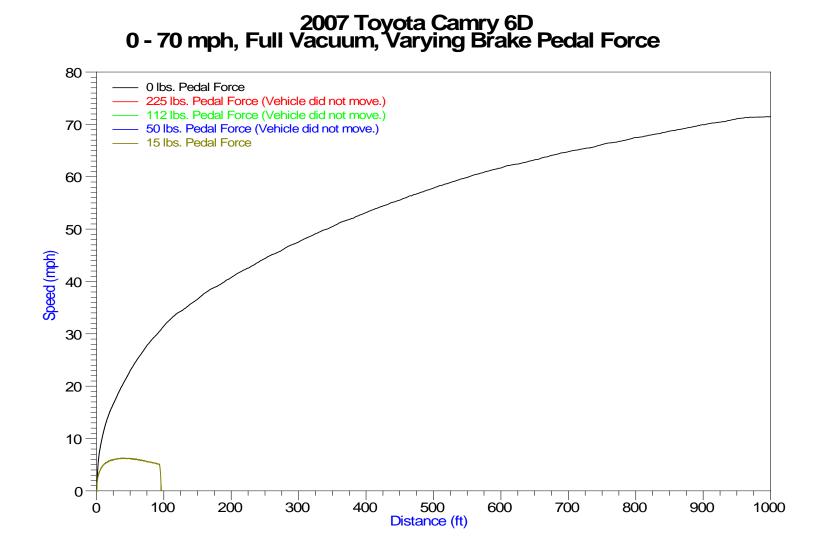
#### 2001 Toyota Camry 3D 0 - 70 mph, Full Vacuum, Varying Brake Pedal Force

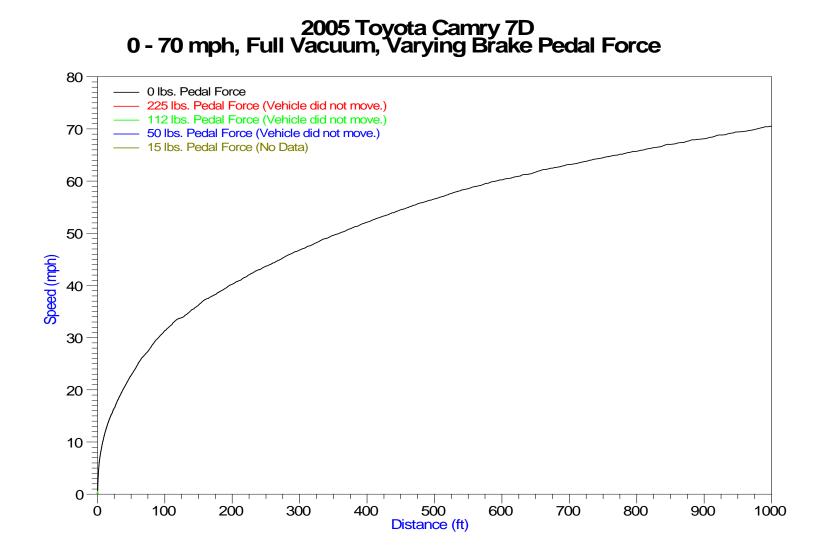


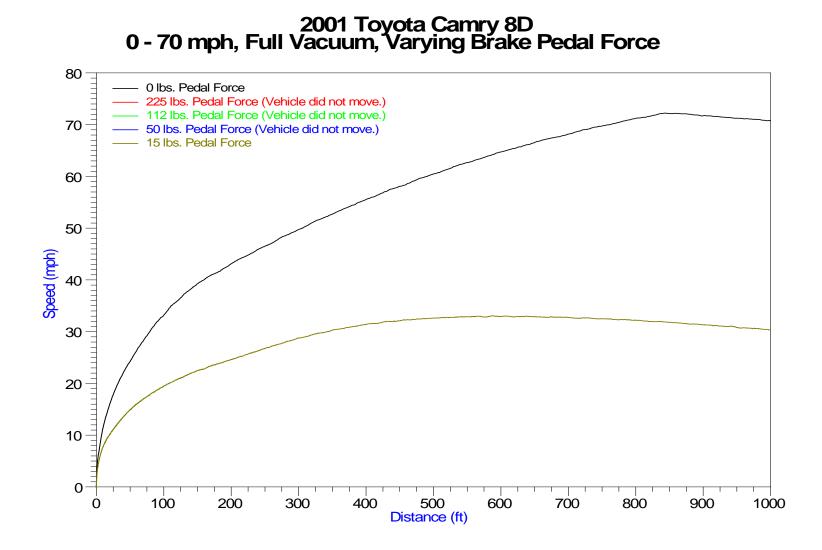


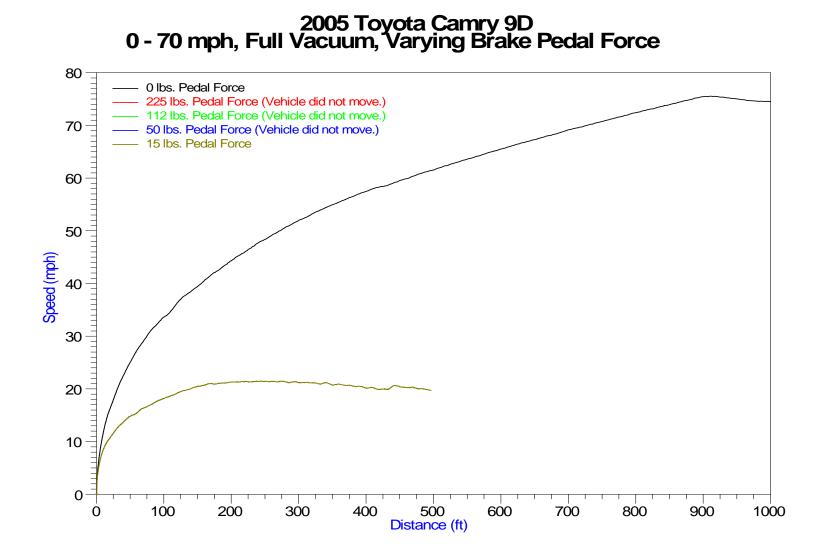


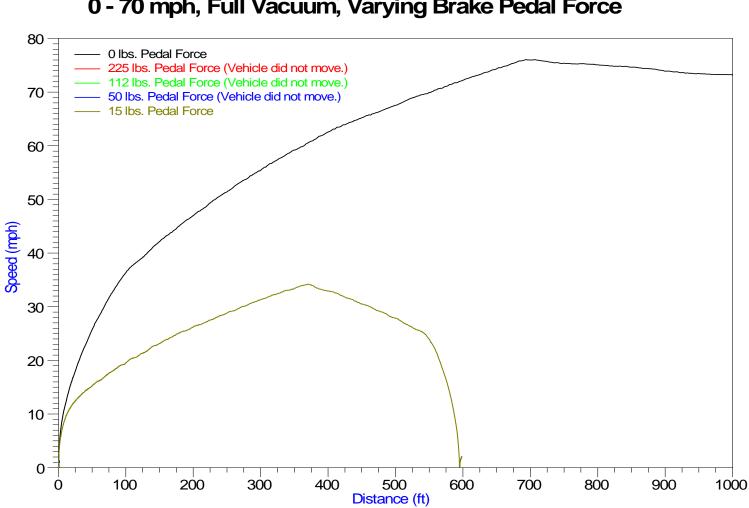






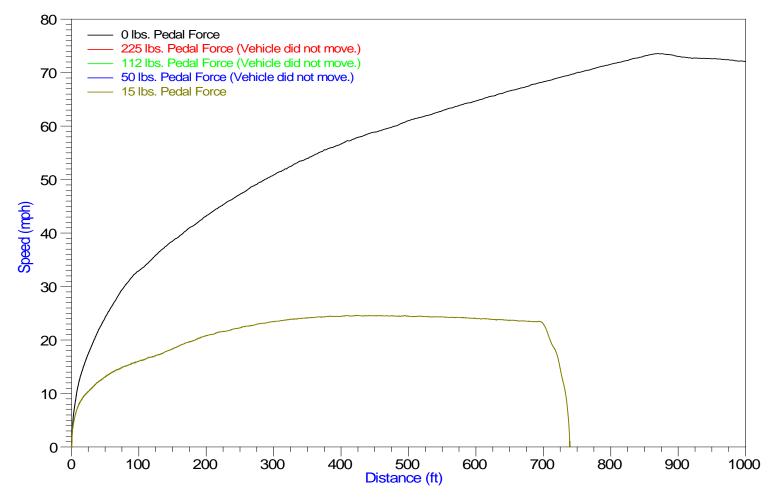


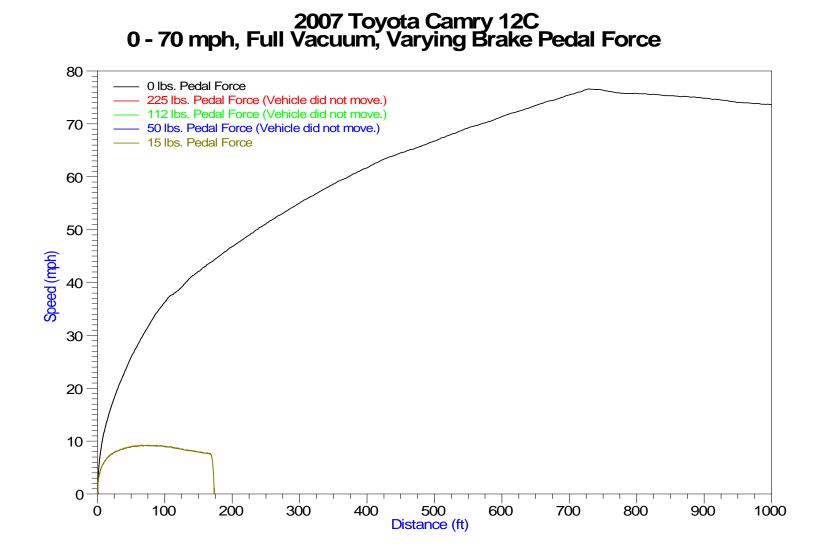




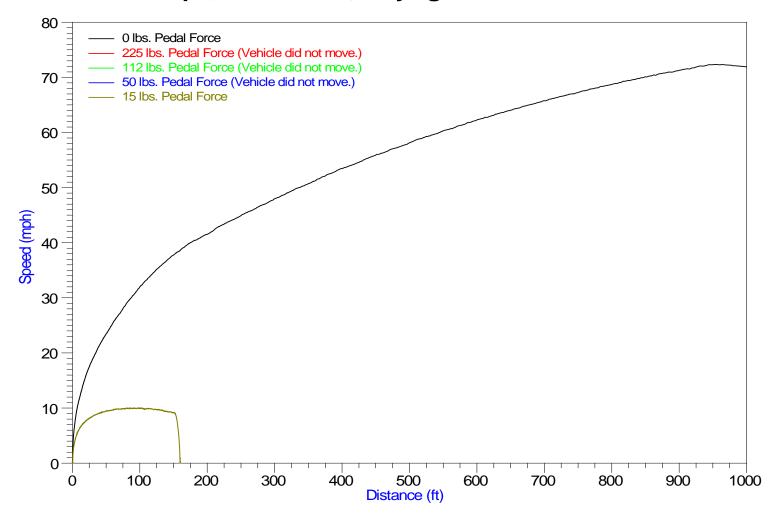
2007 Toyota Camry 10D 0 - 70 mph, Full Vacuum, Varying Brake Pedal Force



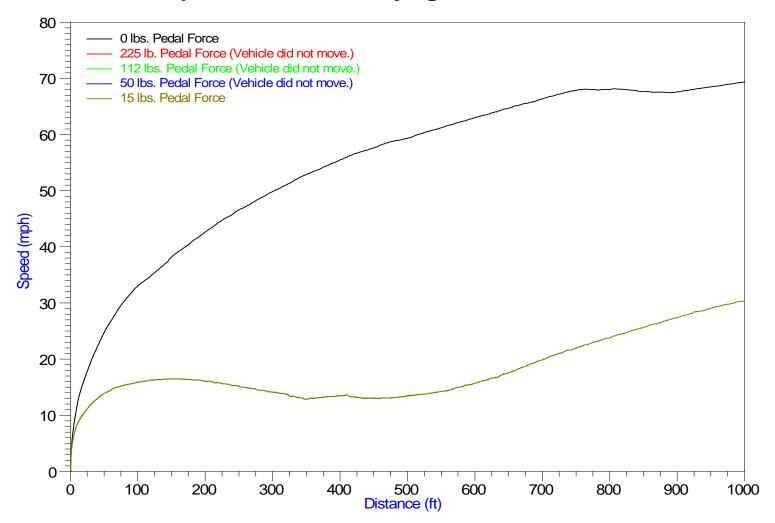




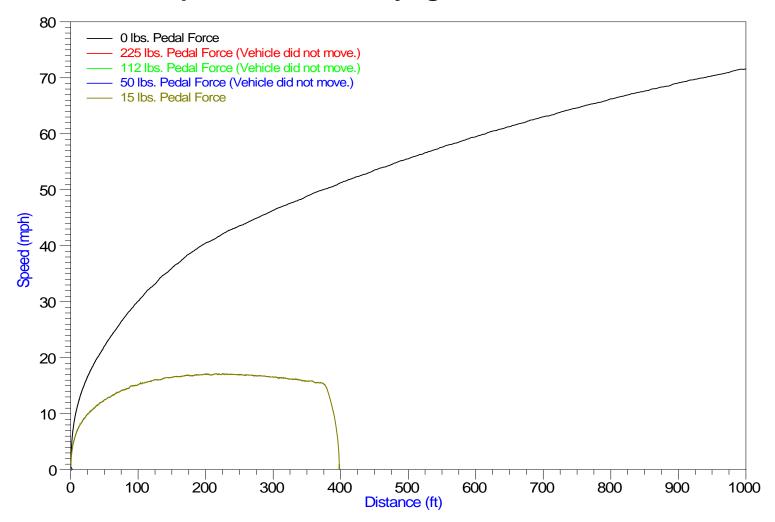
2002 Toyota Camry 13C 0 - 70 mph, Full Vacuum, Varying Brake Pedal Force



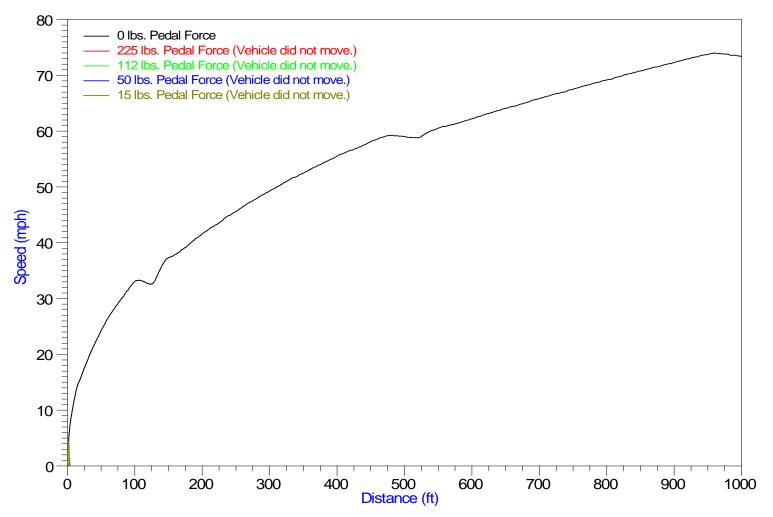
2004 Toyota Camry 14C 0 - 70 mph, Full Vacuum, Varying Brake Pedal Force



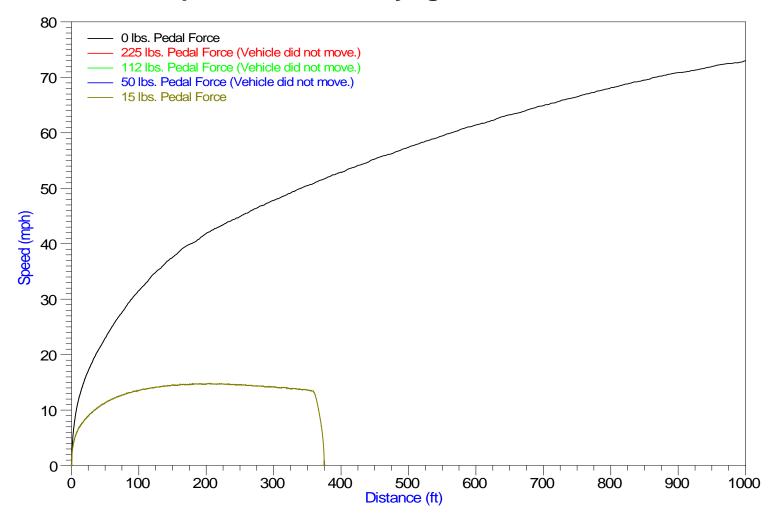
#### 2003 Toyota Camry 15C 0 - 70 mph, Full Vacuum, Varying Brake Pedal Force



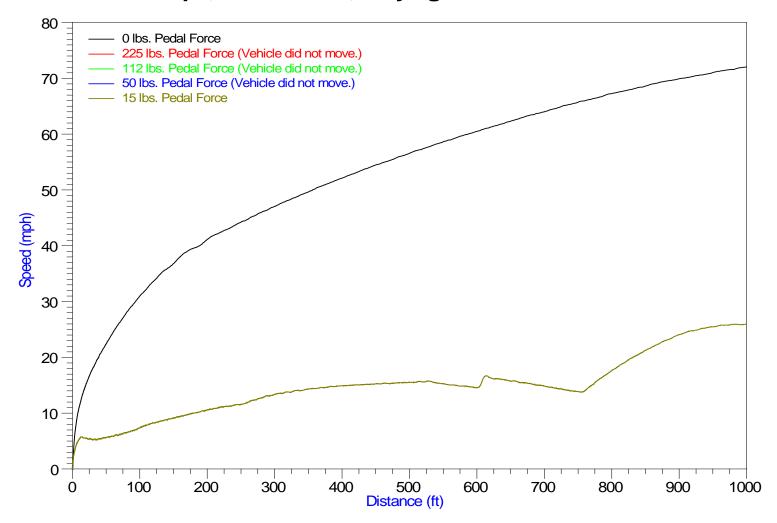




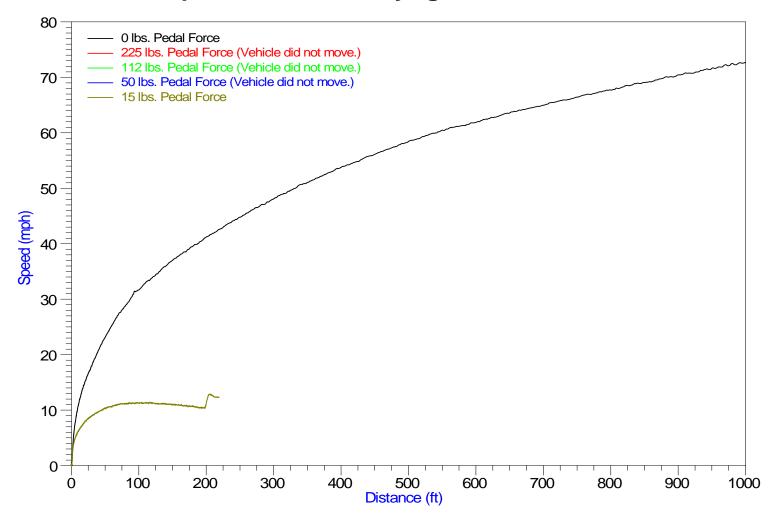
2004 Toyota Camry 17C 0 - 70 mph, Full Vacuum, Varying Brake Pedal Force



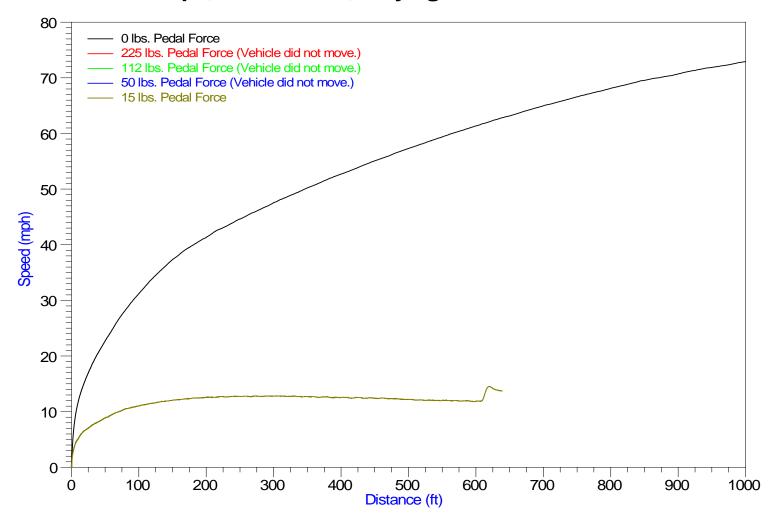
# 2004 Toyota Camry 18C 0 - 70 mph, Full Vacuum, Varying Brake Pedal Force



2007 Toyota Camry 19C 0 - 70 mph, Full Vacuum, Varying Brake Pedal Force

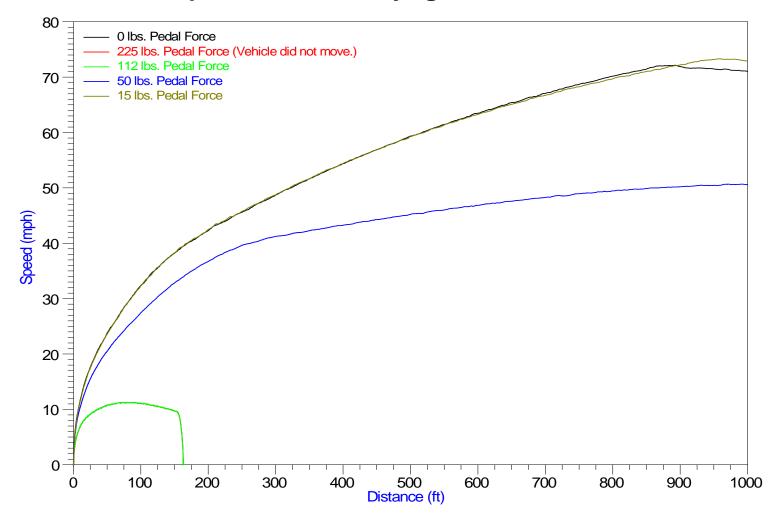


2004 Toyota Camry 20C 0 - 70 mph, Full Vacuum, Varying Brake Pedal Force

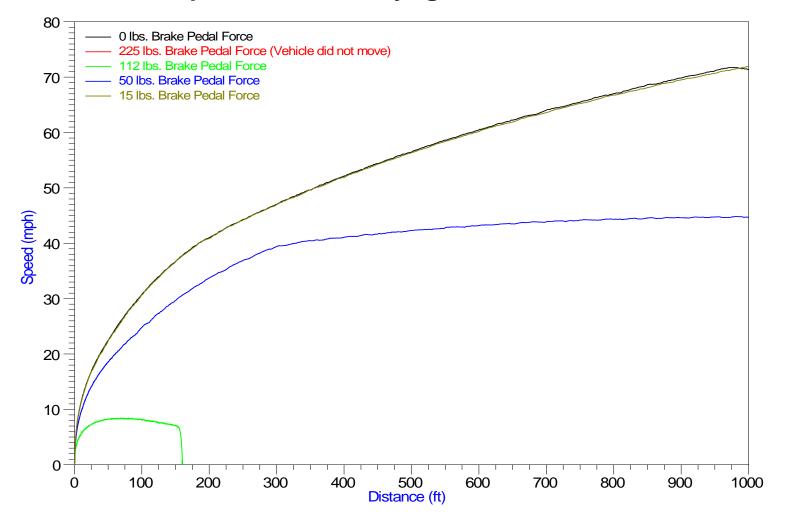


0 to 70 mph Acceleration With No Vacuum And Varying Brake Pedal Force Testing

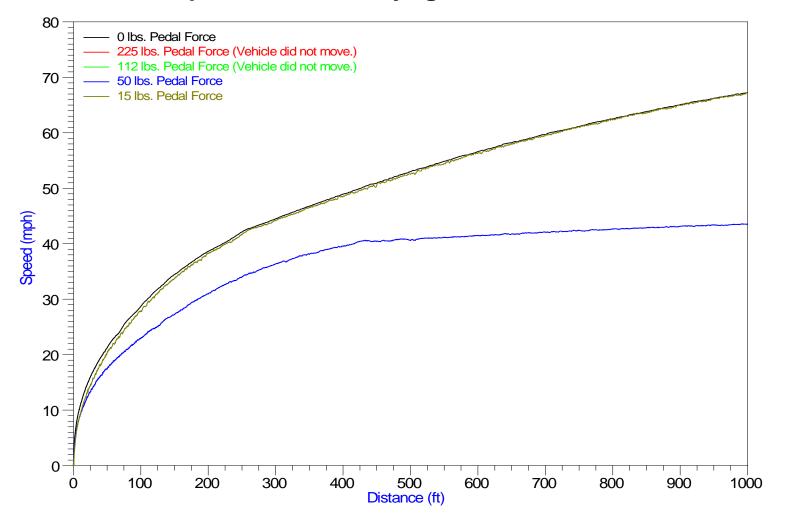
2002 Toyota Camry 1D 0 - 70 mph, No Vacuum, Varying Brake Pedal Force



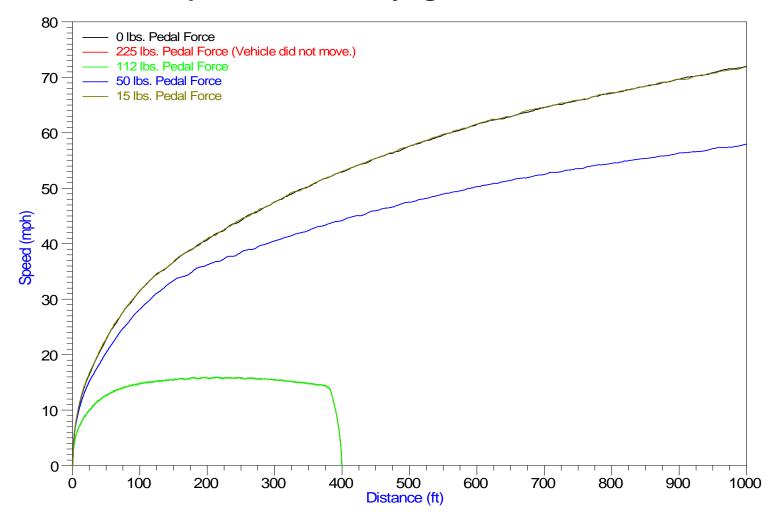
2002 Toyota Camry 2D 0 - 70 mph, No Vacuum, Varying Brake Pedal Force



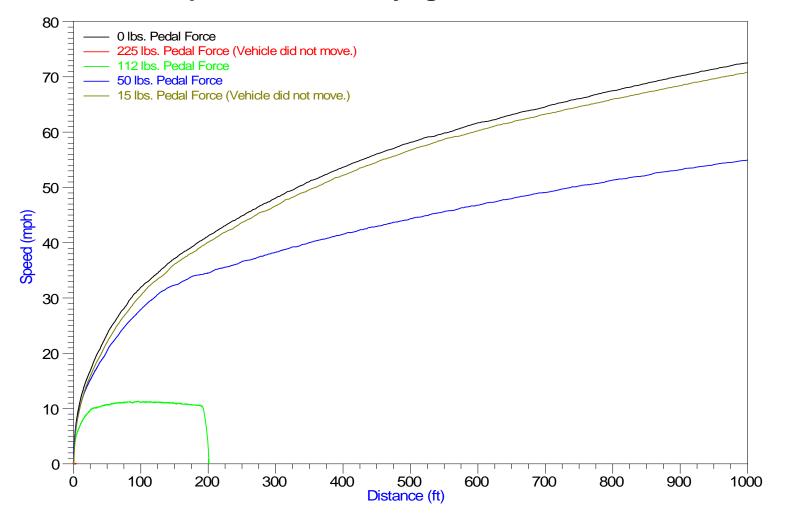
2001 Toyota Camry 3D 0 - 70 mph, No Vacuum, Varying Brake Pedal Force



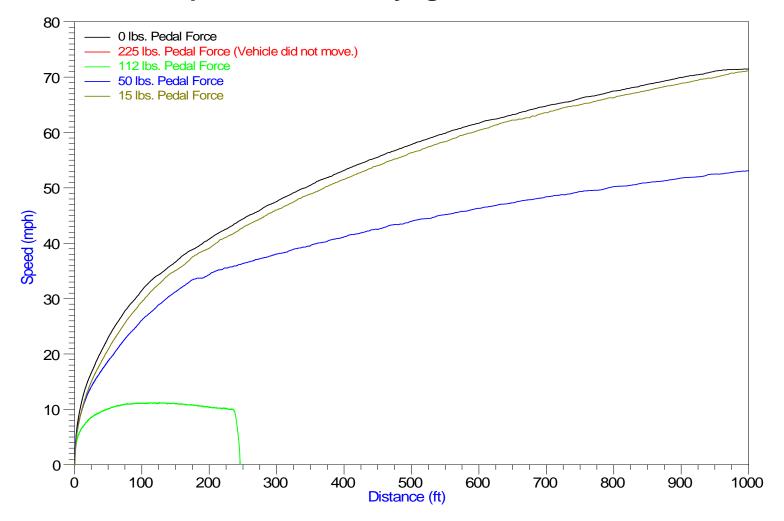
2007 Toyota Camry 4D 0 - 70 mph, No Vacuum, Varying Brake Pedal Force



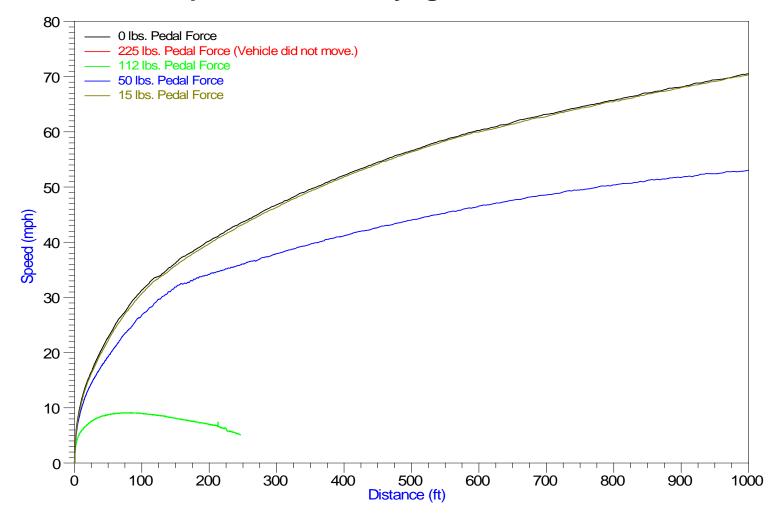
2006 Toyota Camry 5D 0 - 70 mph, No Vacuum, Varying Brake Pedal Force



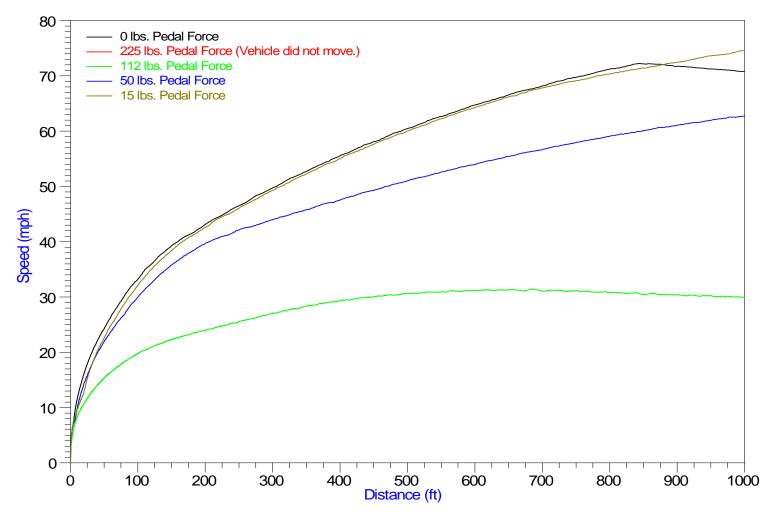
2007 Toyota Camry 6D 0 - 70 mph, No Vacuum, Varying Brake Pedal Force

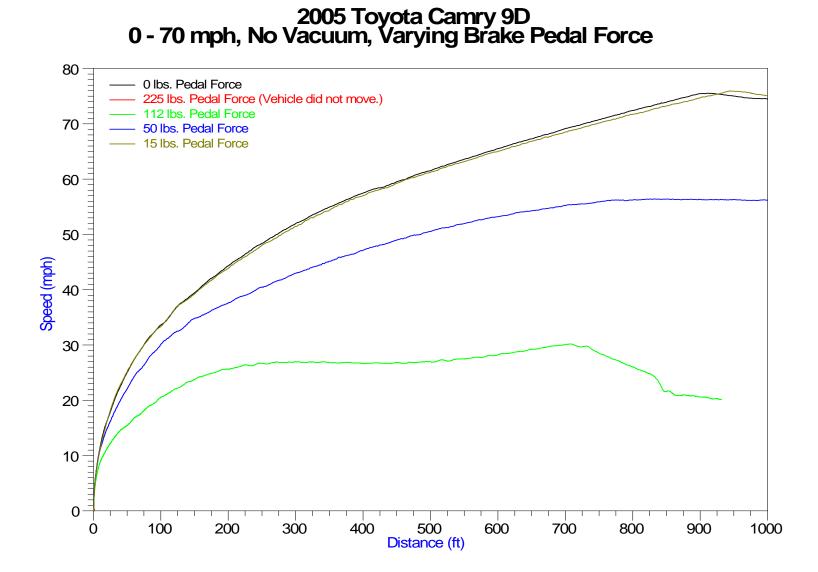


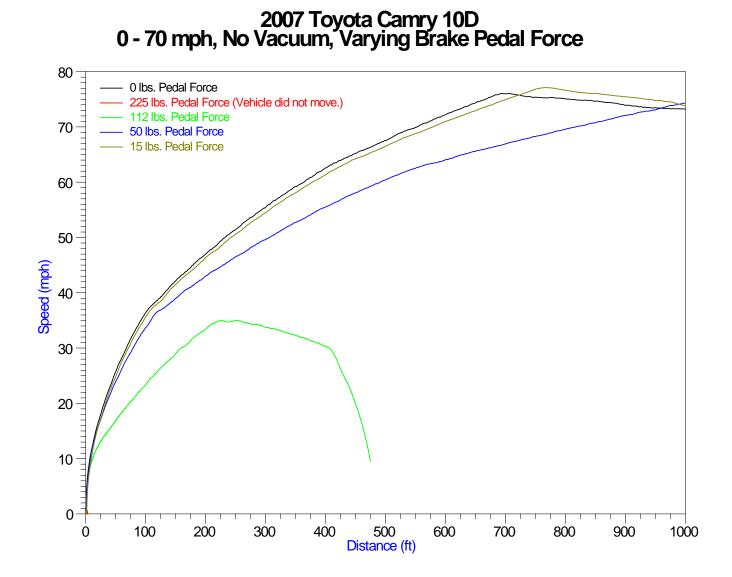
2005 Toyota Camry 7D 0 - 70 mph, No Vacuum, Varying Brake Pedal Force



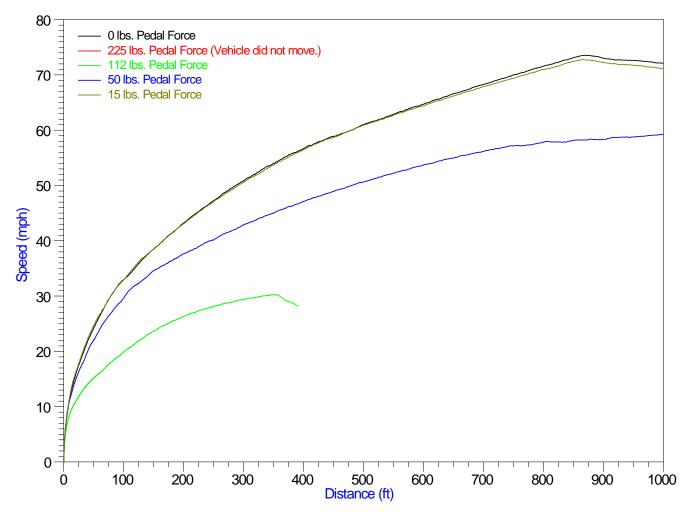


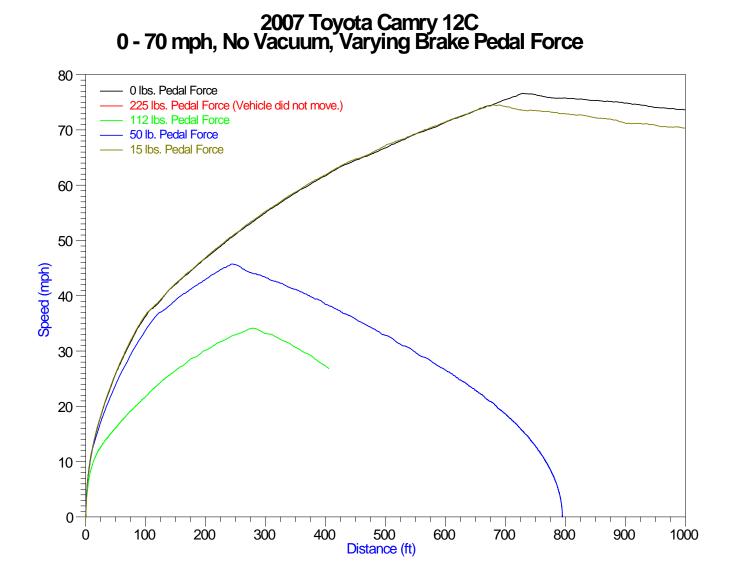




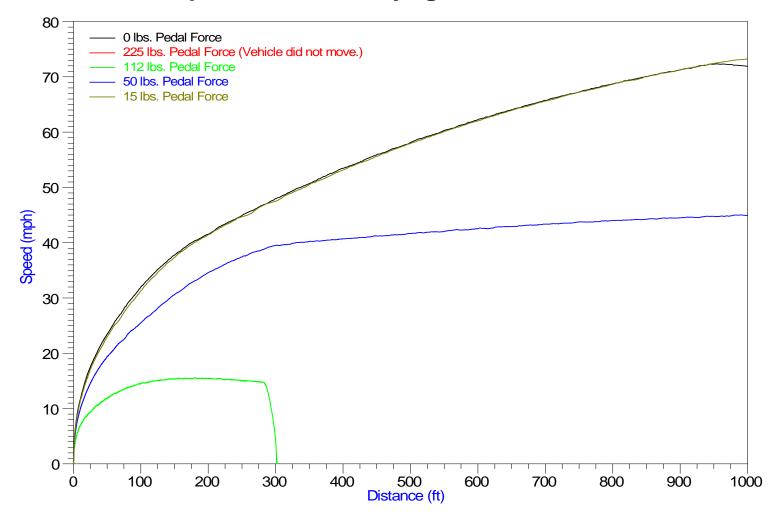




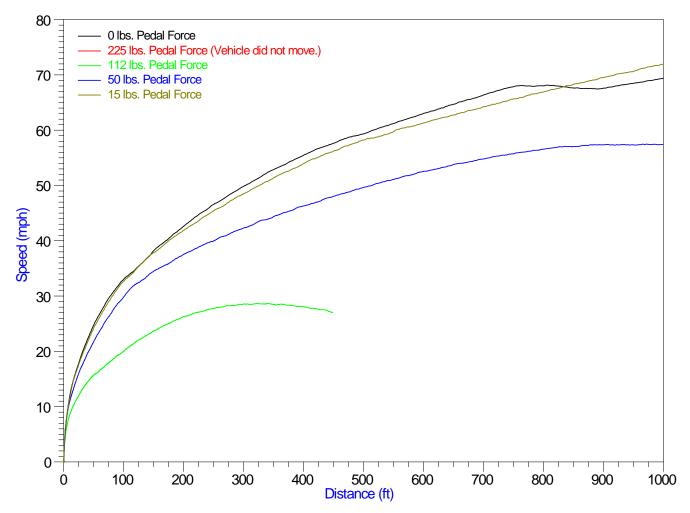




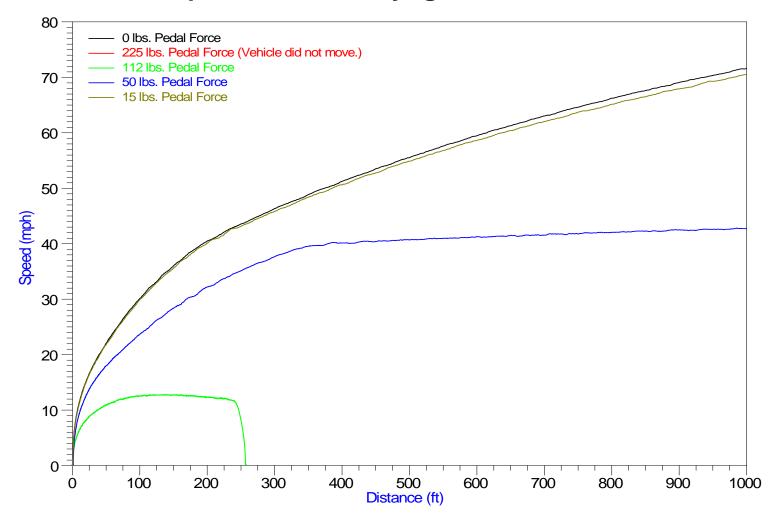
2002 Toyota Camry 13C 0 - 70 mph, No Vacuum, Varying Brake Pedal Force



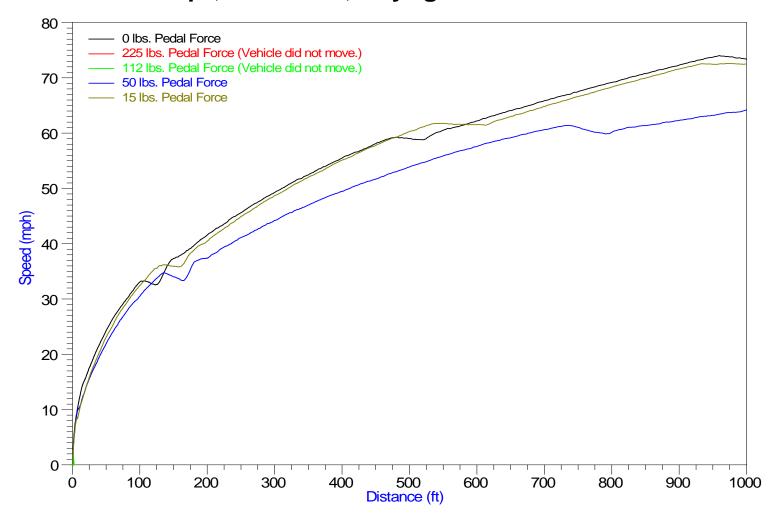




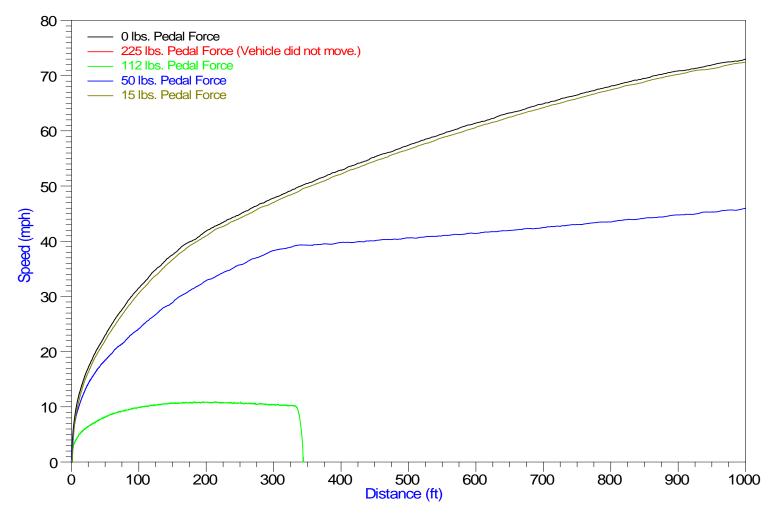
2003 Toyota Camry 15C 0 - 70 mph, No Vacuum, Varying Brake Pedal Force



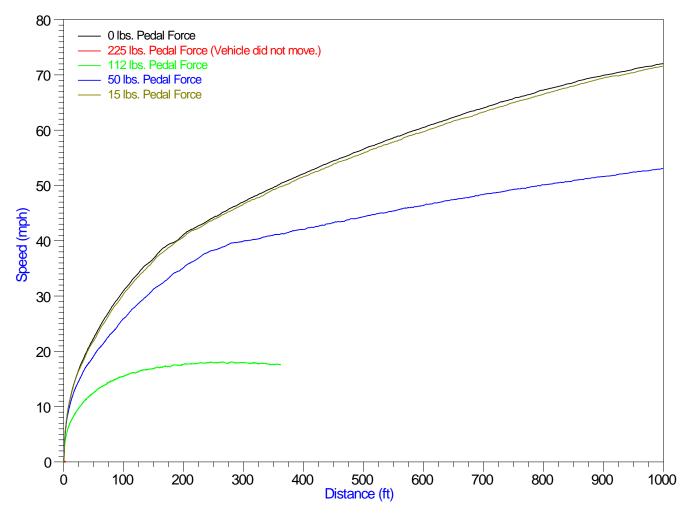
2009 Toyota Camry 16C 0 - 70 mph, No Vacuum, Varying Brake Pedal Force



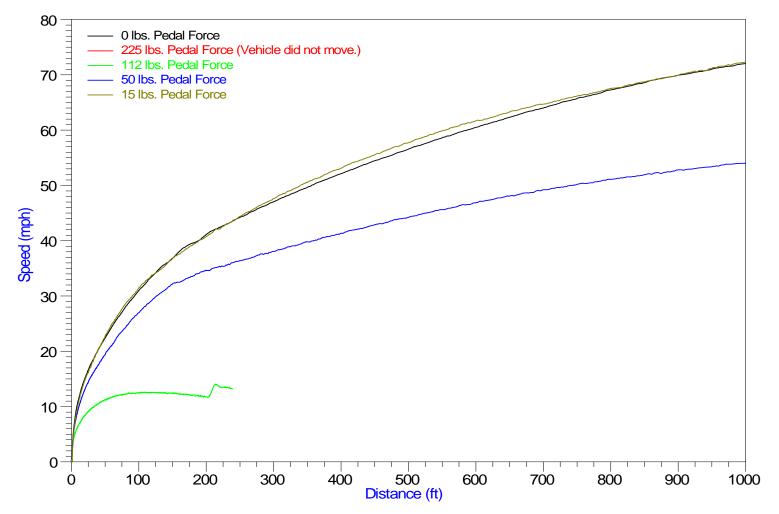




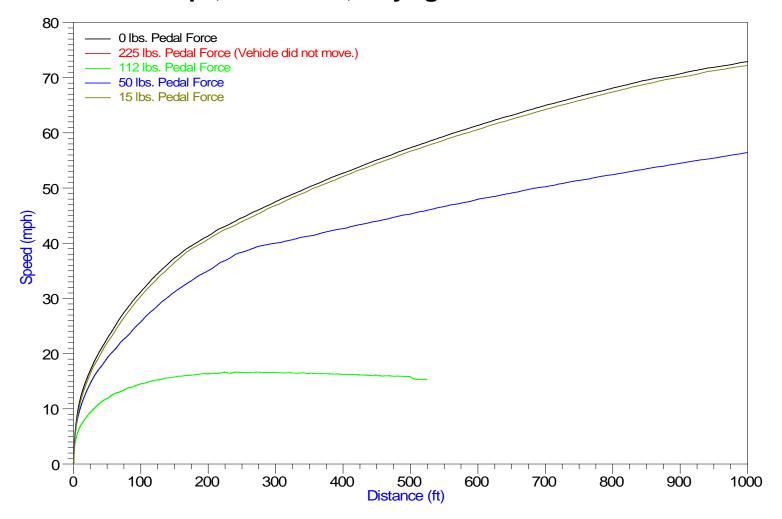






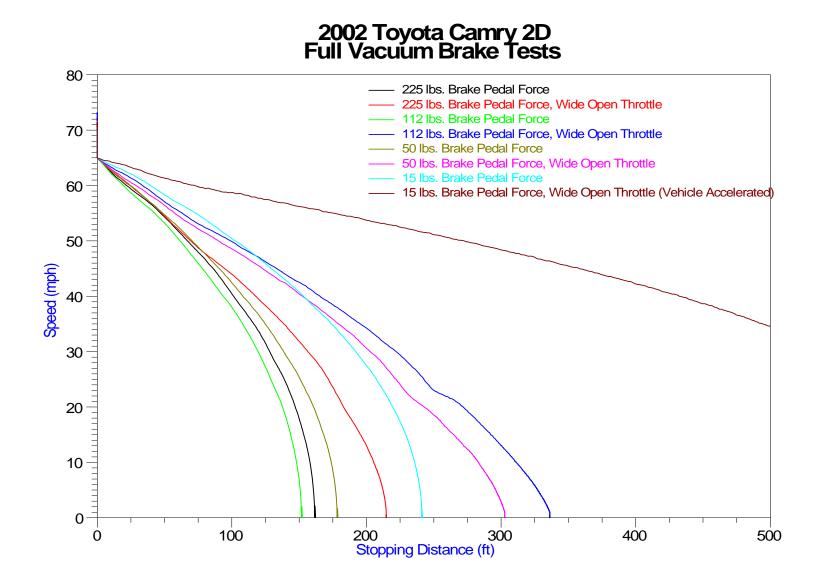


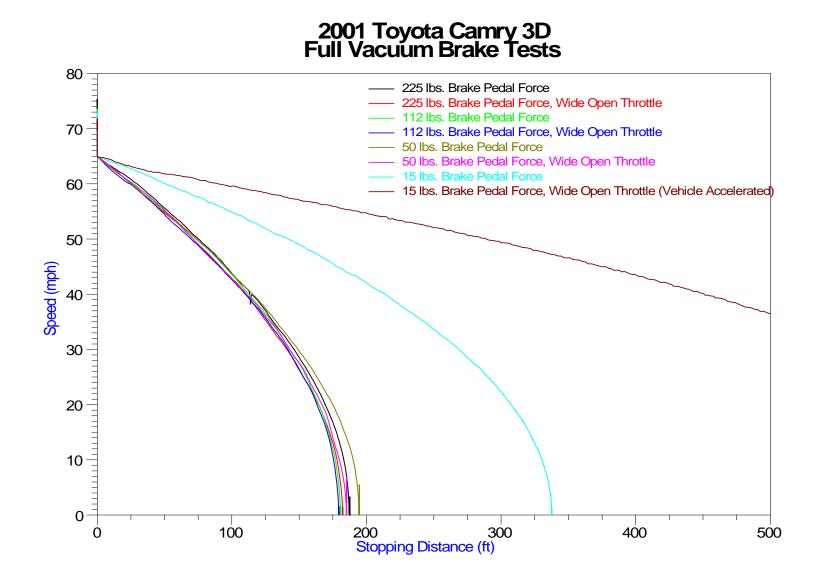
2004 Toyota Camry 20C 0 - 70 mph, No Vacuum, Varying Brake Pedal Force



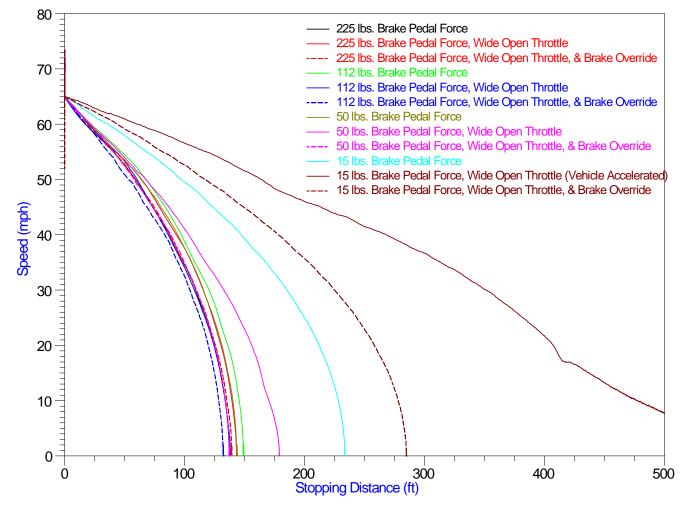
65 to 0 mph Brake Test With Full Vacuum Varying Brake Pedal Force With and Without Wide Open Throttle

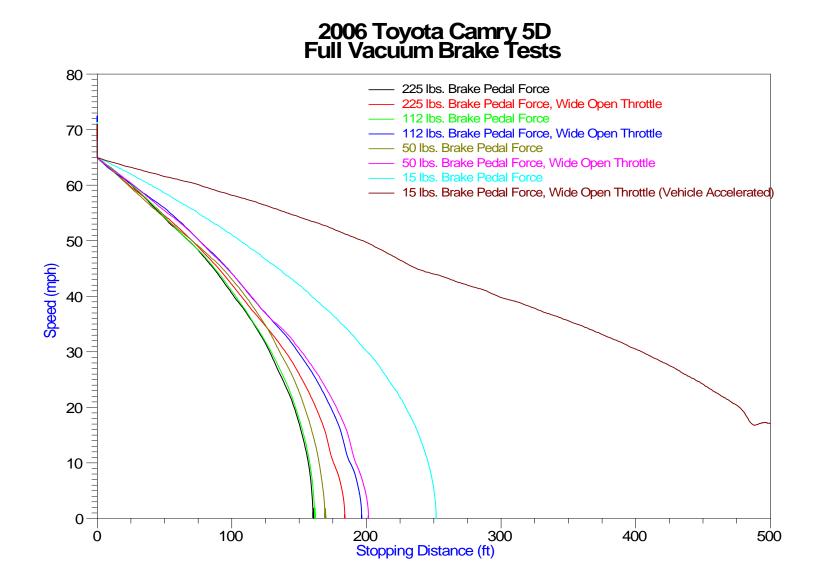
### 2002 Toyota Camry 1D Full Vacuum Brake Tests 80 225 lbs. Brake Pedal Force 225 lbs. Brake Pedal Force, Wide Open Throttle 112 lbs. Brake Pedal Force 70 - 112 lbs. Brake Pedal Force, Wide Open Throttle 50 lbs. Brake Pedal Force 50 lbs. Brake Pedal Force, Wide Open Throttle 15 lbs. Brake Pedal Force 60 50 Speed (mph) 40 30 20 10 0 200 3 Stopping Distance (ft) 100 300 400 500 0



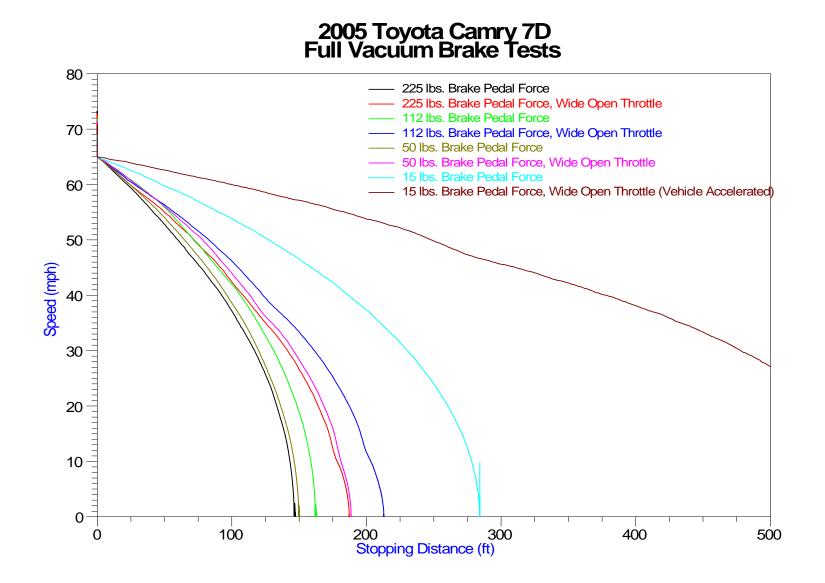


### 2007 Toyota Camry 4D Full Vacuum Brake Tests

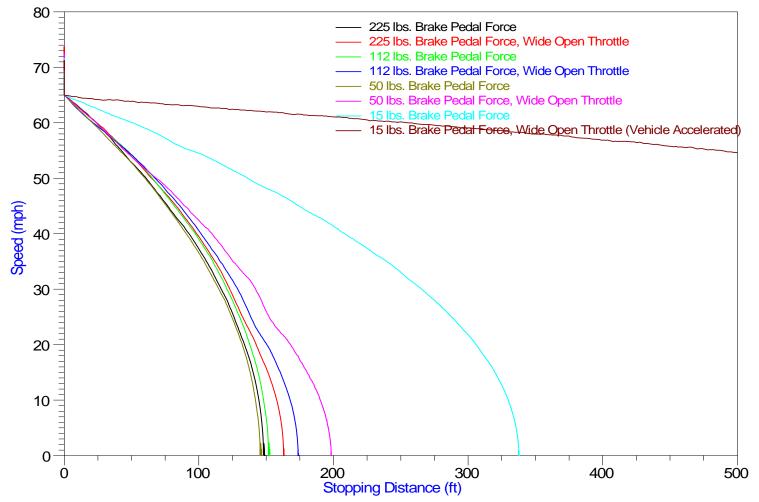


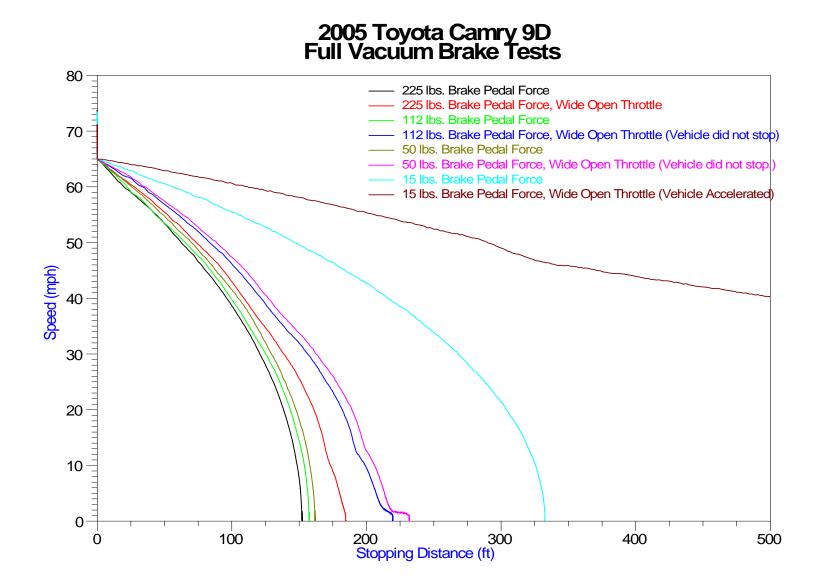


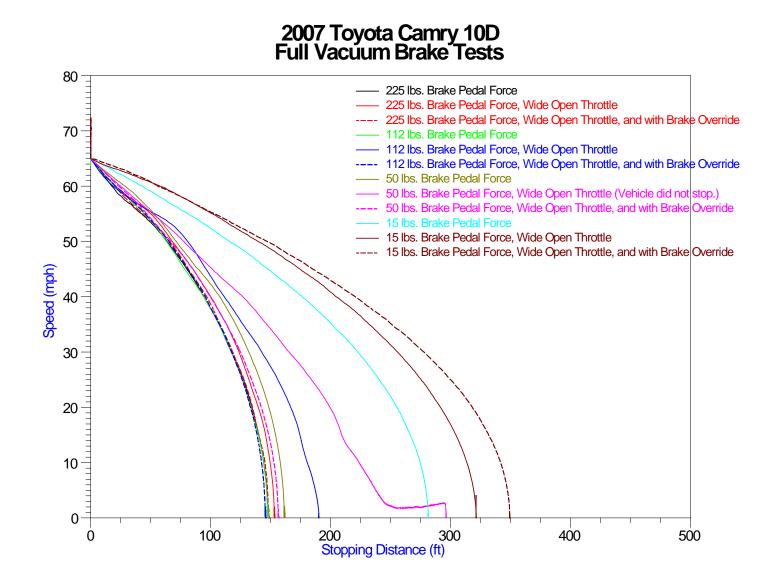
#### 2007 Toyota Camry 6D Full Vacuum Brake Tests 80 225 lbs. Brake Pedal Force 225 lbs. Brake Pedal Force, Wide Open Throttle 112 lbs. Brake Pedal Force 70 - 112 lbs. Brake Pedal Force, Wide Open Throttle 50 lbs. Brake Pedal Force 50 lbs. Brake Pedal Force, Wide Open Throttle 15 lbs. Brake Pedal Force 60 ----- 15 lbs. Brake Pedal Force, Wide Open Throttle (Vehicle Accelerated) 50 Speed (mph) 40 30 20 10 0 100 200 3 Stopping Distance (ft) 0 300 400 500

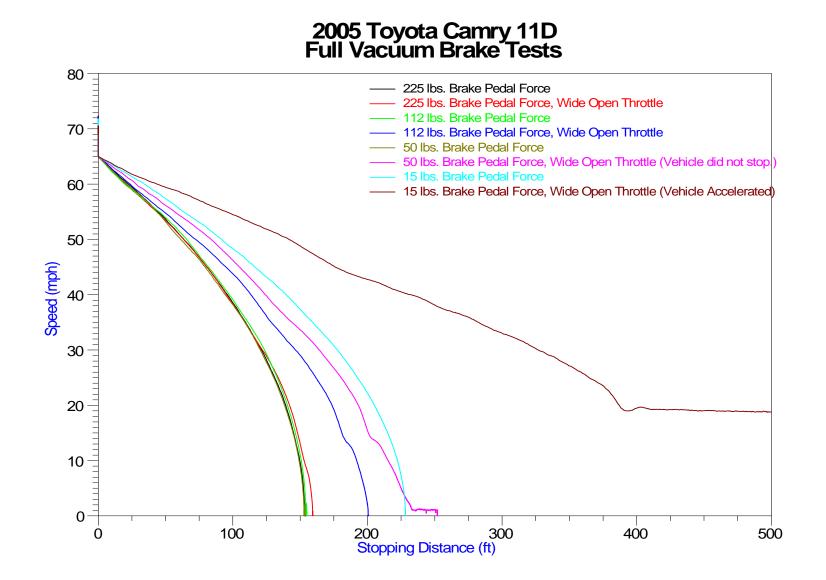


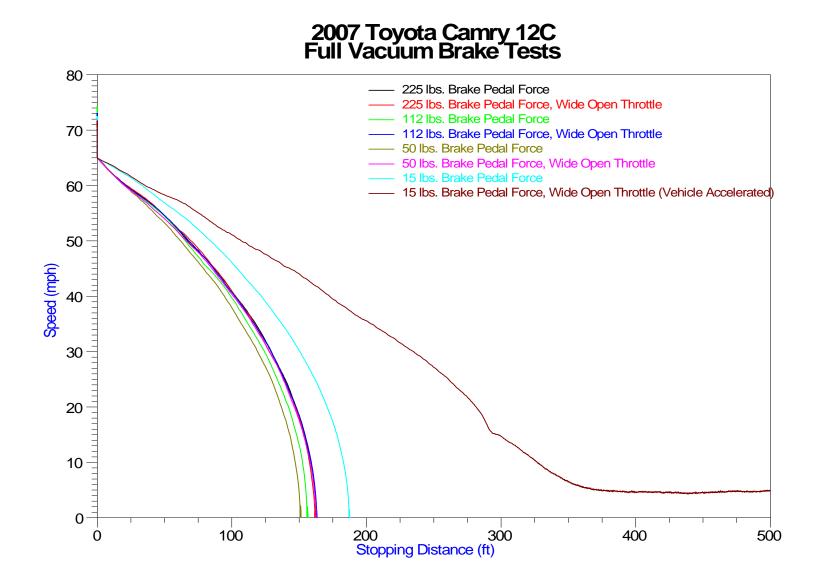
## 2001 Toyota Camry 8D Full Vacuum Brake Tests

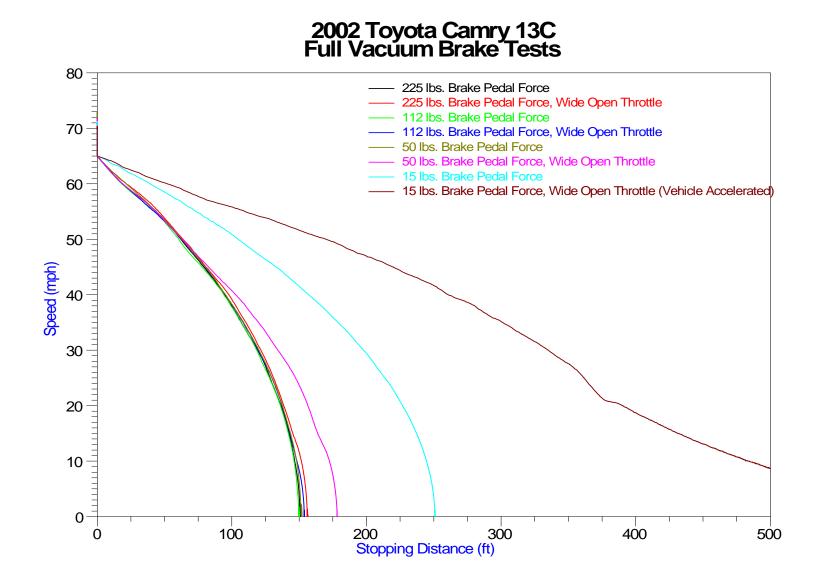


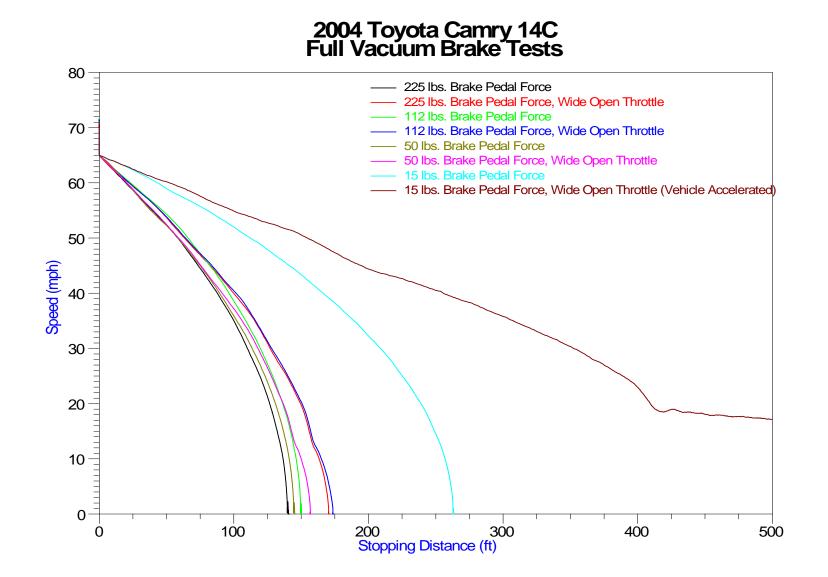


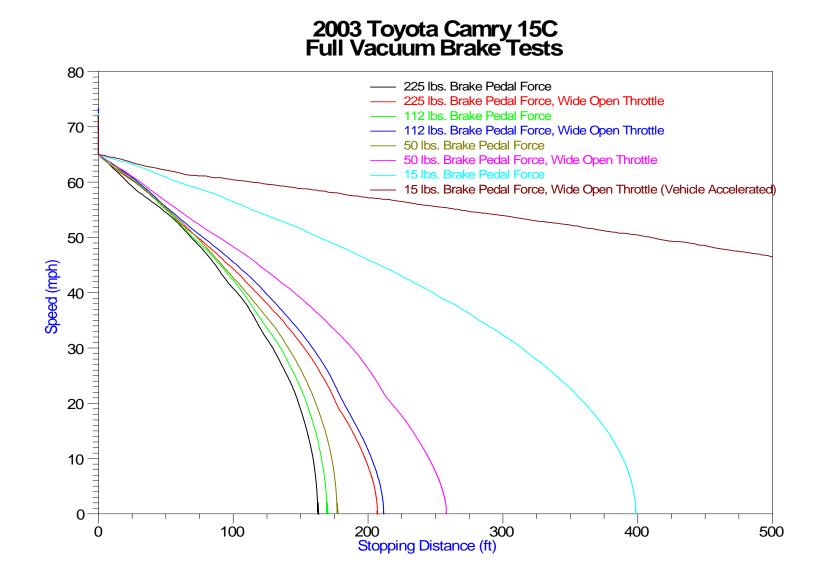


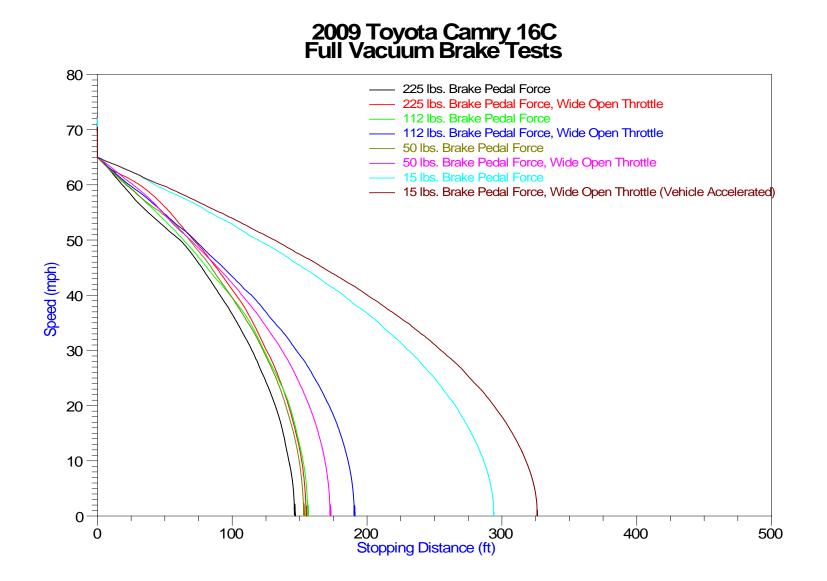


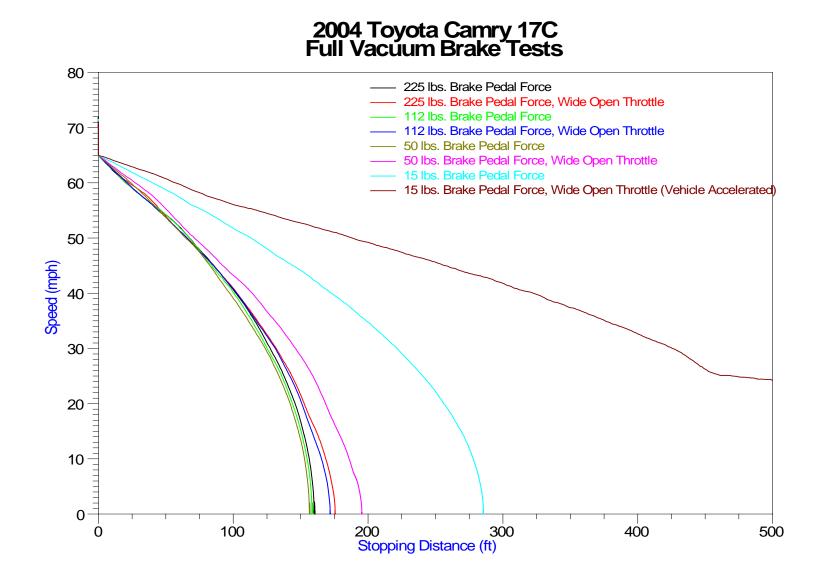


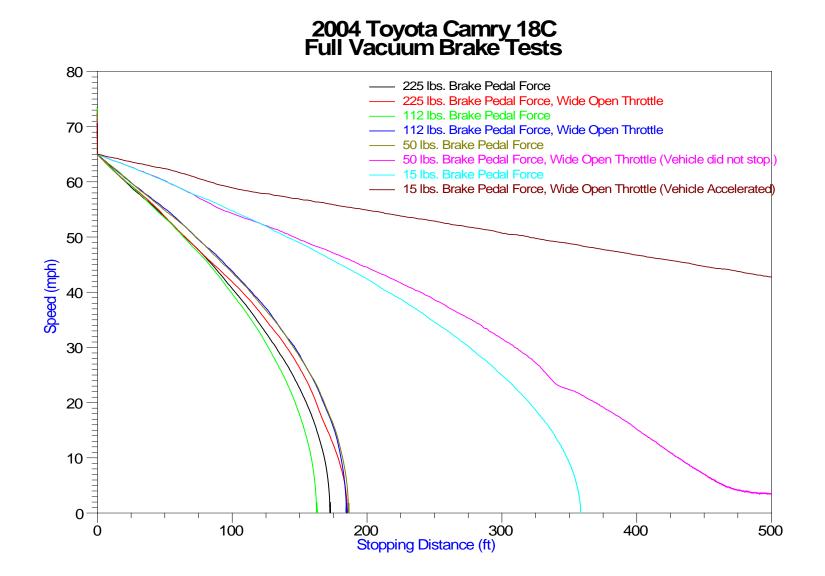


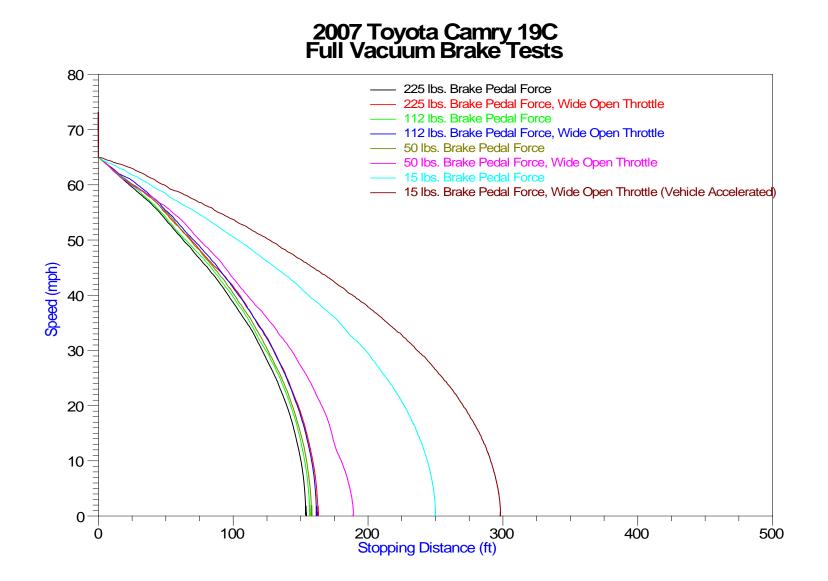


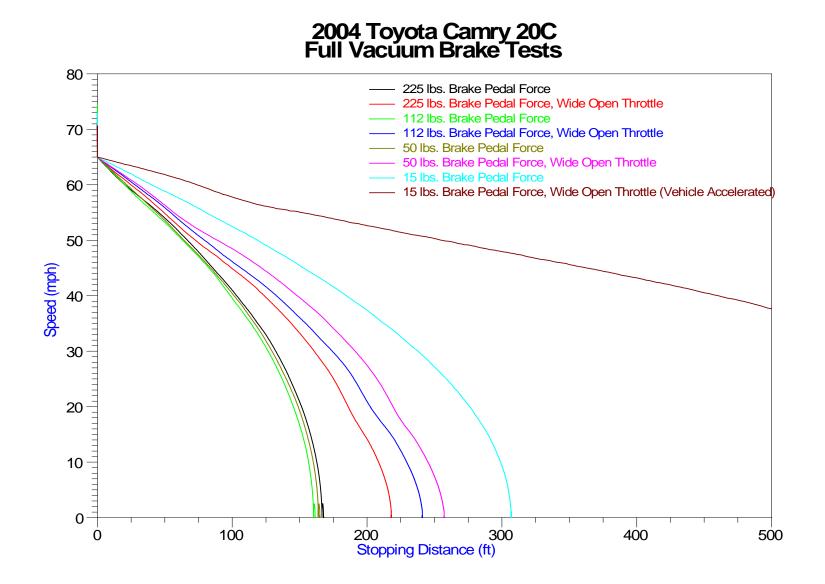






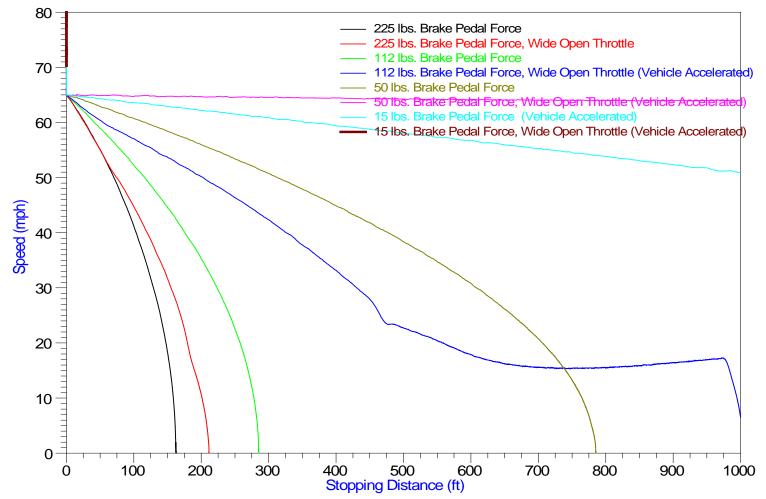


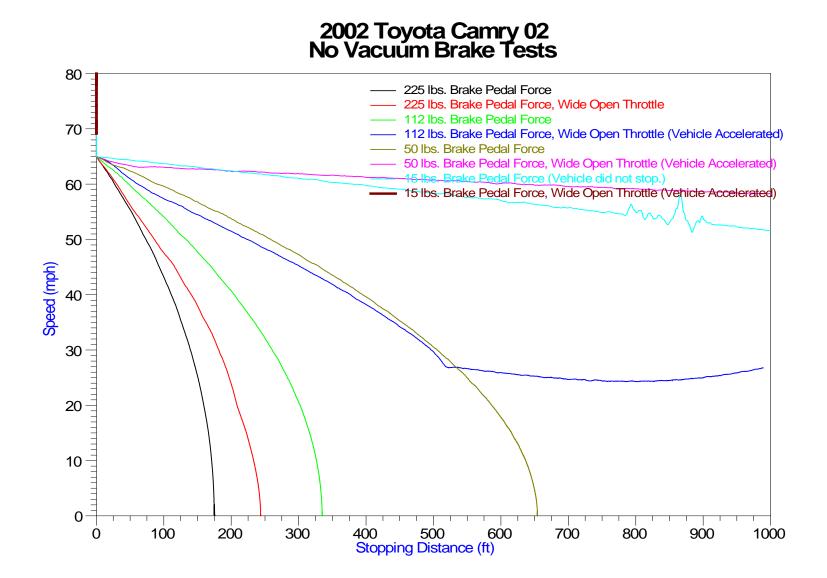


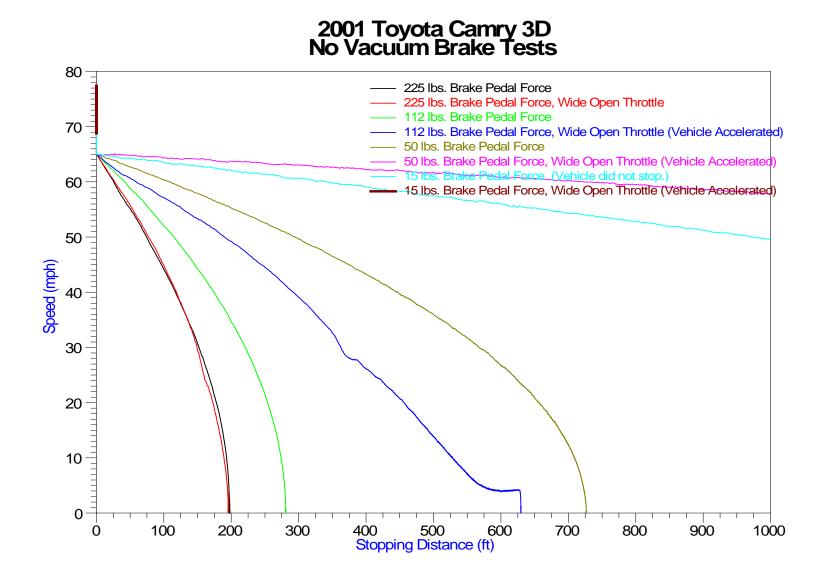


65 to 0 mph Brake Test With No Vacuum Varying Brake Pedal Force With and Without Wide Open Throttle

## 2002 Toyota Camry 01 No Vacuum Brake Tests



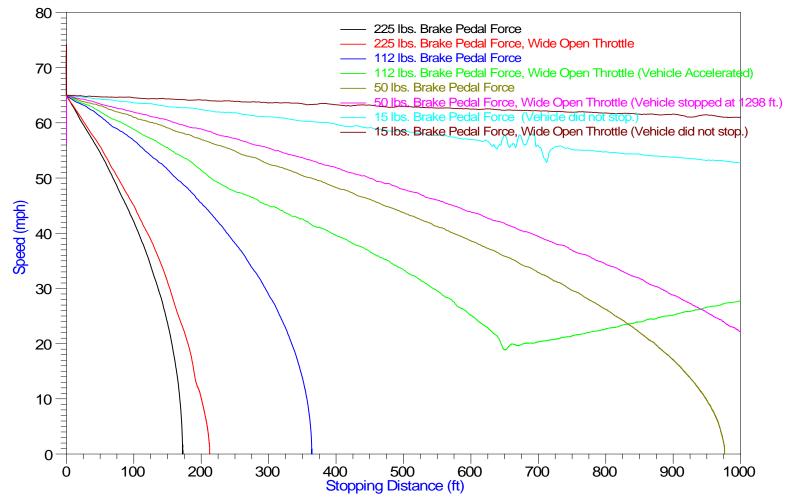


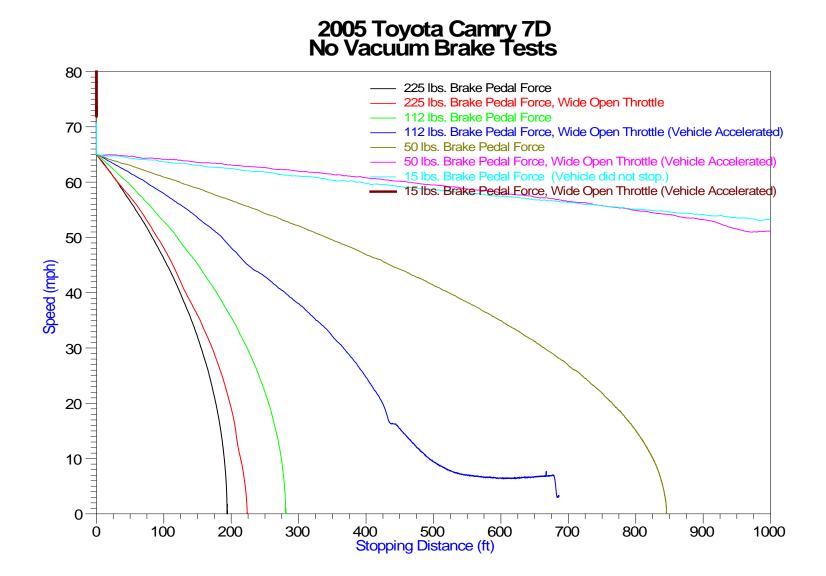


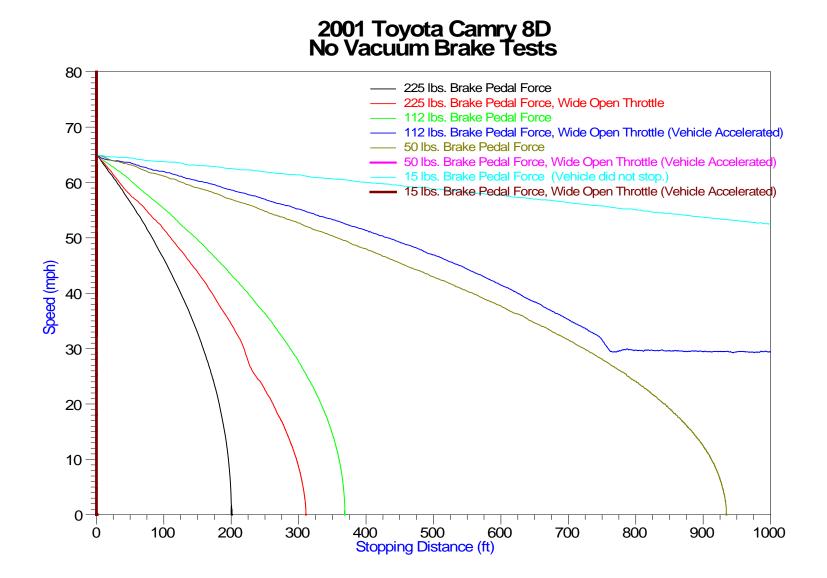
#### 2007 Toyota Camry 4D No Vacuum Brake Tests 80 225 lbs. Brake Pedal Force 225 lbs. Brake Pedal Force, Wide Open Throttle 225 lbs. Brake Pedal Force, Wide Open Throttle, & Brake Override 70 112 lbs. Brake Pedal Force 112 lbs. Brake Pedal Force, Wide Open Throttle (Vehicle Accelerated) 112 lbs. Brake Pedal Force, Wide Open Throttle, & Brake Override 50 lbs\_Brake Pedal Force (Vehicle stopped at 1079 ft.) 60 50 lbs. Brake Pedal Force, Wide Open Throttle (Bad Data File) 50 lbs. Brake Pedal Force, Wide Open Throttle, & Brake Override (Veh. Accel.) 15 lbs. Brake Pedal Force (Vehicle did not stop.) 45 lbs. Brake Pedal Force, Wide Open Throttle (Vehicle Accelerated) 50 15 Jbs. Brake Pedal Force, Wide Open Throttle, & Brake Override (Veh. Accel.) Speed (mph) 40 30 20 10 0 400 500 6 Stopping Distance (ft) 100 200 300 400 600 700 0 800 900 1000

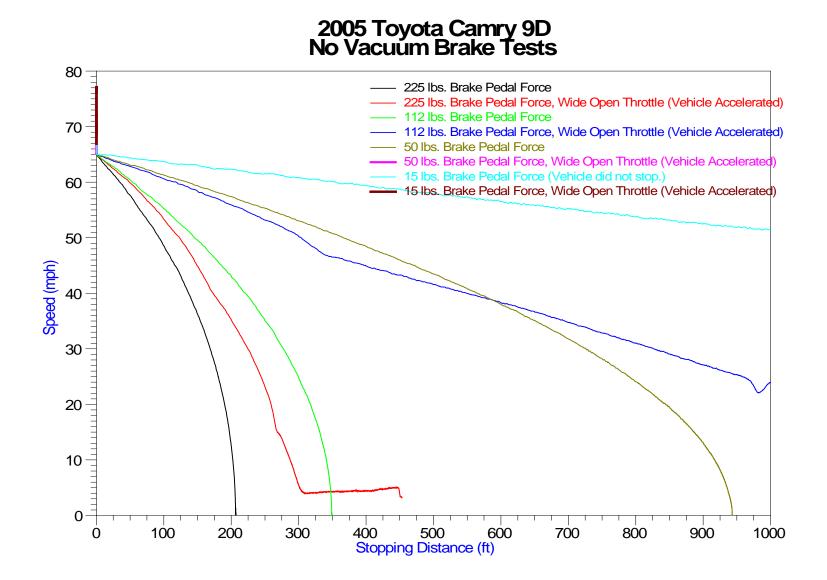
### 2006 Toyota Camry 5D No Vacuum Brake Tests 80 225 lbs. Brake Pedal Force 225 lbs. Brake Pedal Force, Wide Open Throttle 112 lbs. Brake Pedal Force 70 112 lbs. Brake Pedal Force, Wide Open Throttle (Vehicle Accelerated) 50 lbs. Brake Pedal Force (Vehicle stopped at 1052 ft.) 50 lbs. Brake Pedal Force, Wide Open Throttle (Vehicle Accelerated) 15 lbs. Brake Pedal Force (Vehicle did not stop.) 60 ------- 15 lbs. Brake Pedal Force, Wide Open Throttle (Vehicle Accelerated) 50 Speed (mph) 40 30 20 10 0 400 500 6 Stopping Distance (ft) 200 300 700 800 900 0 100 600 1000

## 2007 Toyota Camry 6D No Vacuum Brake Tests

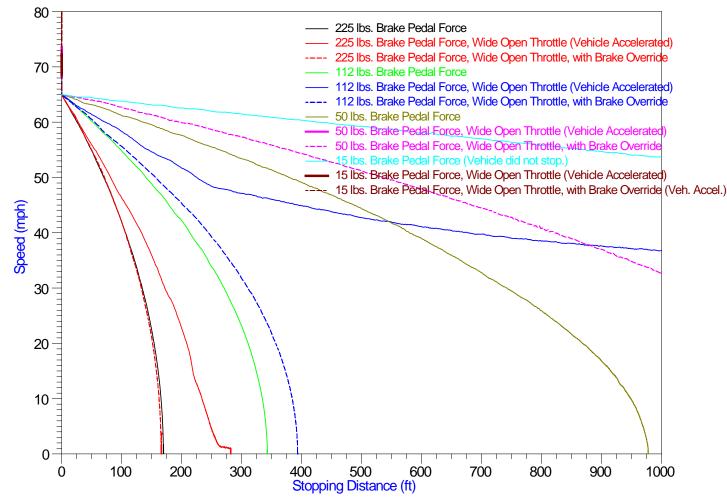


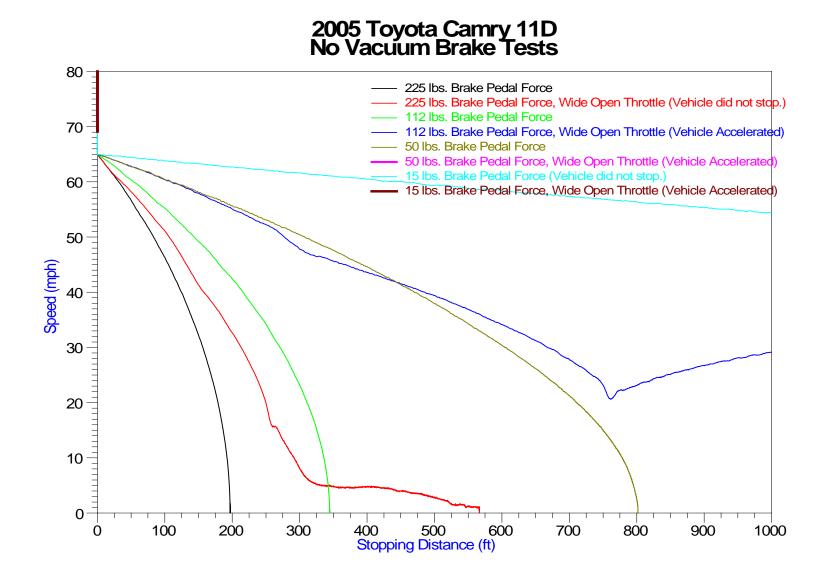


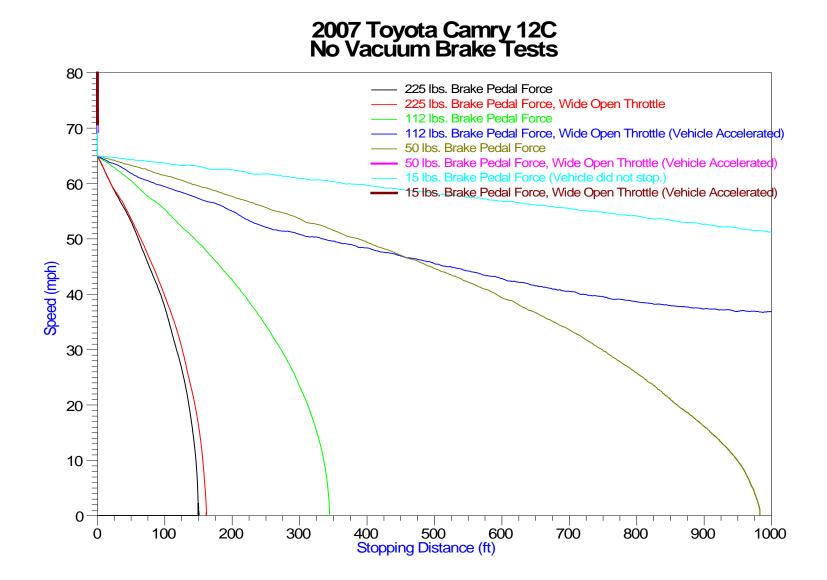


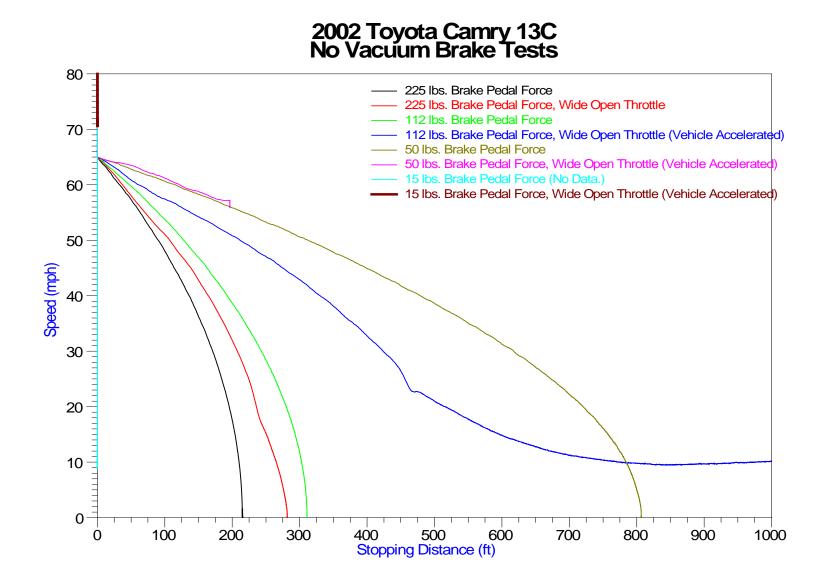


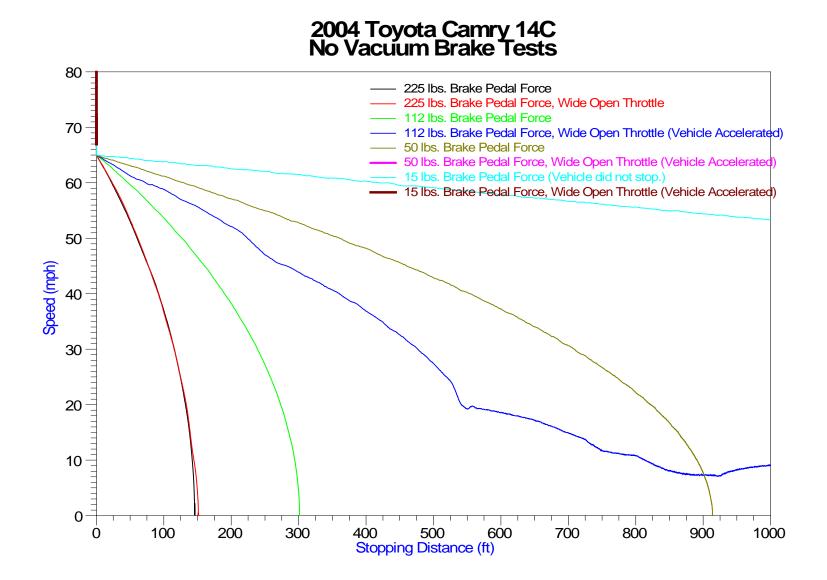
## 2007 Toyota Camry 10D No Vacuum Brake Tests

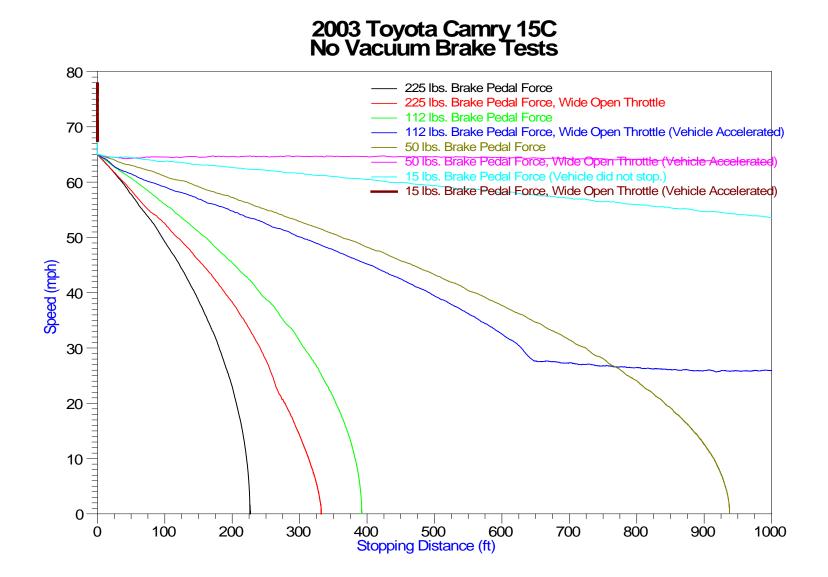


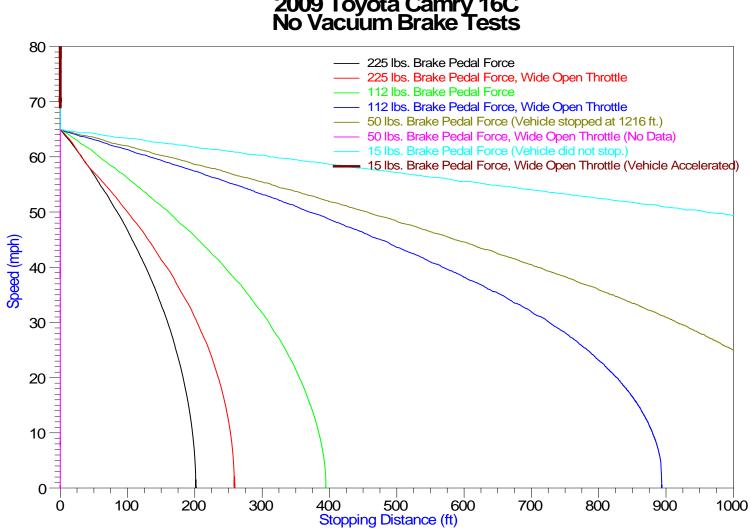




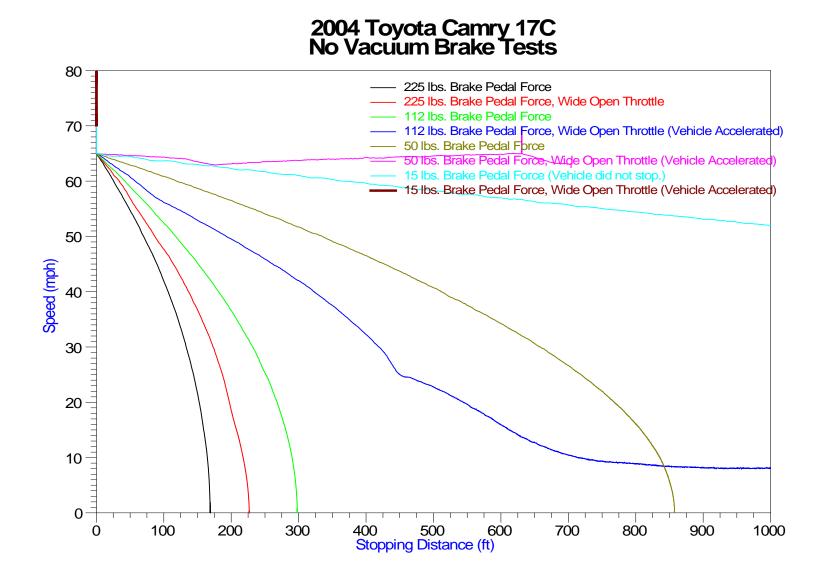




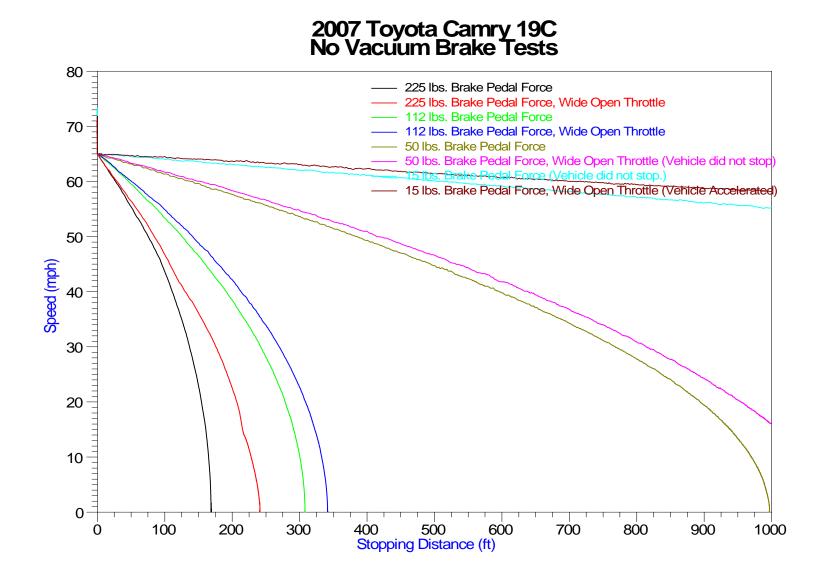




# 2009 Toyota Camry 16C No Vacuum Brake Tests

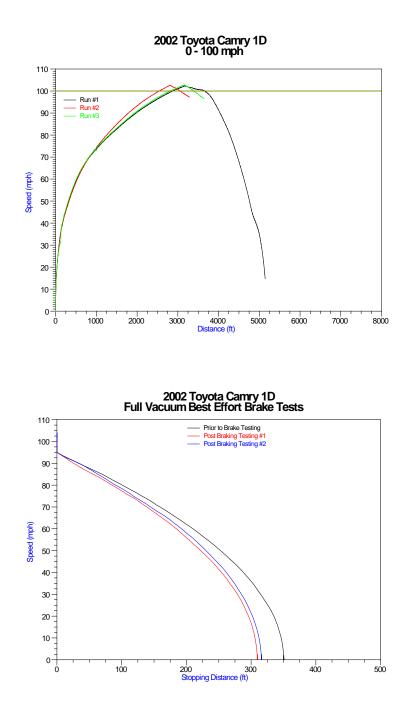


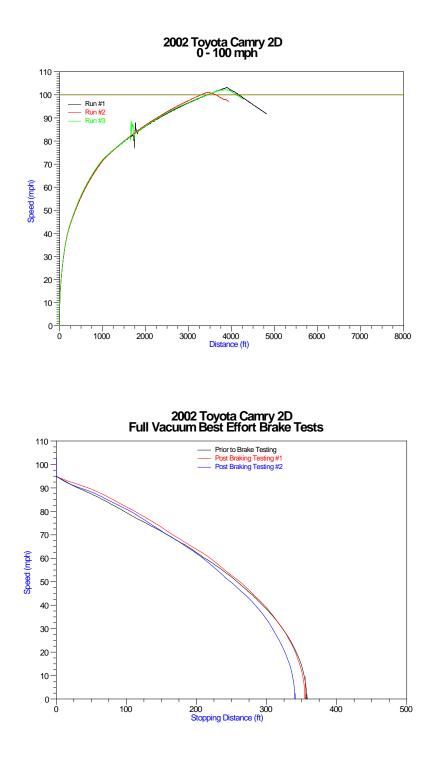
### 2004 Toyota Camry 18C No Vacuum Brake Tests 80 225 lbs. Brake Pedal Force 225 lbs. Brake Pedal Force, Wide Open Throttle 112 lbs. Brake Pedal Force 70 112 lbs. Brake Pedal Force, Wide Open Throttle (Vehicle Accelerated) 50 lbs. Brake Pedal Force 50 lbs. Brake Pedal Force, Wide Open Throttle (Vehicle Accelerated <u>15 lbs. Brake Pedal Force (Vehicle did not stop.)</u> <u>15 lbs. Brake Pedal Force, Wide Open Throttle (Vehicle Accelerated)</u> 60 -\_ 50 Speed (mph) 40 30 20 10 0 400 500 6 Stopping Distance (ft) 200 300 700 800 900 0 100 600 1000

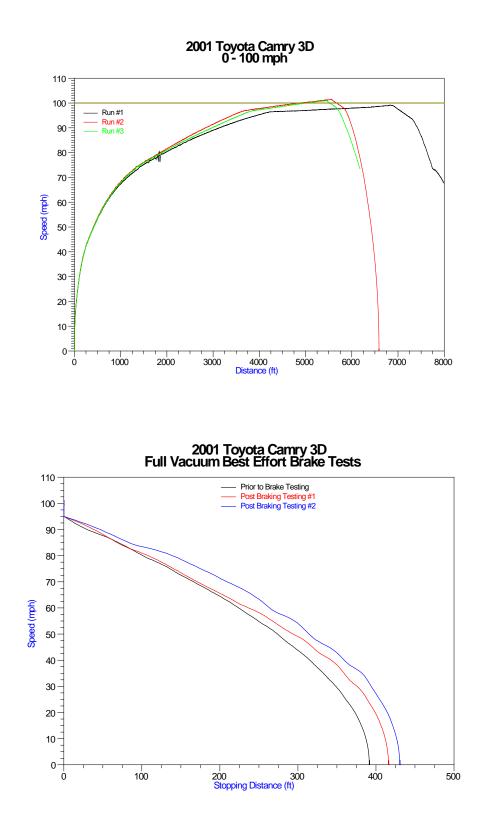


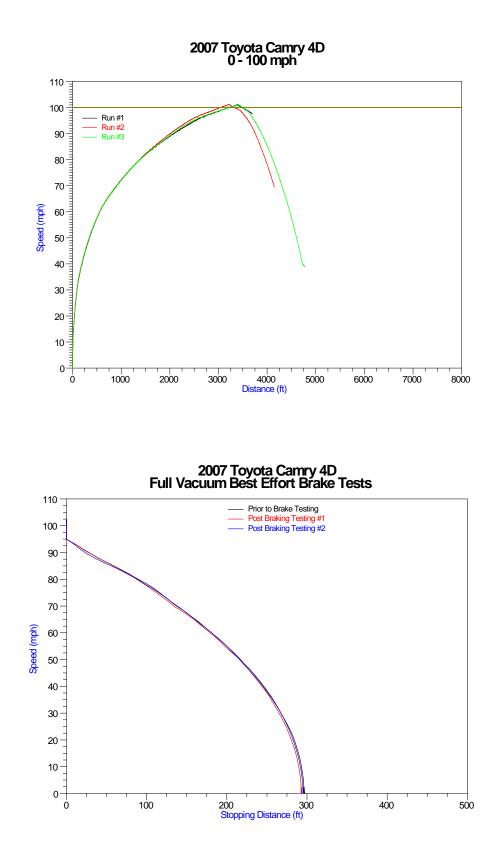
### 2004 Toyota Camry 20C No Vacuum Brake Tests 80 225 lbs. Brake Pedal Force 225 lbs. Brake Pedal Force, Wide Open Throttle 112 lbs. Brake Pedal Force 70 112 lbs. Brake Pedal Force, Wide Open Throttle (Vehicle Accelerated) 50 lbs. Brake Pedal Force (Vehicle Stopped at 1123 ft.) 50 lbs. Brake Pedal Force, Wide Open Throttle (Vehicle Accelerated) 15 lbs. Brake Pedal Force (Vehicle Accelerated) 15 lbs. Brake Pedal Force, Wide Open Throttle (Vehicle Accelerated) 60 \_ 50 \_ Speed (mph) 40 30 20 10 0 400 500 60 Stopping Distance (ft) 100 200 300 600 700 800 900 1000 0

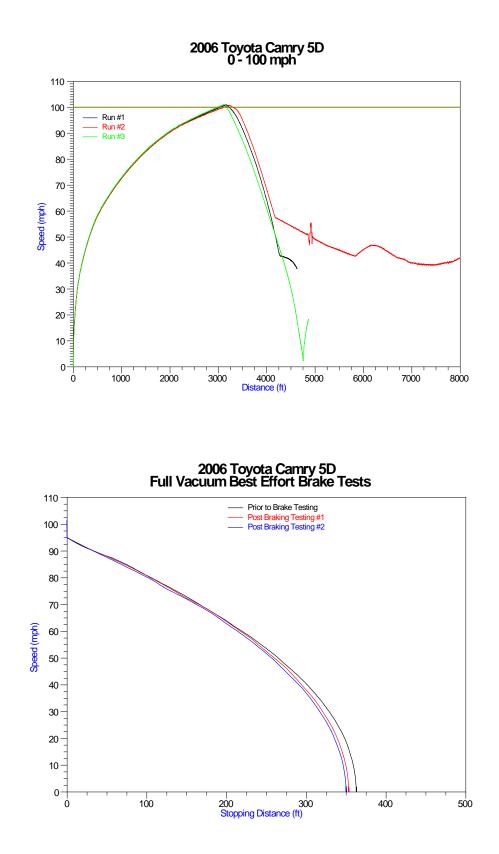
**APPENDIX E5C – 0-100 and 100-0 MPH Brake Performance Tests Before and After Brake Testing** 

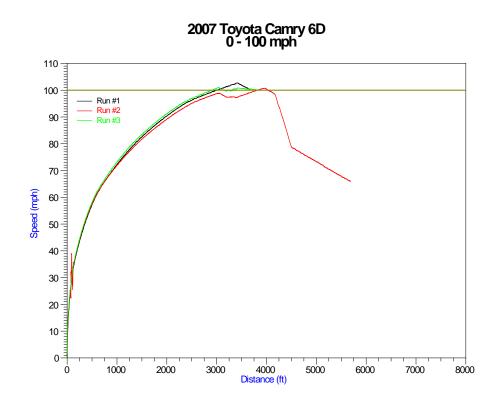




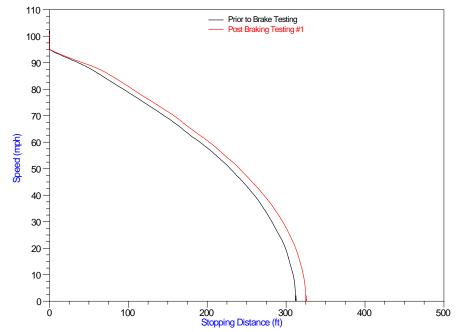


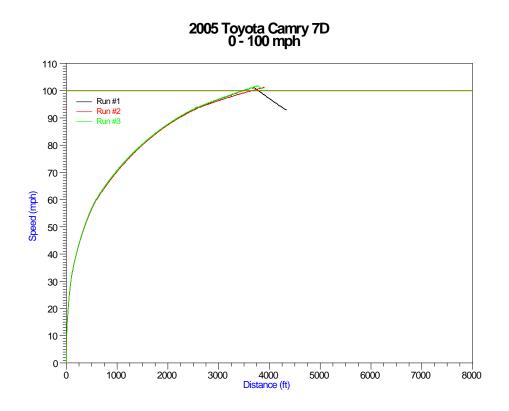




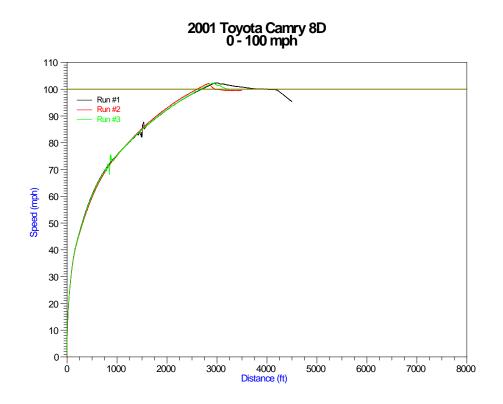


2007 Toyota Camry 6D Full Vacuum Best Effort Brake Tests

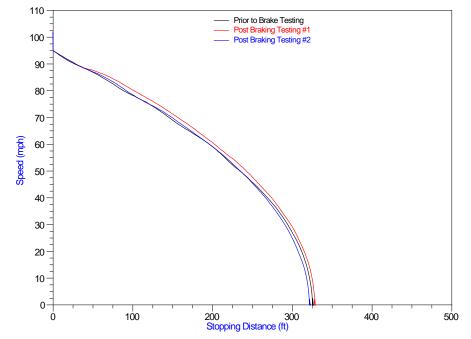


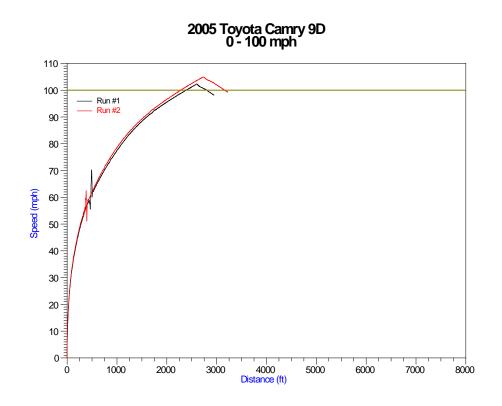


2005 Toyota Camry 7D Full Vacuum Best Effort Brake Tests 110 Prior to Brake Testing Post Braking Testing #1 100 90 -80 -70 -Speed (mph) 60 -50 -40 -30 -20-10-0-200 300 Stopping Distance (ft) ò 100 400 500

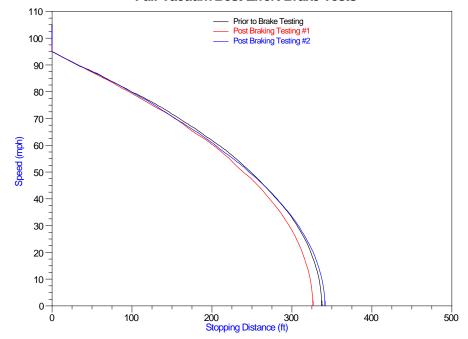


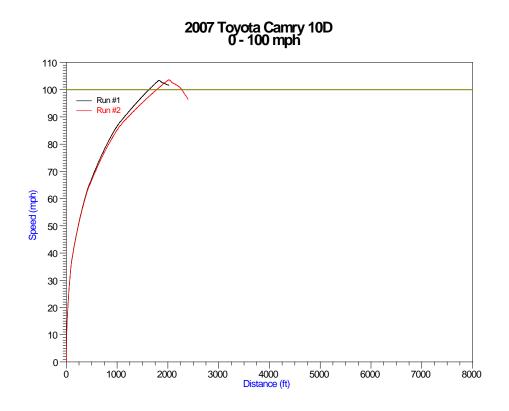
2001 Toyota Camry 8D Full Vacuum Best Effort Brake Tests



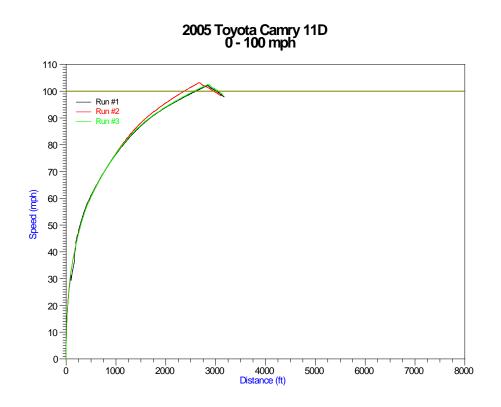


2005 Toyota Camry 9D Full Vacuum Best Effort Brake Tests

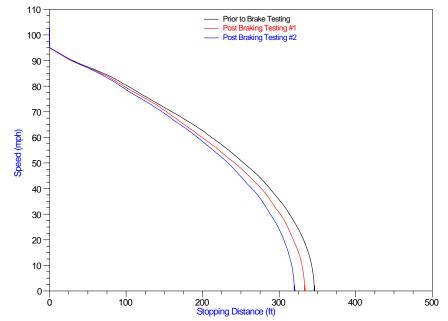


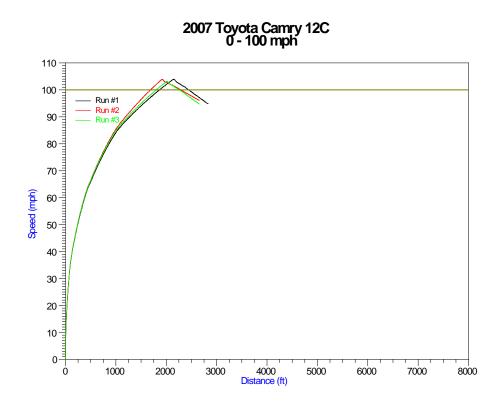


2007 Toyota Camry 10D Full Vacuum Best Effort Brake Tests 110 -Prior to Brake Testing Post Braking Testing #1 Post Braking Testing #2 100 90-80 -70-Speed (mph) 60 -50 40 -30-20 -10 0 100 200 300 Stopping Distance (ft) 0 400 500

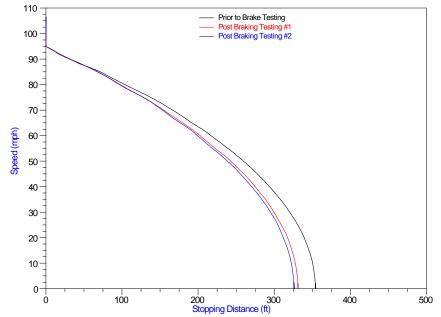


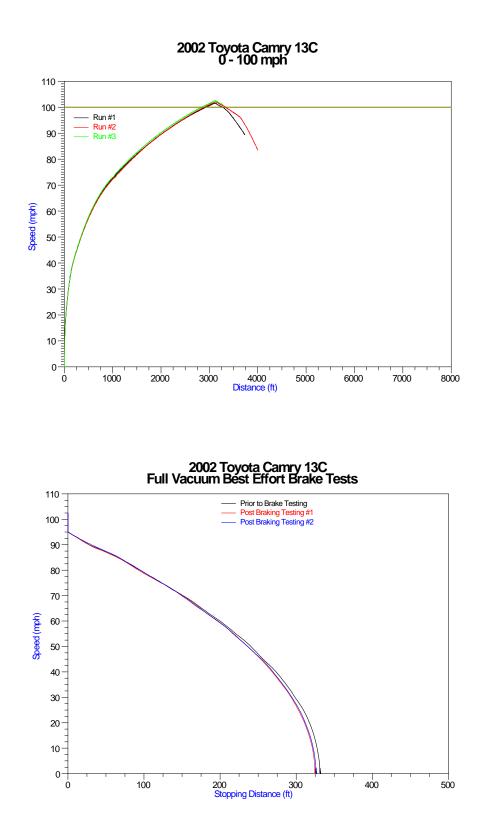
2005 Toyota Camry 11D Full Vacuum Best Effort Brake Tests

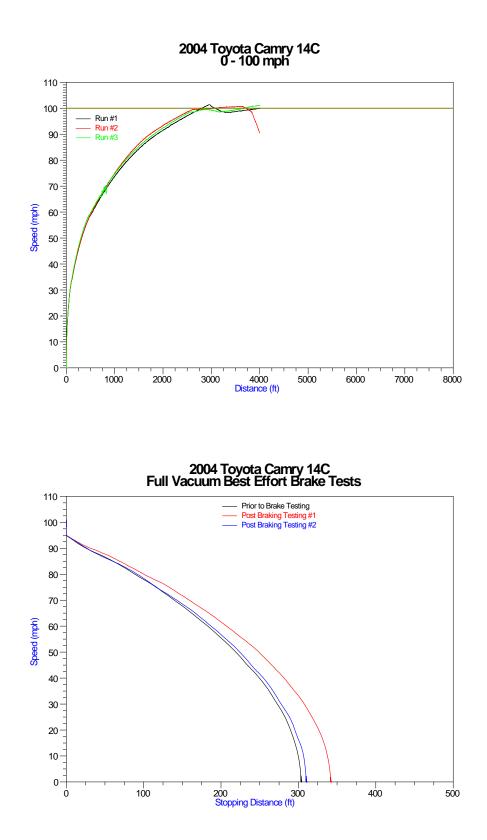


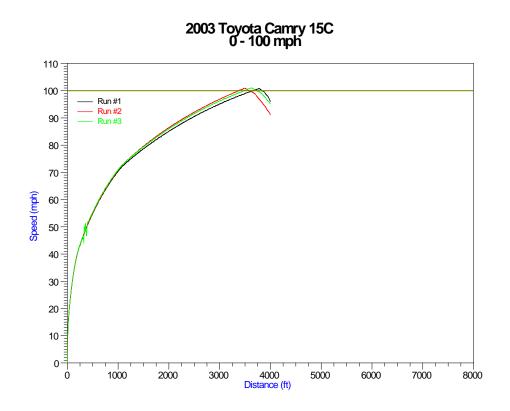


2007 Toyota Camry 12C Full Vacuum Best Effort Brake Tests

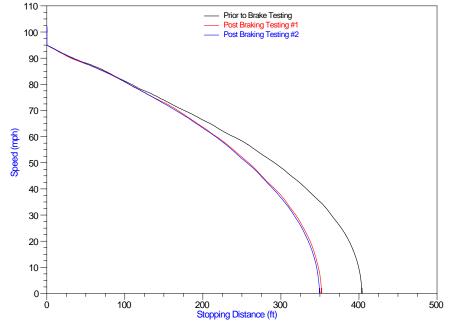


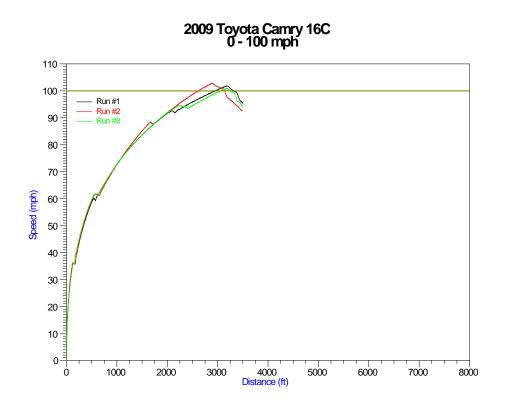




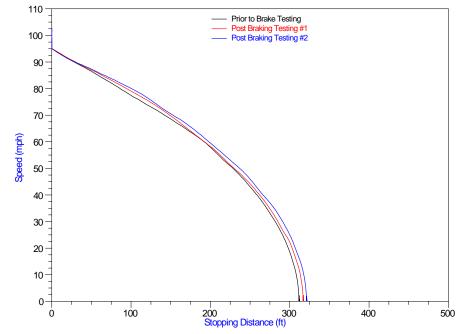


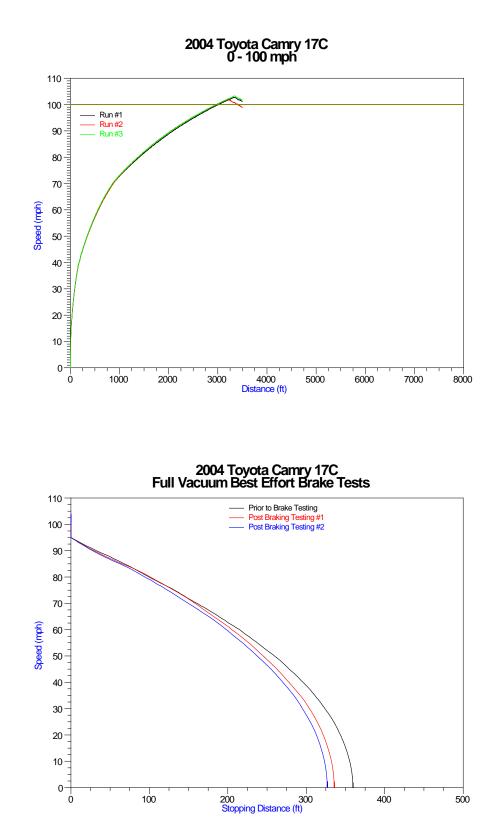
2003 Toyota Camry 15C Full Vacuum Best Effort Brake Tests

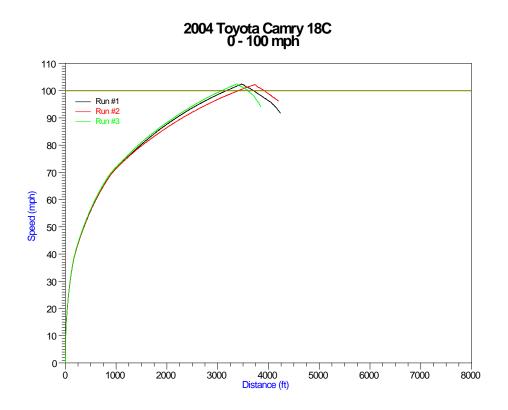




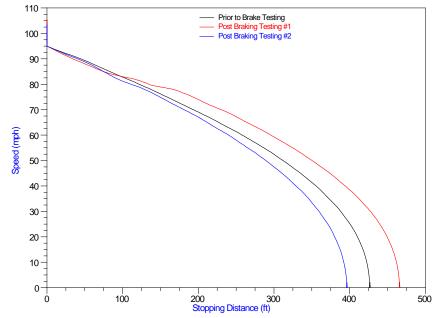
2009 Toyota Camry 16C Full Vacuum Best Effort Brake Tests

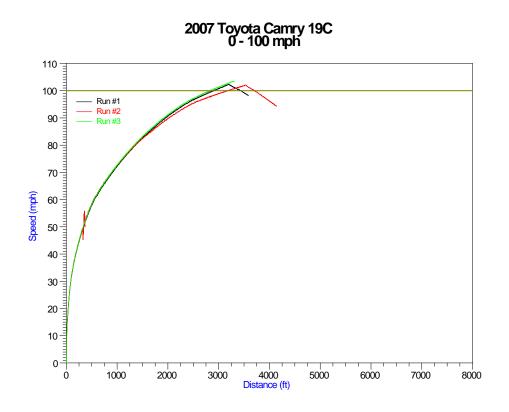




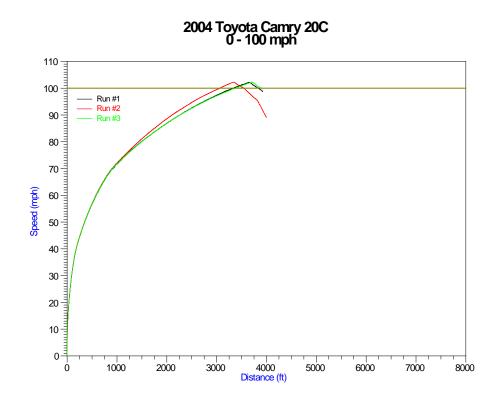


2004 Toyota Camry 18C Full Vacuum Best Effort Brake Tests

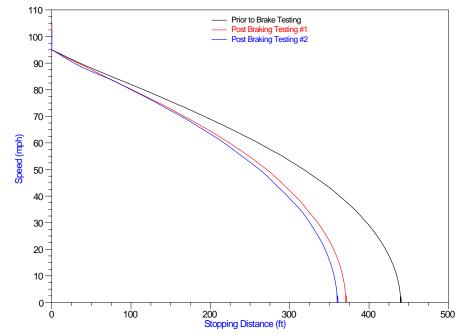




2007 Toyota Camry 19C Full Vacuum Best Effort Brake Tests 110 Prior to Brake Testing Post Braking Testing #1 Post Braking Testing #2 100 -90 -80 -70-Speed (mph) 60 -50 -40 30 -20 -10 0 ò 100 200 300 Stopping Distance (ft) 400 500



2004 Toyota Camry 20C Full Vacuum Best Effort Brake Tests



## **APPENDIX E5D – Cruise Control Testing – Vehicles 1-10**

		1D	2D	3D	4D	5D	6D	7D	8D	9D	10D
Static											
1)	Does the brake lamp illuminate when the brake pedal is depressed?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
2)	Does the control button at the end of the stalk move freely?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
3)	Does the control stalk move in all indicated directions and return normally?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
4)	Does the master cruise switch properly illuminate and extinguish the cruise light on the dash?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
5)	With the ignition on, enable the master cruise switch. Turn the ignition off and then on again. Does the cruise light remain off?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Dynamic											
1)	With the master cruise switch off (no green cruise lamp), drive at 40 mph. Do any of the functions RES, SET, and Cancel have any effect on the vehicle's operation?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
2)	Enable the master cruise switch. Drive at 40 mph, use the SET function of the cruise stalk to set cruise speed. Does the vehicle hold 40 mph for at least 3/10's of a mile?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
3)	Apply the brake. Does the cruise immediately disengage?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
4)	Set the cruise at 60 MPH on straight and level road. Depress brake to release cruise. While driving steady state straight and level at 35 mph, select resume from cruise stalk. Does the cruise resume to 60 mph?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
5)	Set the cruise at 60 on straight and level road. Use cruise stalk to cancel the cruise operation. Does the cruise immediately disengage?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
6)	When the speed is decreases to 50 mph, select the resume feature. Does the cruise resume to 60 mph?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
7)	Select and hold the ACCEL from 60 mph to 90 mph. Does the vehicle downshift to accelerate?	NO	YES	YES	YES	YES	YES	YES	NO	YES	YES
8)	Set the cruise at 40 mph. Depress and hold ACCEL for at least five seconds. Without releasing the ACCEL button, rapidly depress the accelerator to the floor. Does pressing the accelerator cause a greater increased engine power or further downshifting?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
9)	When ACCEL is released at 90 mph, does the vehicle maintain 90 mph?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
10)	Hold ACCEL at 90 mph. Does the cruise accelerate the vehicle to at least 120 mph?	YES	YES	NO*	YES	YES	YES	YES	YES	YES	YES
11)	Hold the DECEL button to 50 mph. Does the cruise maintain 50 mph?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
12)	With the cruise maintaining a speed of 50 mph, shift to Neutral. Does the cruise disengage?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
13)	With the cruise maintaining a speed of 50 mph, downshift. Does the cruise disengage?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
14)	With the cruise maintaining a speed of 50 mph, push the accelerator to increase speed to 60 mph. Release the accelerator pedal and let the car coast. Does cruise automatically resume speed at 50 mph?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
15)	With the cruise maintaining a speed of 60 mph, turn off the master cruise switch. Turn it back on and press resume. Does the cruise control resume speed?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
16)	Drive at 40 and set cruise, apply brake, coast to 10 mph. Verify cruise will not resume at this speed. Slowly increase speed in 2 mph increments to establish minimum speed for resume function. What is the minimum speed that cruise will begin to resume?	DNR	DNR	DNR	30mph	28 mph	27 mph	25 mph	DNR	26 mph	26 mph
17)	Did you experience any unwanted acceleration incidents durng testing?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

		11D	12C	13C	14C	15C	16C	17C	18C	19C	20C
Static											
1)	Does the brake lamp illuminate when the brake pedal is depressed?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
2)	Does the control button at the end of the stalk move freely?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
3)	Does the control stalk move in all indicated directions and return normally?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
4)	Does the master cruise switch properly illuminate and extinguish the cruise light on the dash?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
5)	With the ignition on, enable the master cruise switch. Turn the ignition off and then on again. Does the cruise light remain off?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Dynamic											
1)	With the master cruise switch off (no green cruise lamp), drive at 40 mph. Do any of the functions RES, SET, and Cancel have any effect on the vehicle's operation?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
2)	Enable the master cruise switch. Drive at 40 mph, use the SET function of the cruise stalk to set cruise speed. Does the vehicle hold 40 mph for at least 3/10's of a mile?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
3)	Apply the brake. Does the cruise immediately disengage?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
4)	Set the cruise at 60 MPH on straight and level road. Depress brake to release cruise. While driving steady state straight and level at 35 mph, select resume from cruise stalk. Does the cruise resume to 60 mph?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
5)	Set the cruise at 60 on straight and level road. Use cruise stalk to cancel the cruise operation. Does the cruise immediately disengage?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
6)	When the speed is decreases to 50 mph, select the resume feature. Does the cruise resume to 60 mph?	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES
7)	Select and hold the ACCEL from 60 mph to 90 mph. Does the vehicle downshift to accelerate?	YES	YES	NO	YES	YES	NO	YES	NO	YES	YES
8)	Set the cruise at 40 mph. Depress and hold ACCEL for at least five seconds. Without releasing the ACCEL button, rapidly depress the accelerator to the floor. Does pressing the accelerator cause a greater increased engine power or further downshifting?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
9)	When ACCEL is released at 90 mph, does the vehicle maintain 90 mph?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
10)	Hold ACCEL at 90 mph. Does the cruise accelerate the vehicle to at least 120 mph?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
11)	Hold the DECEL button to 50 mph. Does the cruise maintain 50 mph?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
12)	With the cruise maintaining a speed of 50 mph, shift to Neutral. Does the cruise disengage?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
13)	With the cruise maintaining a speed of 50 mph, downshift. Does the cruise disengage?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
14)	With the cruise maintaining a speed of 50 mph, push the accelerator to increase speed to 60 mph. Release the accelerator pedal and let the car coast. Does cruise automatically resume speed at 50 mph?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
15)	With the cruise maintaining a speed of 60 mph, turn off the master cruise switch. Turn it back on and press resume. Does the cruise control resume speed?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
16)	Drive at 40 and set cruise, apply brake, coast to 10 mph. Verify cruise will not resume at this speed. Slowly increase speed in 2 mph increments to establish minimum speed for resume function. What is the minimum speed that cruise will begin to resume?	25 mph	25 mph	DNR	DNR	25 mph	25 mph	DNR	26 mph	25 mph	DNR
17)	Did you experience any unwanted acceleration incidents durng testing?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

11											_						_												_		
item 1			1D			20			30		_	40			50		_	60			70			80			90			130	_
Are all gear position																															
immediately adjacen			YES			YES			YES			NO			YES			NO		I	YES		I	YES		I	YES			YES	
shifter position when these locations?	placed in																			I			I			I					
Item 2		Longitudinal Manufactional	Lateral Movement	Publicition	Congitudinal	Lateral Monament	Pallation	Congitudinal	Lateral Monormati	Patienter	Congitudinal Movement		Publicition	Congitudinal	Lateral	Pathletter	Congitudinal Movement	Lateral Movement	Publicition	Congilizational	Lateral Manager	Pathlector	Congilizations	Latend Movement	Publicities	Congilizational	Lateral Manager	Publication Pelesse	Congilizations Movement		
				¢			¢			¢			¢			¢			¢	A		¢			¢			¢			
1	Drive to Neutral	1	۰	•	1	۰	۰	1	۰	0	1	۰	0	1	۰	0	1	۰	0	1	۰	0	1	•	0	1	٥	0	1	۰	1
2	Neutral to Reverse	1	۰	1	1	۰	1	1	۰	1	1	1	٥	1	۰	1	1	1	۰	1	۰	۰	1	۰	1	1	۰	٥	1	1	
3	Reverse to Park	1	•	1	1	۰	1	1	۰	1	1	1	0	1	۰	1	1	2	0	1	۰	1	1	۰	1	1	٥	1	1	2	
4	Neutral to	1	•	•	1	•	•	1	•	0	1	•	0	1	•	0	1	•	0	1	•	0	1	•	0	1	•	0	1	•	
5	Drive Reverse to	1	•	•	1	•	•	1	•	0	1	•	0	1	0	0	1	2	0	1	•	0	1	•	0	1	•	0	1	0	
,	Park		-	<u> </u>		-	-	<u> </u>		-			-						-				<u> </u>	-	-	<u> </u>			· ·		F.
6	to Reverse	1	•	1	1	•	1	1	•	1	1	1	۰	1	۰	1	1	2	•	1	۰	1	1	•	1	1	۰	1	1	2	1
item 3: Start the vehi																															
parking brake. Remo			NO			NO			NO			NO			NO			NO		I	NO		I	NO		I	NO			NO	
from the brake, Can vehicle from Park?	you shift the																														
item 4: With the vehi place your foot on th								I															I			I					
to each gear. Is the			NO			NO			NQ			NQ			NO			NO			NQ		I	NO		I	NO			NO	
any gear longer than																															
item 5: is the gearsh	ft connected																														
mechanically to the t	Seclarimentari		YES			YES			YES			YES			YES			YES			YES			YES			YES			YES	
(via cable or rod)?			CABLE			CABLE			CABLE			CABLE			CABLE			CABLE			CABLE			CABLE			CABLE			CABLE	
item 6: Drive the car. traveling forward at 2																				I											
release the accelerat																				I			I			I					
place the car into Ne			YES			YES			YE8			YE8			YES			YES		I	YES		I	YES		I	YES			YES	
the vehicle achieve h	leutral in less																			I			I			I					
than one second?																															
item 7: Repeat Item																															
release the acceleration of the second			YES			YES			YES			YES			YES			YES		I	YES		I	YES		I	YES			YES	
Does the vehicle ach			10.0			10.0			16.0			16.0			16.45			16.45		I	16.0		I	100		I	10.0			10.0	
less than one second																															
tem 8: Repeat Item (	6 and place the																														
vehicle into Reverse																															
seconds. Does it act	vieve Reverse?																														
Reverse			NO			NO			NO			NO			NO			190			NO			NO			NO			NO	
Neutral Drivo			YES NO			YES NO			YES NO			YES NO			YES NO			YES NO			YES NO			YES NO			VES NO			VES NO	_
Stall			NQ			NQ			YES			NO			NO			NO			NQ			NQ			NQ			NO	_
Did you experience U																															
Acceleration at any t tost?			NO			NO			NO			NO			NO			NO			NO			NO			NO			NO	
18					_			_						_						-			-			-					
Engine Size Total Number of Engine	and		VS			14			14			14			1.4			u			u			V6			V6			46	_
Transmission mounts of	embined.		4			4			4			4			4			4			4			5			4			4	_
	Sald Rubber		-									-			-			0			0			0			0			0	_
																								100							
	Fluid Filled		3			2			2			3			3			3			3			1			3			3	

# **APPENDIX E6 - Module 6 – Gearshift Lever and Transmission (Page 1 of 2)**

## **APPENDIX E6 - Module 6 – Gearshift Lever and Transmission (Page 2 of 2)**

tterr 1			11D			120			130			140			16C			16C			170			180			19C		-	200	_
item 1	1.1.1		THD .			1/C			100			140		_	10C			10C			1/Ç			100			THC		-	200	_
Are all gear position								1																					1		
immediately adjacer			YES			NO		I	YES			YES			YES		NO (MANU	AL STYL	E TRANS)		YES			YES		I	NO		I	YES	
shifter position whe these locations?	in placed in																									I			I		
these locations/		Longin for	d torre	Their mark	and the second	Lorest 1	Pallacian		Interest	10-10-000	and a first sec	Arrest	Tel etterner	Internet and	Arrest	A state state	temphotical	1 mmm	the ball of the	Longitudine Start	Internet	In the second	I make the d	Land	In come	Longitudinal	1 mm	The sinds are set		Intel	Terrer
Hern 2		Bicusment	Message 1	Raiduma Briesse C	Moserrert	Mournert	Reference C	Mountaire	Mountaine	Related	Longitudinal Movement A	Messenant	Ratema	Movement	Mexement	Reinese C	Movement	Movement	Relation	Movement	Movement	Release	Movement	Morene m	Release	Mountert	Nevernet	Reisure C	Mourners	Movement	
1	Drive	-	•	0	-	•	0	1	•	0	1	0	0	1	•	0	1	•	N/A	1	•	0	-	0	0	1	•	•	1	•	
2	to Neutral Neutral to	L	0	•	1	1	0	1	•	1	1	0	1	1	0	1	1	1	N/A	1	0	1	1	0				0	1	•	,
	Reverse Reverse to	· ·	-	-	<u> </u>		-	-				-	-			-				-					-		-		-	<u> </u>	+
3	Park Neutral to	1	0	1	1	1	0	1	•	1	1	0	1	1	0	1	N/A	N/A	N/A	1	0	1	1	0	1	1	1	•	1	•	;
4	Drive	1	0	•	1	•	0	1	•	0	1	0	0	1	0	0	1	1	N/A	1	0	0	1	0	0	1	0	•	1	•	-
5	Reverse to Neutral	1	0	•	1	۰	0	1	•	0	1	0	0	1	0	0	1	0	N/A	1	0	0	1	0	•	1	0	٠	1	۰	
6	Park to	1	0		1	1	0	1		1	1	0	1	1	0	1	N/A	N/A	N/A	1	0	1	1	0	1		1		1		,
	Reverse	<u> </u>			<u> </u>			<u> </u>														L							<u> </u>		
item 3: Start the vehi parking brake. Rem																													I		
from the brake. Can			NO			ND			NO			NO			NO			N/A			NO			NO		I	NO		I	ND	
vehicle from Park?	the survey																														
Item 4: With the veh																															_
place your fact on th																													I		
to each gear. Is the			ND			NO			NO			NO			NO			NA			NO			NO		I	NO		I	NO	
any gear longer than		1																											I		
		<u> </u>			<u> </u>			<u> </u>			<u> </u>															-			<u> </u>		
item 5: Is the gears) mechanically to the			YES			YES			YES			YES			YES			YES			YES			YES.			YES			YES	
(via cable or rod)?	CONTRACTOR OF CONTRACTOR		CABLE			CABLE		<u> </u>	GABLE		-	CABLE			CARLE			CABLE			CARLE			CALL			CARLE			CARLE	
Item 6: Drive the car																										I			I		
traveling forward at release the accelera																										I			I		
place the car into N			YES			YES			YES			YES			YES			YES			YES			YES			YES		I	YES	
the vehicle achieve																													I		
than one second?																													I		
																													<u> </u>		
item 7: Repeat Item																													I		
release the acceleration moh and place the c			YES			YES			YES			YES			YES			YES			YES			YES			YES		I	YES	
Does the vehicle act			TED.			150			150			TED			reo.			150			100			1ED			1ED		I	150	
less then one secon																															
ten 8: Repeat Item	6 and place the																														
whicle into Reverse	e for two																														
seconds. Does it ac	theve Reverse?																														
Reverse			NO			NO			NO			No			NO			NO			NO			NO			NO			NO	
Neutral			YES			YES			YES			YES			YES			YES			YES			YES			YES			YES	
Drive			NO			NO			NO			NO			NO			YES			NO			NO			NO			YES	
Stall			N0			NQ			NO			NO			NO			NO			NO			NQ			NQ			NQ	
Did you experience															117			117			11.7								1		
Acceleration at any	time during this		NO			NO		1	NO			NO			NO			ND			NO			NO			NO		1	NO	
test?			_				_			_		_	_		_	_		_			_			_			_	_		_	_
Engine Size			V6			- 14			V6			16			4			L4			L4			4		I	44		I	4	
Total Number of Engine Transmission mounts	e and combined		4			4			4			4			4			4			4			4			4			4	
	544					6			ō			0			ð			ð			0			3						0	_
1	Rubber	1	1			1			1			1			1			1			1			1			1			1	
	Fluid Filled	-	3		<u> </u>				6			0			0			ő			ð					<u> </u>	- 6			ō	

## **APPENDIX E7 - Module 7 – Ignition Switch Control Functionality**

TF112	1D	20	30	4D	50	60	70	8D	90	10D	11D	12C	13C	14C	15C	16C	17C	18C	19C	20C
Key Type																				
1. Can the engine be started without stepping on the brake pedal when in Park?	YES		YES	YES	YES	N/A, CLUTCH	YES	YES	YES	YES										
2. Can the engine be started when in the Neutral position?	YES		YES	YES	YES	YES	YES	YES	YES	YES										
3. Can the engine be started without stepping on the brake pedal when in Neutral?	YES		YES	YES	YES	YES	YES	YES	YES	YES										
4. Can the engine be started with the transmission in Drive?	NO		NO	NO	NO	NO	NO	NO	NO	NO										
5. Can the engine be started with the transmission in Reverse?	NO		NO	NO	NO	NO	NO	NO	NO	NO										
6. Can the key be removed with the vehicle in gear?	NO		NO	NO	NO	YES	NO	NO	NO	NO										
7. Is there an audible alarm if you open the door with the engine running?	NO		NO	NO	NO	NO	NO	NO	NO	NO										
8. Is there an audible alarm if you open the door with the engine off?	YES		YES	YES	YES	YES	YES	YES	YES	YES										
9. Does the steering wheel lock when the key is in the off position and in Park?	NO		NO	NO	NO	NO	NO	NO	NO	YES										
10. Does the steering wheel lock when the key is in the off position and in gear?	NO		NO	NO	NO	NO	C	С	С	NO										
11. Will the vehicle restart in Drive when moving?	YES	YES	NO	YES		YES	YES	YES	YES	NO	NO	NO	NO							
12. Will the vehicle restart in Neutral when moving?	YES		YES	YES	YES	YES	YES	YES	YES	YES										
13. Are all the key functions described in the Owner's Manual?	NO		NO	NO	NO	NO	NO	NO	NO	N/A										
14. Do the key functions correspond correctly to the Owner's Manual instructions?	YES		YES	YES	YES	YES	N/A	N/A	N/A	N/A										
Pushbotton Type																				
1. Can the engine be started without stepping on the brake pedal when in Park?												NO								
2. Can the engine be started when in the Neutral position?												YES								
3. Can the engine be started without stepping on the brake pedal when in Neutral?												NO								
4. Can the engine be started with the transmission in Drive?												NO								
5. Can the engine be started with the transmission in Reverse?												NO								
6. Is there an audible alarm if you open the door with the engine running?												NO								
7. Is there an audible alarm if you open the door with the engine off?												NO								
8. Does the steering wheel lock if the button is pushed to the off position and in Park?												YES								
9. Does the steering wheel lock if the button is pushed to the off position and in gear?												NO								
10. Will the vehicle restart in Drive when moving?												NO								
11. Will the vehicle restart in Neutral when moving?												YES								
12. Does the engine start with a single one second push of the button when in Park?												YES								
13. Does the engine stop with a single one second push of the button when in Park?												YES								
14. Does the engine stop with a single one second push of the button when in Drive and																				
not moving?												YES								
15. Does the engine stop with a single one second push of the button when in Drive and																				
the vehicle is moving?												NO								
16. Does it require holding the button for 3 seconds to shut the engine off when in gear																				
and moving?												YES								
17. Do the ignition functions require the key-fob to be inside the vehicle passenger's																				
compartment?												YES								
18. Will the ignition functions work if the key-fob is outside the vehicle passenger's																				
compartment after a normal Park engine shutdown sequence?												NO								
19. Will the ignition functions work if the key-fob is outside the vehicle passenger's																				
compartment after a 3 second in gear and moving engine shutdown sequence?												NO								
20. Are all the button functions described in the Owner's Manual?												YES								
21. Do the button functions correspond correctly to the Owner's Manual instructions?												YES								

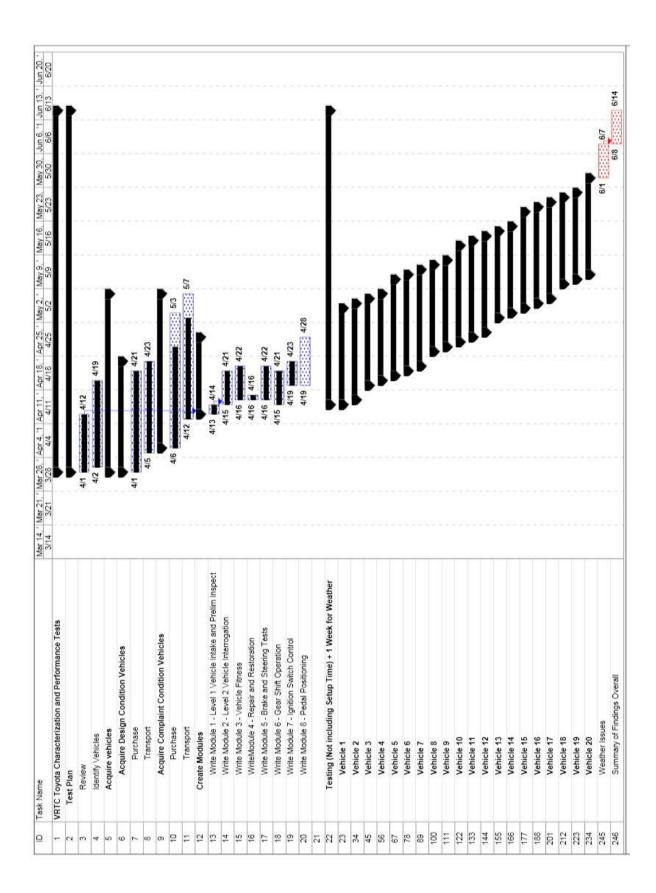
C = CANNOT TEST

### **APPENDIX E8 - Module 8 – Pedal Positioning**

	10	20	30	40	50	40	70	60	90	100
14	1 10						10			
item 1: Complete the following questions that characterize the vehicle accelerator pedal.										
1. Who is the manufacturer or the pedd?	TOYOTA	TOYOTA	CABLE DRIVEN THROTTLE BCDY	стя	TOYOTA	CTS	TOYOTA	CABLE DRIVEN THROTTLE	τογοτΑ	CEN
<ol> <li>Has the pedal in this vehicle had a recall performed by the dealer (metal shim and/or trimmed at the bottom)?</li> </ol>	NO	NO	NO	YES	NO	YES	NO	BOOY NO	NO	YE
<ol> <li>Has the peak in this vehicle been trimmed at the bottom?</li> </ol>	NO	NO	NQ	YES	NO	YES	NO	NO	NO	YE
Has the pedal in this vehicle been shimmed in the arm pixet (CBS Only)     Does the pedal have a fixed non-moving style shoe?	NO YES	YES	NO YES	YES	NO YES	YES	NO YES	NQ YES	NQ YES	NC YE
6. Does the pedal taxe a hirged mouble style shoe?	NO	NO	NÓ	NO	NO	NO	NO	NÖ	NO	NO
<ol> <li>is the return spring internal or external on the assembly housing?</li> </ol>	EXTERNAL	EXTERNAL	EXTERNAL	MERNAL	EXTERNAL	INTERNAL	EXTERNAL	NA	EXTERNAL	INTER
At full application, what are the two-contact points for the politike stop?     The levers edge/radius of the pedal and the floor pan				-	-			-		-
b. The Pedal arm and the floor gam	1	1		1			1			
6. The Peckel arm and the peckel housing 8. Other		-								
<ol> <li>Describe the visual condition of the pocal (i.e. contacting marks on the bottom edge of the shee, any crading of the assembly parts, corroder, or contamination).</li> </ol>	USED, NO ORACKS OR CORROSION	DENEW	CARPET SMASHED FROM FULL THROTTLE APPLICATION RETURN IS TROTO-IP	GOOD	GOOD	LOOKS USED NO CRACKS OR CONTAMINATION		GOOD	GOOD	
10. Is the electrical connector clean and free of contractors and avel connected? 11. Some the effect because to be accompanying the beaters of chaffed edges, an other constant?	YES	VES ROKEN OR 3	N/A YES	YES YES	VES VES	YES	YES	YES YES	VES VES	VE VE
<ol> <li>Coes the wiring harness appear to be uncompromised (no broken or chaffed wires, no splice repairs)?</li> </ol>	16.8	NUMBER OF	PEDL DD	11.8	163	163	768	168	11.3	- "
12. Characterize the motion of the pecial (i.e. sticky action, bose or worm pixel, noises or quiet and smooth).	QUIET 8 SMOOTH	QUET & SMOOTH	STICK ON RETURN AT ABOUT 14 PROM START POS	NCE, SMOOTH MOVEMENT	0000 CONDITION	QUET & SMOOTH	SMOOTH MOVEMENT, NO BINDING ISSUES	CABLE HYSTERISIS DOES EAST	SMOOTH, GOOD CONDITION	SMO: MOVER
13. Can the podal be planed with only a loose carpet mat?	NO NO	NO	NO	NO	NO	NO NO	NO NO	NO NO	NQ	14
14. Can the peolal be ploated with a loase all weather mail placed on top-of the carpet mail? 15. Could the peolal be ploated by any trim or molding places that are losse?	NO	NO NO	NO NO	VES NO	NO NO	NO	NO NO	NO NO	NO NO	NK NK
tem 2: Engine RPM Test				1 140					1 100	
idd/Park	1390	1350	1300	1400	1600	1250	1050		\$200	11
idd/Novtral	1250	1229	1290	1400	1600	1250	100		\$250	12
idd/Drive NamyPark	1820	675	790	800	1650	550 675	575		950	- 8
NamyNextral	600	675	790	650	700	675	675		6.90	6.
VaringOrbe	620	660	650	610	676	660	660		600	6
em 3: Displacement versus Force versus Commanded Voltage Test (Ignition in ON position) File Number	028	005	003/004	002	900	610	011	012	013	014
	FARD LASER	FAR0	FARO LASER	FARO	FARO	FARO LASER LINE	FARO	FARO	FARO	EA.
inau rement Device identification:	LINE PROBE			LASER LINE		PROBE VJ	LASER LINE	LASER LINE	LASER LINE	
rive Liec	200	21/0	V3 2MD	PROSE V3 2WD	PROBE V3 2WD	200	PROBE V3 2WD	PROBE V3 2WD	PROBE V3 2WD	PR08
Telescopieg strening wheel:	1 140	10	2WD NO	1 140	NO	I NO	NO NO	I NO	NO	20
'B vleering wheel'	YES	VES	YES	YES	VES	VE3	YES	YES	YES	M
ange ef Miction Notopraph List	26.0 mm	26.8 mm	42.0 mm	2.9 m	27.3 nm	28.2 mm	27.9 mm	41.8 mm	27.0 mm	26.4
Www.hield.uertifier (VIN)		-	-	-	-		-	-	-	
Nor Plased										-
hedais Nespendisular Side view Wide hedais Tight siew-Otifique	+									
tedah farat uleur-Wide	1	1	1	1	1	1	1	1	1	
todak Kear view- Tight	· ·	1	1	1	*	· ·	1	1	*	
6 Mensurement Device Identification	00	60	63	0.0	0	63	00	03	(3)	1 0
ower finales:	YES	YES	YES	YES	YES	YES	YES	YES	YES	Y
vive Liner	200	21/0	200	200	200	2WD	2100	200	240	21
ingine: Configuration:	VS	1.4	1.4	L4 GASOLINE	14	14	L4 GASOLINE	V5	VS	V
wt	GASOUNE	GASOLINE	L4 GASOLNE		L4 GASOLINE	GASOLINE		GASOLINE	GASCINE	GAS
Rybornent: decoging steering wheel	NO NO	241 NO	NO	YES	24L NO	241. NO	24L NO	NO	30L NO	- 2
R steering wheek	YES	YES	YES	YES	YES	YES	YES	YES	YES	'n
est center line (CL) to steering wheel CL:	-0.001	-0.266	-0.026	4 292	-0,564	-0.024	-0.34)	-0.201	-0.252	-0
inike podal to Assel podal (depress kreke, measure nearest points between podabi):	3.376 (RUDDER PAD MISSINO FROM BRAKE FEDAL	•	3.750	2.875	2.875	2.5	2.875	3.0625	2.875	2
brake pedial to Assel pedial (greatest D, E, or F subtracted from smallest G, H, or I):	3.876	3.125	3.600	3.500	3.600	3.375	3.500	3.625	3.600	3.6
ig of lenie pedal to top of Accel pedal (depress lenke, measure vertical distance 0 to 0): ottom of brake pedal to bottom of Accel pedal (depress brake, measure vertical distance # to 0;	0.500	0.750	0.625	0.125	0.250	6,000	0.625	0.250	0.125	0,1
rake pedal height above Accel pedal (step-over height measured perpendicular to brake pedal front face):	1.125	1.375	1.500	1.250	1.128	1.125	1.125	1.250	1.125	11
art CL to Braine Peolal (in)	-1.832	.2.2%	-2.661	-2.271	-2.159	-1.879	-2.015	-2.238	-1.864	2
	-1.677	-198	-2.529	2.174	-2.052	4.7.0	-1.837	2.165	-1720	2
	-1 293	-1.453	-2.176	2.261	-1.726	-1 / 20 -1 407 2 627	2.539	2.621	.1 205	-4
	1,966	2.318	2.1%	2.097	2 192	2,461	2.539	2.618	2 656	2
		1.962	1.812	1.575	1.736	1.961	1.946	2.243	2.001	1.0
	1.543					6.514	5.561	5.061	5.6%	53
est (1. 1:s Accelerator Pedal (1a)		5 237	5 830	5.376	5.3%					63
est (3. 1= Accelerator Pedal (a)	1.543 5.722 5.722	6.237	5 832	5.376	5.3%	6.614	5.561	5.795	5.694	
eet (1. to Accelerator Pedal (in)	1.543 5.722 5.722 5.722 5.722	6.237 6.237	5 8 32 5 8 32	5.376 5.376	6.394 6.394	6.614	5.541	5.842	5.694	6.3
n 191 Cl. to Accelerator Pedd (in) 1	1.543 5.722 5.722 5.722 5.722	6.237 6.237	5 8 32 5 8 32	5.376 5.376	6.394 6.394	6.614	5.541		5.694	6.3
n 191 Cl. to Accelerator Pedd (in) 1	1.543 5.722 5.722	6.237	5 832	5.376 5.376 5.765 5.765 5.765 5.765 6.765	6.394	6.614	5.561 5.561 7.240 7.545 7.545 7.545	5.842		- 6 ) - 6 ) - 6 )
rent (1. to Accelerator Pedal (in) Rent (2. to Accelerator Pedal (in) R R R R R R R R R R R R R R R R R R R	1.543 5.722 5.722 5.722 7.333 7.333 7.333 7.333 7.333 7.333	6 237 6 237 6 531 6 531 6 531 6 531 8 531 9 260	5 832 6 832 7 436 7 436 7 436 7 436 7 436 7 230	5.376 5.376 6.755 6.755 6.755 6.755 6.755 6.755 10.030	5 334 6 334 7 0.2 7 0.2 7 0.2 7 0.2 7 0.2 7 0.2 9 375	6.514 6.514 7.004 7.004 7.004 7.004 10.000	5.561 7.240 7.240 7.240 7.340 9.375	5.842 7.229 7.229 7.229 7.229 8.929 8.929	5 65H 7 250 7 250 7 350 9 250	6. 6 6 10
eet (), to Accelerator Pedal (In) t t t t till fore,/AT adjustment samp of driver seat: till fore, AT adjustment samp of driver seat:	1.543 5.722 5.722 5.722 7.333 7.333 7.333 7.333 9.375 0.710	6 237 6 237 6 531 6 531 6 531 6 531 8 531 9 260 3 000	5 832 5 832 7 436 7 436 7 436 7 436 7 436 7 246 1 200	5.376 5.376 6.755 6.755 6.755 6.755 6.755 6.755 6.755 6.755 6.755 7.000 2.100	5 334 6 334 7 032 7 632 7 632 9 375 0 750	5.514 5.514 7.004 7.004 7.004 10.000 2.600	5.541 7.249 7.248 7.248 9.375 3.009	5.842 7.229 7.229 7.229 8.929 8.920 3.675	5 694 7 250 7 350 9 250 9 250 3 000	6. 6. 6. 10. 2.0
red CL to Accelerator Pedal (in) R R 	1.543 5.722 5.722 5.722 7.333 7.333 7.333 7.333 7.333 7.333	6 237 6 237 6 531 6 531 6 531 6 531 8 531 9 260	5 832 6 832 7 436 7 436 7 436 7 436 7 436 7 230	5.376 5.376 6.755 6.755 6.755 6.755 6.755 6.755 10.030	5 334 6 334 7 0.2 7 0.2 7 0.2 7 0.2 7 0.2 7 0.2 9 375	6.514 6.514 7.004 7.004 7.004 7.004 10.000	5.561 7.240 7.240 7.240 7.340 9.375	5.842 7.229 7.229 7.229 7.229 8.929 8.929	5 65H 7 250 7 250 7 350 9 250	6. 6. 6. 10. 2.0 3.0
iner CE to Accelerator Predid [m]  for CE to Accelerator Predid [m]  for  ft  ft  ft  ft  ft  ft  ft  ft  ft  f	1.543 5.722 5.722 5.722 7.333 7.333 7.333 9.375 0.740 3.375	6 237 6 237 6 531 6 531 6 531 6 531 9 260 3 000 2 875	6 832 6 832 7 436 7 436 7 436 7 436 7 436 7 246 1 200 3 116	5.376 5.376 6.755 6.755 6.755 6.755 6.755 6.755 6.755 2.500 2.500 3.750	6 334 6 334 7 0.2 7 032 7 032 9 376 0 750 4 325	6.514 6.514 7.004 7.004 10.000 2.400 2.400 2.402	5.541 7.249 7.248 7.248 9.375 3.000 3.075	5.842 7.229 7.229 8.600 3.675 3.750	6 694 7 250 7 350 9 250 3 000 4 250	63 67 67 103 26 38
0. 1. Accelerator Pedd [a] 1. Accelerator Pedd [a] 1. Accelerator Pedd [a] 1. Accelerator Pedd [b] 1. Accelerator Pedd Pedd Pedd Pedd Pedd Pedd Pedd Ped	1.543 5.722 5.722 5.722 7.333 7.333 7.333 9.375 0.740 3.375	6 237 6 237 6 531 6 531 6 531 6 531 9 260 3 000 2 875	6 832 6 832 7 436 7 436 7 436 7 436 7 436 7 246 1 200 3 116	5.376 5.376 6.755 6.755 6.755 6.755 6.755 6.755 6.755 2.500 2.500 3.750	6 334 6 334 7 0.2 7 032 7 032 9 376 0 750 4 325	6.514 6.514 7.004 7.004 10.000 2.400 2.400 2.402	5.541 7.249 7.248 7.248 9.375 3.000 3.075	5.842 7.229 7.229 8.600 3.675 3.750	6 694 7 250 7 350 9 250 3 000 4 250	6.3 6.7 6.7 10.0 2.6 3.8 NK

4	110									_
		120	130	140	16C	160	170	180	190	200
tem 1: Complete the following questions that characterize the vehicle accelerator pedal.										
. Who is the manufacturer or the pedal?	TOYOTA	CENSO	TOYOTA	TOYOTA	TOYOTA	CTS	TOYOTA	TOYOTA	CTS	DEN
The state and the information of the state of the state in the state in the state of the state o	NÔ	NÖ	NO	NO	NO	YES	NO	ND	VFR	NO
t. His the pedal in this vehicle had a recall performed by the dealer inetial shim and/or trimmed at the bottom? A His the pedal in this vehicle been trimmed at the bottom?	NO	NO	NO	NO	NO	YES	NO	NO	YES	NO
Has the pedal in this vehicle been shimmed in the arm pivot (CTS Only)?	NQ	NQ	NO	NO	NO	NO	NO	NQ	NO	NC.
Does the pedal have a fixed non-moving style shoe?	YES	YES	YES	YES	YES	YES	YES	YES	Yis	YE
Does the peak have a hinged movable style shee?	NQ	ÇM	NO	NQ	NQ.	NO	NO	ÇM	NO	NC NC
K the ration spring internal or external on the assembly housing?     At full application, what are the two contact points for the positive stop?	EXTERNAL	INTERNAL	EXTERNAL	ECTERINA	EXTERNAL	INTERNAL	EXTERNAL	EXTERNAL	INTERNAL	EULER
The lower edge/radius of the petal and the floor pan		· ·								_
. The Pedal arm and the floor pan	1		1	1				-		
The Pedal arm and the pedal housing	_									- 1
A Other	_		<u> </u>							
<ol> <li>Describe the visual condition of the pedal (Secontacting marks on the bottom edge of the shoe, any oracking of the assembly parts, arreador, or contamination).</li> </ol>	VERY CLEAN	CLEAN, NO CRACKS OR CORROSION	CLEAN, NO CRACKS	CLEAN, NO MODS, NO CRACKS	NO CRACKS OR MARKS & IS CLEAN	LOOKS USED BUT NO CORROSION OR RUST	USED, NO CRACKS OR CORROSION		USED BUT CLEAN	CONDIT CONDIT FREE MOVEM
D. Is the electrical connector dean and free of corrosion and well connected?	YES	YES	YES	YES	YES	YES	YES	YES	Yis	YE
<ol> <li>Does the wiring harness appear to be uncompromised (no broken or chaffed wires, no splice repairs)?</li> </ol>	YES	YES	YES	YES	YES	YES	YES	YES	YES	YE
12. Characterize the motion of the peak (i.e. sticky action, loose or worm pleak, noises or quiet and smooth).	QUIET & SMOOTH	QUET & SMOOTH	QUIET & SMOOTH	QUET & SMOOTH	QUET & SMCOTH	QUIET & SMOOTH	GUIET & SMOOTH	QUIET & SMCOTH	QUIET & SMOOTH	SMOX MOVEN NO BIN
13. Can the people be planed with only a loose surget mat?	NQ	NO VEC	NO NO	NO NO	NO	NO NO	NO NO	NO NO	NO	NK NK
14. Can the pedal be planed with a losse all weather met placed on top of the surpet mat? 15. Could the pedal be planed by any trim or molding places that are losse?	NQ	VES NO	NO NO	NO NO	NO NO	NO	NO NO	NO NO	NO	NK.
tem 2: Engine RPM Test					1.00					1
dé/faite	\$450	500	1400	1950	1250	N/A	1450	1350	1150	14
uk@Newtral	1450	500	1400	1220	1200	1500	1400	1350	1150	14
idd/Drive	1050	670	1050	964	\$10	NVA.	1000	590	810	55
Varm/Park Varm/Heutral	610	680	610	589	800	700	650	660	570	66
Varm/Drive	620	600	600	580	700	NA	660	680	650	68
tem 3: Displacement versus Force versus Commanded Voltage Test (Ignition in ON position) File Number	917	622	019	020	023	005	026	627	029	
5		10.00.000								1 0 0 0
leasurement Device Identifications	FAR0 LASER UNE	FARO LASER	FAR0 LASER LINE	FAR0 LASER LINE	FAR0 LASER LINE	LINE PROBE	FARO LASER UNE PROBE		FARD LASER LINE	FAR
	FROM VJ	VJ	PROBE VJ	PROBE VJ	PROBE V3	V3	V3	VJ	PROBE V3	PROB
vive Line:	2WD	20/0	2WD	2WD	2WD	2WD	2WD	20/0	2WD	21/
descoping steering wheel	NO VES	YES YES	NO YES	NO YES	NO VES	NO VES	NO YES	ND VES	YES	NC VE
IR steering unreal: large of Motion:	28.1 mm	251mm	26.9 mm	27.3 mm	25.9 mm	28.7 mm	23.6 mm	28.2 mm	267 mm	27.5
hotopagh List										
Vodsheld Kentifer (VN)		*	1	*	*	*	*	*	1	*
ker Haust	1	× .	1	*	1	1 ( )	1	× .	1	1
hedah Perpendinalar Side view-Wide hedah Tight view-Obligae										- 1
edas tea view Wide		+ >								
redals floar view. Tight	1	1	1	1	1	1	1	1	1	
<u> </u>										
Resurrement Device Mentiliarians	YES	03	93 YES	7ES	YES	YES	YES	VES	VES VES	YE
tweer Brakes: View Line:	200	YES 200	2WD	200	20/0	200	2//0	200	200	2//
ngha:										-
ionfiguration:	V6	VE	VS	VK	L4	Lá	L4	Lá	Lá	Li
uel	GASOLINE	GASOUNE	GASOLINE	GASOUNE	GASOLINE	GASCLINE	GASOLINE	GASOLINE	GASCUNE	0A30
Subsement: decouping steering wheel	3.0 L NO	3.5L YES	3.0 L NO	3.0 L NO	2.4 L NO	2.4 L YES	2.4 L NO	24L NO	2.4 L YES	2.4
it steering wheel	YES	YES	YES	YES	YES	YES	YES	YES	YES	YE
eat center line (CL) to steering wheel CL	-0.238	0,164	0.000	-2.600	-0.089	-0.049	-0.110	-0.203	-0.179	-0.1
	2.475	2.75	,	2.5	2.625	2.5	2.875	2.75	2.625	2
nike pedid to Accel pedid (depress brake, ranasare neares) polets between pedid):										
nder pedal to Accel pedal (depress brake, measure nonreal poliets between pedals): raise pedal to Accel pedal (grouted B), C, or T with seted from smalled G, H, or ():	3 250	3.760	3.500	3.260	3 260	3 000	3 590	3.600	3.375	3.5
nike pošil to Accel pošil (doprova brake, manure nasres) poleta between pošis); nike pošil to Accel pošil (gradiet) D, E, or 1 svibtračné fran smallest G, K, or 1); op di brake pošil to top el Accel pošil (doprova brake, mesova vertical distance 1 to Q);	3 250 0.125 1 250				3.250 0.500 0.750	3.000 1.250 0.750	3 500 0 500 1 375	3.600 0.000 1.125	3.375 0.500 0.250	0.0
nike pešil to Accel pešil (depress brake, manure narce) polets between pedia); nike pešil to Accel pešil (groutest B), E, or E subtracted from smallest B, H, or I); go d brake pešil to top at Accel pešil (depress brake, messure vertical distance D to G); ettam at brake pešil to bottom of Accel pešil (depress brake, messure vertical distance F to G); mino pešil brake brake Accel pešil (depress brake, messure vertical distance D to G);	0.125	3.760	3.500	3.269	0.500	1.250	0.500	0.000	0.500	0.0
nike pešil to Accel pešil (depress brake, manure narce) polets between pedia); nike pešil to Accel pešil (groutest B), E, or E subtracted from smallest B, H, or I); go d brake pešil to top at Accel pešil (depress brake, messure vertical distance D to G); ettam at brake pešil to bottom of Accel pešil (depress brake, messure vertical distance F to G); mino pešil brake brake Accel pešil (depress brake, messure vertical distance D to G);	0.125 1.250 1.250	3.750 0.000 2.000 1.500	3.500 0.000 1.000	2.250 0.500 1.000 1.375	0.500 0.750 1.250	1.250 0.750 1.750	0.500	0.000 1.125 0.125	0.500 0.250 0.500	0.0 1.1 1.2
nike pešil to Accel pešil (depress brake, manure narce) polets between pedia); nike pešil to Accel pešil (groutest B), E, or E subtracted from smallest B, H, or I); go d brake pešil to top at Accel pešil (depress brake, messure vertical distance D to G); ettam at brake pešil to bottom of Accel pešil (depress brake, messure vertical distance F to G); mino pešil brake brake Accel pešil (depress brake, messure vertical distance D to G);	0.125	3.750 0.000 2.000	3.500 0.000 1.000	3.260 0.500 1.000	0.500	1.250 0.750 1.750 0.277	0.500 1.375 1.125 -2.121	0.000	0.500 0.250 0.500	0.0 1.1 12
nike pešil to Accel pešil (depress brake, manure narce) polets between pedia); nike pešil to Accel pešil (groutest B), E, or E subtracted from smallest B, H, or I); go d brake pešil to top at Accel pešil (depress brake, messure vertical distance D to G); ettam at brake pešil to bottom of Accel pešil (depress brake, messure vertical distance F to G); mino pešil brake brake Accel pešil (depress brake, messure vertical distance D to G);	0.125 1.250 1.250 -2.305 -2.176 -1.062	3.759 0.000 2.000 1.500 -2.205 -2.214 -1.740	3.500 0.000 1.000	3 2840 0.500 1.000 1.375 -2 142 -1.988 -1.988	0.500 0.750 1.250 -2.012 -1.724 -1.304	1.250 0.750 1.750 0.277 0.406 0.671	0.500 1.375 1.125 -2.121 -2.011 -1.587	0.000 1.125 0.125 -2.204 -1.9(2) -1.5(9)	0.500 0.250 0.500 2.305 -2.053 -1.584	6.0 1.1 12 -17 -16 -12
nike pešil to Accel pešil (depress brake, manure narce) polets between pedia); nike pošil to Accel pošil (groutest B), E, or E subtracted from smallest B, H, or I); go d brake pašil to togo d Accel pašil (depress brake, messure vertical distance D to G); ettom d brake pašil to borna of Accel pašil (depress brake, messure vertical distance F to G); mino pašil brake hom Accel pašil (pego-ser brake, messure depress/brake); to second to to G);	0.125 1.250 1.250 -2.305 -2.176 -1.965 2.203	3.769 0.000 2.000 1.500 -2.235 -2.214 -1.740 2.210	3.500 0.000 1.000	3 280 0.500 1.000 1.375 -2.142 -1.998 -1.998 2.410	0.500 0.750 1.250 -2.012 -1.724 -1.304 2.668	1.250 0.750 1.750 0.277 0.406 0.671 2.646	0.500 1.375 1.125 -2.121 -2.011 -1.507 2.432	0.000 1.125 0.125 -2.204 -1.9(2) -1.9(2) -1.9(9) 2.265	0.500 0.250 0.500 2.305 -2.053 -1.584 2.309	6.0 1.1 12 -17 -18 -12 -12 -12 -12 -12
nike polid to Accri pedal (depress brake, manure namen) polisis between pedals): mise polid to Accri pedal (granitett D, E, or 1 with acted from smallest G, K, or (): go of brake pedal to top of Accri pedal (depress brake, measure vertical distance D to G): ettawa af brake pedal to tomat of Accri pedal (depress brake, measure vertical distance F to G): mise pedal height how Accri pedal (depresser brake, measure depredational to brake pedal from those):	0.125 1.250 1.250 -2.305 -2.176 -1.061 2.203 2.203 2.051	3.769 0.000 2.000 1.500 -2.235 -2.214 -1.740 2.210	3.500 0.000 1.000	3.280 0.500 1.000 1.375 -2.142 -1.969 -1.695 2.410 2.294	0.500 0.750 1.250 -2.012 -1.724 -1.324 2.668 2.640	1.250 0.750 1.750 0.277 0.406 0.671 2.646	0.500 1.375 1.125 -2.121 -2.011 -1.507 2.432 2.269	0.000 1.125 0.125 -2.204 -1.912 -1.640 2.266 2.105	0.500 0.250 0.500 -2.053 -1.584 2.329 2.127	0.00 1.10 1.20 -1.7 -1.6 -1.2 -1.2
nder pedid to Acct pedid kleptens brake, measure neures) points between pedid); reke pedid to Acct pedid (groutest B), T, or T rektracted from smallest B, H, or I); op of brake pedid to to so of Accd pedid (depress brake, measure vertical distance D to Q); criste pedid to batten of Accel pedid (depression brake, measure vertical distance T to Q); criste pedid braket Accel pedid (brap-over height measured perpendicular to brake pedid front from); excel C to Brake Pedid (b).	0.125 1.250 1.250 -2.305 -2.176 -1.965 2.203	3,750 0,000 2,000 -2,205 -2,214 -3,740 2,210 2,210 2,210 2,210 2,210	3.500 0.000 1.000	3 280 0 560 1 000 1 375 -2 142 -1 988 -1 6095 2 410 2 264 1 763	0.500 0.750 1.250 -2.012 -1.724 -1.304 2.668	1.250 0.750 1.750 0.277 0.406 0.671	0.500 1.375 1.125 -2.121 -2.011 -1.507 2.432 2.269 1.805	0.000 1.125 0.125 -2.204 -1.9(2) -1.9(2) -1.9(9) 2.265	0.500 0.250 0.500 2.305 -2.053 -1.584 2.309	0.00 1.10 1.20 -1.7 -1.6 -1.2 -1.2
nder pedid to Acct pedid kleptens brake, measure neures) points between pedid); reke pedid to Acct pedid (groutest B), T, or T rektracted from smallest B, H, or I); op of brake pedid to to so of Accd pedid (depress brake, measure vertical distance D to Q); criste pedid to batten of Accel pedid (depression brake, measure vertical distance T to Q); criste pedid braket Accel pedid (brap-over height measured perpendicular to brake pedid front from); excel C to Brake Pedid (b).	0.125 1.250 1.250 2.176 -1.963 2.203 2.051 1.619 5.161	3,750 0,000 2,000 -2,205 -2,214 -3,740 2,210 2,210 2,210 2,210 2,210	3.500 0.000 1.000	3 280 0 560 1 000 1 375 -2 142 -1 988 -1 6095 2 410 2 264 1 763	0.500 0.750 1.250 -2.012 -1.724 -1.304 2.668 2.440 1.625 	1 250 0 750 1 750 0 277 0 406 0 671 2 546 2 450 2 189 5 101	0.500 1.375 1.125 -2.121 -2.011 -1.507 2.432 2.269 1.805	0.000 1.125 0.125 -2.234 -1.9(2) -1.6(0) 2.265 2.106 1.725 5.402	0.500 0.350 0.500 2.305 2.053 -1.884 2.829 2.127 1.727 1.727	0.00 1.10 1.20 -1.7 -1.6 -1.2 2.6- 2.6- 2.6- 2.6- 2.6- 2.6- 2.6- 2.
nike pedië to Accel pedië (depress breke, measure neares) polisis between pedië); reke pedië to Accel pedië (groutest D, T, er T with acted from smalledt G, H, er (j): op at breke pedië to to to at Accel pedië (depress trake, measure vertical distance D to Q); crise pedië botten et divise pland (gtop-over beight measure et perpedicular to brake pedië front from); mice pedië beight above accel pedie (gtop-over beight measure et perpedicular to brake pedie front from); et CL to Brake Pedie (je).	0.125 1.250 1.250 2.305 2.136 3.063 2.031 2.051 1.619 5.161	3,759 0,000 2,000 1,500 -2,215 -2,214 -3,740 2,210 2,210 2,210 1,744 5,505 5,549	3.500 0.000 1.000	3 280 0 560 1 000 1 375 -2 142 -1 988 -1 6095 2 410 2 264 1 763	0.500 0.750 1.250 -2.012 -1.724 -1.304 2.668 2.440 1.625 	1 250 0 750 1 750 0 277 0 406 0 671 2 646 2 460 2 189 5 101 5 101	0.500 1.375 1.125 -2.121 -2.011 -1.507 2.432 2.269 1.805	0.000 1.125 0.125 -2.234 -1.9(2) -1.6(0) 2.265 2.106 1.725 5.402	0.500 0.350 0.500 2.305 2.053 -1.884 2.829 2.127 1.727 1.727	0.0 1.1 12 -17 -16 -12 2.6 2.6 2.6 2.6 2.6 2.6
nike pedië to Accel pedië (depress breke, measure neares) polisis between pedië); reke pedië to Accel pedië (groutest D, T, er T with acted from smalledt G, H, er (j): op at breke pedië to to to at Accel pedië (depress trake, measure vertical distance D to Q); crise pedië botten et divise pland (gtop-over beight measure et perpedicular to brake pedië front from); mice pedië beight above accel pedie (gtop-over beight measure et perpedicular to brake pedie front from); et CL to Brake Pedie (je).	0.125 1.250 1.250 -2.365 -2.176 -1.900 2.200 2.200 2.200 2.200 2.200 2.200 2.200 2.200 2.200 2.200 5.161 5.161	3,759 0,000 1,500 -2,235 -2,214 -3,740 2,219 2,219 2,219 2,219 2,219 2,219 2,219 2,219 2,219 2,219 5,555	3.500 0.000 1.000	3 289 0.500 1 000 1 375 -2 142 -1 988 -1 988 -2 410 2 214 1 763 -6 276 5 276 5 226	0.500 0.750 1.250 -1.724 -1.725 -	1 250 0 750 1 750 0 277 0 406 0 671 2 546 2 466 2 189 5 101 5 101 5 101	0.500 1.375 1.125 -2.121 -2.011 -1.507 2.432 2.259 1.805 -5.283 5.283 5.473	0.000 1.125 0.125 -2.234 -1.9(2) -1.6(0) 2.265 2.106 1.725 5.402	0 500 0 250 0 500 2 205 2 253 -1.584 2 127 1 727 5 280 5 280 5 280	6.0 1.1 12 -17 -16 -12 26 26 26 29 29 59 52 52 52 52 52
nike pedië to Accel pedië (depress breke, measure neares) polisis between pedië); reke pedië to Accel pedië (groutest D, T, er T with acted from smalledt G, H, er (j): op at breke pedië to to to at Accel pedië (depress trake, measure vertical distance D to Q); crise pedië botten et divise pland (gtop-over beight measure et perpedicular to brake pedië front from); mice pedië beight above accel pedie (gtop-over beight measure et perpedicular to brake pedie front from); et CL to Brake Pedie (je).	0.125 1.250 1.250 -2.305 -2.136 -2.136 -2.136 -2.203 2.203 2.203 2.203 2.203 -2.203 2.203 -2.203 -2.203 -2.203 -2.203 -2.203 -2.205 -3.151 -5.	3,780 0,000 2,000 1,500 -2,225 -2,214 -1,742 2,210 2,2	3.500 0.000 1.000	3.289 0.550 1.000 1.375 -2.142 -1.998 -1.9976 -1.9976 -1.9976 -1.9976 -1.9976 -1.9976 -1.9976 -1.997	0.500 0.750 1.250 -2.012 -1.724 -1.72	1 250 0 750 1 750 0 277 0 406 0 671 2 646 2 460 2 188 5 101 5 101 5 101 5 627	0 500 1 375 1 125 -2.121 -2.311 -1.567 2 432 2 249 1 805 5 783 5 363 5 547 3 5 997	0.000 1.125 0.125 0.125 -2.234 -1.982 -1.982 2.265 2.265 2.265 1.725 5.219 5.342 6.872	0 500 0 350 2 305 2 003 - 1,584 2 127 1 727 - 5 200 5 200 5 5 200 5 5 200	6.0 1.1 12 -17 -16 -12 26 26 26 26 26 26 26 26 26 26 26 26 26
trike pedid to Accel pedid (depress brake, measure neares) policis between pedia's: reise pedid to Accel pedid (granites) D, T, or T subtracted from senalles) G, K, or (): op of brake pedid to top of Accel pedid (depress trake, measure vertical distance 0 to Q): central of take pedid to top of Accel pedid (depress brake, measure vertical distance 1 to Q): miss pedid brake Pedid (b): Note CC 10 brake Pedid (b): Note Pedid	0.125 1.250 1.250 -2.365 -2.176 -1.900 2.200 2.200 2.200 2.200 2.200 2.200 2.200 2.200 2.200 2.200 5.161 5.161	3,780 0,000 2,000 1,500 -2,225 -2,214 -1,742 2,210 2,2	3.500 0.000 1.000	3 289 0.500 1 000 1 375 -2 142 -1 988 -1 988 -2 410 2 214 1 763 -6 276 5 276 5 226	0.500 0.750 1.250 -2.012 -1.724 -1.72	1 250 0 750 1 750 0 406 0 671 2 646 2 646 2 186 5 101 5 101 5 101 5 101 5 101 5 8 627	0.500 1.375 1.125 -2.121 -2.911 -1.567 2.432 2.259 1.805 -5.783 5.363 5.473 5.997 6.997	0.000 1.125 0.125 -2.234 -1.9(2) -1.6(0) 2.265 2.106 1.725 5.402	0 500 0 3%0 0 350 2 305 2 305 2 003 - 1,584 2 127 1 727 1 727 5 200 5 200 5 520 5 510	0.00 1.12 1.22 -1.17 -1.6 -1.22 2.64 2.99 5.23 5.23 5.23 5.23 5.23 5.23 5.23 5.23 5.23 5.23 5.23 5.23 5.23 5.23 5.23 5.24
trike pedid to Accel pedid (örpress brike, measure neared) polets between pedid); rike pedid to Accel pedid (protect Q, C, or E subtracted from sendled G, K or (). op of brike pedid to tota of Accel pedid (depress brike, measure vertical distance D to Q); extern of brike pedid to bota of Accel pedid (perposer bright measure of perpendicular to brake pedid front face); exet CL to Buske Pedid (b). N. N. N. N. N. N. N. N. N. N	0.125 1.250 1.250 2.355 2.155 2.165 2.205 2.051 1.619 5.161 5.161 5.161 5.164 5.	3,759 0,000 2,000 1,0000 1,0000 1,000 1,0000 1,0000 1,00000000	3.500 0.000 1.000 1.250	3.289 0.500 1.000 1.000 1.000 1.000 1.000 1.000 2.2142 1.1005 2.241 2.241 2.241 2.241 2.241 2.244 1.765 5.226 5.20	0.500 0.750 1.250 2.012 1.724 1.724 1.925 2.440 1.925 5.351 5.	1 250 0 750 1 750 0 406 0 671 2 646 2 466 2 466 2 189 5 101 5 101 5 101 5 101 5 627 5 827 5 827 7 500	0.500 1.375 1.125 -2.121 -2.011 -1.587 2.432 2.259 1.805 5.243 5.255 5.355 5.255	0.000 1.125 0.125 -2.234 -1.942 -1.942 -1.942 -1.942 -1.942 -1.942 -1.942 -2.265 2.265 1.745 5.142 5.242 6.872 6.872 6.872 5.342 6.872	0 500 0 286 0 500 -2.003 -1.584 2 305 2 107 1 727 	0.00 1.12 1.22 1.12 1.12 1.12 1.12 1.12 1.12 1.12 1.12 1.12 1.12 1.12 1.12 1.22
nike pedid to Accil pedid (depress broke, measure norme) politis between pedid):  vice pedid to Accil pedid (provided B), 5, or E velteneted from smalled 6, 16, or 8;  op of broke pedid to to top of Accel pedid (depress broke, measure extraid extrance b to 0; enters of broke pedid to botton of Accel pedid (depress) broke, measure extraid extrance to 0; enters of broke pedid (depress) pedid (depress) broke from the pedid broke to broke pedid (top - over height measure of perpendicular to broke pedid (top - over height measure of perpendicular to broke pedid (top - over height measure) perpendicular to broke pedid (	0.125 1.250 1.250 2.302 2.176 3.180 2.203 2.001 1.619 5.161 5.	3 780 0 000 2 000 1 500 -2 225 2 214 -1 142 2 210 2 210 2 210 2 210 5 306 5 349 5 605 6 085 6 085	3.500 0.000 1.000 1.250	2280 0.500 1.000 1.575 2.142 1.598 2.410 2.241 2.241 2.241 2.241 2.241 2.241 2.241 2.241 2.241 2.241 2.241 2.245 2.255 5.2555 5.2555 5.2555 5.2555 5.25555 5.2555 5.25555 5.2555555 5.255555555	0.500 0.780 1.250 -2.012 -1.724 -1.724 -1.304 2.668 2.668 2.668 -2.651 5.350 5.351 5.350 5.351 5.350 5.351 5.350 5.35	1 250 0 756 1 750 0 277 0 406 0 671 2 546 2 466 2 186 2 186 5 101 5 101 5 101 5 101 5 101 5 101 5 501 7 500	0.500 1.375 1.125 -2.121 -2.211 -	0.000 1.125 0.125 -2.224 -1.982 -2.256 2.196 2.256 2.196 5.242 5.242 6.875 6.7555 6.7555 6.7555 6.7555 6.7555 6	0.500 0.250 2.003 -1.584 2.395 2.003 -1.584 2.395 2.127 1.727 1.727 5.200 5.200 5.200 5.200 5.200 5.510 6.610 9.505	6.00 1.12 1.22 1.12
nike pedid to Acct pedid (depress brake, measure neared) points between pedia); relia pedid to Acct pedid (groutest D, T, or T with acted from smalled G, H, or (): op of brake pedid to to top of Accel pedid (depress brake, measure vertical distance D to (2): critica pedid brake to top of Accel pedid (depress brake, measure vertical distance T to (2): critica pedid brake to top of Accel pedid (depress) brake, measure vertical distance T to (2): critica pedid brake to top of Accel pedid (depress) brake pedid from the second perpendicular to brake pedid from the second pedid N Accel To Brake Pedid (N) Accel To Accelerative Pedid (N) Accel To Accel To Accel To Accel To Accel To Accelerative Pedid (N) Accel To Accel To Accel To Accel To Accel To	0.125 1.250 1.250 2.355 2.355 2.355 2.355 2.355 2.456 3.161 5.	3 799 0 000 2 600 1 500 -2 225 -2 214 -2 214 2 210 2 210 2 210 2 210 2 210 5 319 5 539 5 548 5 548	3.500 0.000 1.000 1.250 9.376 3.000 4.125	2.289 0.500 1.000 1.000 1.100 1.100 2.142 2.410 2.244 1.105 2.244 1.105 2.244 1.105 2.244 1.254 5.2355 5.2355 5.2355 5.2355 5.23555 5.235555 5.235555555555	0.500 0.500 1.259 1.	1 250 0 750 1 750 0 2277 0 406 0 871 2 646 2 466 2 466 2 466 2 466 5 101 5 101 5 101 5 101 5 527 5 627 7 600 2 500 4 125	0.500 1.175 1.125 -2.121 -2.121 -2.931 -1.387 2.432 2.949 1.805 5.783 5.363 5.473 5.997 6.997 6.997 6.997 9.250 3.125	0.000 1.125 0.125 0.125 1.912 2.234 1.912 2.265 2.105 2.105 2.105 3.124 2.265 3.124 5.213 5.242 5.242 5.243 5.242 5.245 5.242 5.245 5.242 5.245 5.242 5.245 5.242 5.245 5.	0.500 0.9% 0.500 2.053 -1.584 2.127 2.127 1.777 5.280 5.280 5.280 5.280 5.280 5.280 5.280 5.280 5.280 5.280 5.280 5.515	6.00 1.12 1.22 1.12
nike pedil to Accil pedil (jörgreno brake, measure norme) politis between pedia):  rike pedil to Accil pedil (jörgreno brake, measure norme) politis between pedia):  rike pedil to Accil pedil (jörgreno brake, measure norme) politis between pedia):  rike pedil to to top at Accel pedia (jörgreno brake, measure vertial distance to to (j):  rike pedil to bace Pedil (jorgreno brake);  rike pedil to bace Pedil (jorgreno brake);  rike pedil to Accel pedil (jorgreno brake, measure vertial distance to to (j):  rike pedil to bace Pedil (jorgreno brake);  rike pedil to toto at at at an pedil (jorgreno brake);  rike pedil to toto at at at an pedil (jorgreno brake);  rike pedil to toto at at at an pedil (jorgreno brake);  rike pedil to foor:	0.125 1.250 1.250 2.302 2.176 3.180 2.203 2.001 1.619 5.161 5.	3 780 0 000 2 000 1 500 -2 225 2 214 -1 142 2 210 2 210 2 210 2 210 5 306 5 349 5 605 6 085 6 085	3.500 0.000 1.000 1.250	2280 0.500 1.000 1.575 2.142 1.598 2.410 2.241 2.241 2.241 2.241 2.241 2.241 2.241 2.241 2.241 2.241 2.241 2.245 2.255 5.2555 5.2555 5.2555 5.2555 5.25555 5.2555 5.25555 5.2555555 5.255555555	0.500 0.780 1.250 -2.012 -1.724 -1.724 -1.304 2.668 2.668 2.668 -2.651 5.350 5.351 5.350 5.351 5.350 5.351 5.350 5.35	1 250 0 756 1 750 0 277 0 406 0 671 2 546 2 466 2 186 2 186 5 101 5 101 5 101 5 101 5 101 5 101 5 501 7 500	0.500 1.375 1.125 -2.121 -2.211 -	0.000 1.125 0.125 -2.224 -1.982 -2.256 2.196 2.256 2.196 5.242 5.242 6.875 6.7555 6.7555 6.7555 6.7555 6.7555 6	0.500 0.250 2.003 -1.584 2.395 2.003 -1.584 2.395 2.127 1.727 1.727 5.200 5.200 5.200 5.200 5.200 5.510 6.610 9.505	6.00 1.12 1.22 1.12
nike pedid to Acct pedid (depress brake, measure neared) points between pedia);  riske pedid to Acct pedid (groutest 0, 1, or 1 with acted from smalled 0, 14 or 1); op of brake pedid to to top of Accel pedid (depress brake, measure vertical distance 0 to 0); criste pedid braket actual pedid (depress brake, measure vertical distance 1 to 0; criste pedid braket actual pedid (depress) braket measure of perpendicular to brake pedid (from too); criste pedid braket actual pedid (depress) braket measure of perpendicular to brake pedid (from too); criste pedid (braket Pedid (from too); criste pedid to Accel pedid (from too); criste pedid to From too); criste pedid to From too; criste ped	0.125 1.250 1.250 2.355 2.355 2.355 2.355 2.355 2.456 3.161 5.	3 799 0 000 2 600 1 500 -2 225 -2 214 -2 214 2 210 2 210 2 210 2 210 2 210 5 319 5 539 5 548 5 548	3.500 0.000 1.000 1.250 9.376 3.000 4.125	2.289 0.500 1.000 1.000 1.100 1.100 2.142 2.410 2.244 1.105 2.244 1.105 2.244 1.105 2.244 1.254 5.2355 5.2355 5.2355 5.2355 5.23555 5.235555 5.235555555555	0.500 0.750 1.259 1.	1 250 0 750 1 750 0 2277 0 406 0 871 2 646 2 466 2 466 2 466 2 466 5 101 5 101 5 101 5 101 5 527 5 627 7 600 2 500 4 125	0.500 1.175 1.125 -2.121 -2.121 -2.931 -1.387 2.432 2.949 1.805 5.783 5.363 5.473 5.997 6.997 6.997 6.997 9.250 3.125	0.000 1.125 0.125 0.125 1.912 2.234 1.912 2.265 2.105 2.105 1.726 5.213 5.242 5.242 5.243 5.242 5.243 5.242 5.243 6.872 6.875 6.	0.500 0.9% 0.500 2.053 -1.584 2.127 2.127 1.777 5.280 5.280 5.280 5.280 5.280 5.280 5.280 5.280 5.280 5.280 5.280 5.515	6.00 1.12 1.22 1.12 1.12 1.12 2.64 2.64 2.64 2.64 5.27 6.57
Traine pedid to Accel pedid [depress brake, measure neares] paints between pedids): Traine pedid to Accel pedid Igravited B, E, or E subtracted from smalled B, H, or B:  Igr of brake pedid to tog of Accel pedia [depress brake, measure vertical distance D to U]:  Extern and the algo addit to the state pedia [depress brake, measure vertical distance D to U]:  Extern and the algo addit to the state pedia [depress brake, measure vertical distance D to U]:  Extern and the algo addit to the state pedia [depress brake, measure vertical distance D to U]:  Extern and the algo addit to the state pedia [depress brake, measure vertical distance D to U]:  Extern and the algo addit to the state pedia [depress brake, measure vertical distance D to U]:  Extern and the algo addit to the state pedia [depress brake, measure vertical distance D to U]:  Extern and the algo addit to the state pedia [depress brake, measure vertical distance D to U]:  Extern and the algo addit to the state pedia [depress brake, measure of perpendicular to brake pedia from the state pedia from the state pedia [depress brake, measure of perpendicular to brake pedia from the state pedia [depress to U]:  Extern and the algo addit to the state pedia [depress to U]:  Extern addit to the pedia [depress to U]:  Extern addit to the brake pedia [depress to U]:  Extern addit to the brake pedia [depress to U]:  Extern addit to the brake pedia [depress to U]:  Extern addit to the brake pedia [depress to U]:  Extern addit to the brake pedia [depress to U]:  Extern addit to the brake pedia [depress to U]:  Extern addit to the brake pedia [depress to U]:  Extern addit to the brake pedia [depress to U]:  Extern addit to the brake pedia [depress to U]:  Extern addit to the brake pedia [depress to U]:  Extern addit to the brake pedia [depress to U]:  Extern addit to the brake pedia [depress to U]:  Extern addit to the brake pedia [depress to U]:  Extern addit to the brake pedia [depress to U]:  Extern addit to the brake pedia [depress to U]:  Extern addit to the brake p	0.125 1.250 1.250 2.355 2.355 2.355 2.355 2.355 2.456 3.161 5.	3 799 0 000 2 600 1 500 -2 225 -2 214 -2 214 2 210 2 210 2 210 2 210 2 210 5 319 5 539 5 548 5 548	3.500 0.000 1.000 1.250 9.376 3.000 4.125	2.289 0.500 1.000 1.000 1.100 1.100 2.142 2.410 2.244 1.105 2.244 1.105 2.244 1.105 2.244 1.254 5.2355 5.2355 5.2355 5.2355 5.23555 5.235555 5.235555555555	0.500 0.750 1.259 1.	1 250 0 750 1 750 0 2277 0 406 0 871 2 646 2 466 2 466 2 466 2 466 5 101 5 101 5 101 5 101 5 527 5 627 7 600 2 500 4 125	0.500 1.175 1.125 -2.121 -2.121 -2.931 -1.387 2.432 2.949 1.805 5.783 5.363 5.473 5.997 6.997 6.997 6.997 9.250 3.125	0.000 1.125 0.125 0.125 1.912 2.234 1.912 2.265 2.105 2.105 1.726 5.213 5.242 5.242 5.243 5.242 5.243 5.242 5.243 6.872 6.875 6.	0.500 0.9% 0.500 2.053 -1.584 2.127 2.127 1.777 5.280 5.280 5.280 5.280 5.280 5.280 5.280 5.280 5.280 5.280 5.280 5.515	2.12 0.00 1.12 1.25 1.22 2.43 2.44 2.44 2.44 2.44 2.44 2.44 2

**APPENDIX F - Project Schedule** 



# **APPENDIX G - Blank Technician Worksheet Forms**

***	**	PROJ. TEST	9157 PRO					1 of 1 TF-100	
	<u> 115A</u>	Date:	VEHICLE RECEIV			1 VIII		11-100	
	www.nhtsa.gov	Technician:			Signatur Complet				
Vehicle	e Lot Identifie	er and Color:							
			-						
	e Informatio								
Mfr. D	ate:	Mode	el Year (EPA label) er in:	:	Make		M	odel:	
Trim li	ne:	Odomete	er in:						
	Frain Inform								
Engine	type: ()L4	() V6() V	78 Displacement:						
() Au	omatic ()M	anual S	peeds Fwd:		Drive Typ	e: ()2	wD ()	4WD (	)AWD
	Information								
Power	Brakes?() Y	es () No	If Yes, ( )Vac	uum Assist	()Hydroboo	st () Oth	er ABS	?()Yes	( ) No
Eront: /	ABSECU (ca	Drum Po	ar: ()Rotor ()D	Darle	NO. OF WIR	r () Dr	m and (	Uand (	) Foot
FIOIL.		Dimi Ke							)1001
Chassi	s Informatio	n:							
Wheelt	base:	I	Roof height: nches] Rear track v		Estimated C	G height	(40% RI	I):	
Front 1	rack width		nches] Rear track	width	[1	nches] (1	Measured	center to	center)
Gallon	s of fuel adde	d to tank(s):							
	t Information								
Curb w	eight (full tar	ik, no occupa	ants or instrumenta	tion):					
LF:	[16],	KF:	[lb], LR: Front GAWR	[Ib], .	KK:		l'otal:		
GVWR	د	[10]	Front GAWK		_[10] Ke	ar GAW.	к		_[10]
Tire In	formation:								
		nmended inf	lation: Front:	_[psi] Re	ar:[ps	i] (see vo	ehicle ma	nufactu	rer
	d/manual)								
			e size:						
lires a	s Received:								
				Tread	Max.	Press.		Tread	
				Wear	Inflation		Press.		Durometer A
	Tire Brand a	and Model	Size	Rating	Press.	Found	As Left	(32 <sup>ma</sup> 's)	A
LF									
RF									
LR									
RR									
	Other Obser	vations:							

****	3	PROJ.	9157	PROJ.TITLE:	9157	Toyota	Page/s	1	of 1
www.nh		TEST	Vehicle Det	ailed Listed Opt	ions and Acce	ssories	Form No.	TF101	
		Date:		Vehicle Lot	Identifier				
		Technician:		Signature W Complete	/hen				

Traction Control	YES	NO
ABS Braking	YES	NO
ESC Stability Control System	YES	NO
TPM Tire Pressure Monitor	YES	NO
Air Conditioning	YES	NO
Cruise Control	YES	NO
Backing Assist Video	YES	NO
Dual Airbags	YES	NO
Rear Defrost	YES	NO
Cell Phone	YES	NO
TV/VCR/DVD	YES	NO
Stereo System	YES	NO
Power Antenna	YES	NO
Speed Proportional Power Steering	YES	NO
Power Tilt Steering Wheel	YES	NO
Power Adjustable Pedals	YES	NO
Power Door Locks	YES	NO
Keyless Entry	YES	NO
Power Windows	YES	NO
Power Driver Seat	YES	NO
Power Passenger Seat	YES	NO
Seat Heater	YES	NO
Interval Wipers	YES	NO
Power Mirrors	YES	NO
Power Sun Roof	YES	NO

Additional Options Listed Below

	PROJ.	9157	PROJ.TITLE:	Toyota 9157	Page/s	1 of 1
www.ahtsa.gov	TEST		Owner's Ma	anual Information	Form	TF102
	Date:		Vehicle Lot	Identifier:		Mileage:
	Technician:		Signature W	hen Complete:		

Locate the Owner's Manual.

- Print a copy of the information requested below and place into the vehicle folder (in the Technicians' office area).
- 2) Write the page numbers on the line provided.
- 3) Save a digital copy in the specific vehicle folder on the O: Drive.
- 4) Also copy all related warnings and advisements related to the function. Indicate whether the task was completed OK or NOK (Not OK). If a task could not be completed, please explain why in the space provided at the bottom.

Task 1: Locate the vehicle Owner's Manual.	ок	NOK
Task 2: Within the manual, find and copy the engine starting procedure. Pages Copied:	ок	NOK
Task 3: Within the manual, find and copy the engine stop procedure. Pages Copied:	ок	NOK
Task 4: Within the manual, find and copy information for cruise control operation. Pages Copied:	ок	NOK
Task 5: Within the manual, find and copy information for transmission gearshift operation. Pages Copied:	ок	NOK

If any of the above were answered NOK, please indicate why:

****	PROJ.	PROJ.TITLE:	Page/s	1 of 3
NHTSA	TEST	Level 2 Vehicle Interrogation	Form	TF103
www.ahtsa.gov	Date:	Mileage:		Signature When Complete
	Tech:	Vehicle Lot Identifier		

VEHICLE MAKE:	COMP	LAINT VEHICLE	[YES/NO]	
VEHICLE MODEL: VEHICLE MODEL YEAR:				
VEHICLE MODEL TEAR.				
QUALIFICATION STANDARDS	Response	If Repair Necessary Mark "X"	Copy all	Description or Comments Items to TF 106 Repair and Restoration
QUALIFICATION STANDARDS				
1. Frame/Unibody Overall				
2. Body Overall				
3. Glass condition				
4. Aftermarket accessories				
5. A/M Affects emission				
6. A/M affects safety				
OWNERSHIP MATERIALS				
7. Owner's manual				
8. Spare key				
9. Key fobs				
10. Other maintenance documents				
MECHANICAL STANDARDS				
Under Hood				
11. Hood release				
12. Brake fluid				
13. Power steering fluid filled				
14. Wiper washer fluid filled				
15. Battery condition/load test				
16. Charging system operation				
17. Throttle linkage operation				
18. Power cable routing Normal				
19. Seating of cables				
20. Seating of modules				
21. Overall engine cleanliness				
OPERATIONAL CHECKS				
22. Remote key fob				
23. Type of Ignition switch				
24. Ignition on dash/column				
25. Door/liftgate/trunk				
26. Seat adjuster				
27. Steering column adjuster				
28. Air bag system				
29. Overhead console				
30. Heated seat				
31. Heating, ventilation, AC				

TF103: Vehicle Interrogation

****	PROJ.	9157	PROJ.TITLE:	Toyota	a 9157	Page/s	1 of 1
NHTSA	TEST	Ve	Level 2 Vehicle Stored Information Download				TF104
www.ahtsa.gov	Date:		Mileage:				Signature When Complete
	Tech:		Vehicle Lot I	dentifier			

VEHICLE MAKE:	COMPLAINT VEHICLE [ YES/NO ]	
VEHICLE MODEL:		
VEHICLE MODEL YEAR:		

DATE/TIME	DATA ITEM REQUIREMENT	RESULT/COMMENTS
	Carfax - Obtained and on Paper and Digital Record?	
	Technical Service Bulletins and Recall Notices - Obtained and on Paper and Digital Record? Is there evidence that these bulletins/recalls have been performed on this vehicle?	
	All diagnostic trouble codes should be recorded. If a Techstream screen print is available with DTC's, capture this information. If this is a complaint vehicle, do not reset DTC's. Otherwise, reset DTC. If the cause or action that led to the DTC is known, record the cause.	
	Event Data Recorder – Download. If an event exists, create a PDF image and save to the digital vehicle folder. Also print a paper copy for the vehicle folder.	
Other?		

TF104: Vehicle Stored Information Download

****	PROJ.	9157	PROJ.TITLE:	Toyota 9157	Page/s	1 of 2
NILITCA	TEST		Drivability Fitn	ess	Form	TF105
www.nintse.gov	Date:		Start Time/Milea	ge::	.1	Signature When Complete
	Driver:		Vehicle Lot Ident	ifier		]

VEHICLE MAKE:	COMPLAIN	IT VEHICLE	[YES/NO]	
VEHICLE MODEL:				
VEHICLE MODEL YEAR:				
QUALIFICATION STANDARDS	Response	If Repair Necessar y Mark "X"	<u>Copy all I</u>	Description or Comments tems to TF 106 Repair and Restoration
QUALIFICATION STANDARDS				
Verify that each item meets expectation.				
Road Test				
1. Ease of starting				
2. Cold-idle quality				
3. Gear selector operation				
Steering performance				
4. Power steering performance				
5. Power steering noise				
6. Steering wheel alignment				
7. Vehicle tracking				
8. Vehicle alignment				
Equipment operation				
9. Cruise control – See TF108	See TF108			
10. Overdrive button				
11. Gauges/instrument panel				
12. MIL lamps on				
13. Sound system				
Powertrain performance				
14. Acceleration performance				
15. Clutch operation (manual)				
16. Upshifting performance				
17. Downshifting performance				
18. Steady throttle perform				
19. Transfer case performance				
20. Hot-idle performance				
Braking performance				
21. Brake booster performance				
22. Vehicle tracking during Braking				
23. Antilock brake system				
24. ESC System				
25. Traction Control System				
26. AWD Driver Selection				
27. Overdrive Driver Selection				
28. Overall stopping perform				
29. Brake Override equipped?				

TF105: Drivability Fitness

NHTSA www.nhtsa.sov	PROJ. TEST	9157	PROJ.TITLE: Repair and	-	a 9157	Page/s Form	1 of 2 TF106
www.iniba.gov	Date:		Mileage:				Signature When Completed
	Tech:		Vehicle Lot I	dentifier			

Item 1: Check TF102, 103, 104, and 105 for any non-functioning items already listed.

Item 2: List by category all components and systems in disrepair.

Item 3: Repair or restore all non-conforming systems. If unrepairable, indicate the reason why it cannot be repaired.

	Repair Item	Repair Sta	tus
<b>.</b> .		Repaired	Unrepairable
Engine:			
Drivetran:		·	
		·	
Chassis:			
Electrical:			

Form TF106: Repair and Readiness

****	PROJ.	9157	PROJ.TITLE:	Toyot	a 9157	Page/s	1 of 5
NHTSA	TEST	Braking Performance				Form	TF107
www.nhtso.gov	Date:		Start Time/M	ileage:	<u>_:_</u> /_		Signature When Complete
	Driver:		Vehicle Lot k	dentifier			-

VEHICLE MAKE:	COMPLAINT VEHICLE [ YES/NO ]	
VEHICLE MODEL:		
VEHICLE MODEL YEAR:		

#### Vehicle weight with occupants and instrumentation: LF\_

Total \_\_\_\_RF\_\_ \_\_\_\_\_\_\_ RR\_\_\_\_

Note: Prior to the start of this module, all brake friction material (pads/shoes) and rotors should be replaced with new components, not including the parking brake. Vehicles must have completed the appropriate burnish procedure.

Brakes pads, shoes, and rotors have been replaced immediately prior to the start of this module? YES NO

YES NO

Burnish has been completed and is on file?

Collect a data acquisition file for each maneuver. Record the file number next to the corresponding test.

Prior to each test run, measure each of the two front rotors temperatures with two individual touch pyrometers to verify the rotors are below 300 degrees. Record the temperatures.

If vehicle is not equipped with ABS, wheel lock up during brake applies should be kept to a minimum.

Maneuver 1 - 100-0 MPH ABS panic stop, maximum effort, vacuum connected, brakes applied manually.

Maneuver 2 - Acceleration and Braking Tests with varying levels of braking pedal force, with and without vacuum. For "No Vacuum" tests, disconnect vacuum line from the booster and plug intake. Pump brake pedal four times to deplete accumulated vacuum

\*When forward acceleration of the vehicle ceases, conclude test run to prevent torque converter damage.

Maneuver 3 - Brake Pedal Force required to keep vehicle stationary. With and without vacuum apply the brake ram at a threshold only sufficient to allow the vehicle to creep forward when the accelerator is depressed fully. Release the brakes and begin recording the test file. Apply brakes, place vehicle in drive, fully depress accelerator. If vehicle moves, shift to neutral, release the brakes, increase the brake force and repeat until the vehicle becomes stationary.

Comments

Maneuver 4 - Measure stopping distances from 70 mph using different levels of brake pedal force with and without vacuum assist; also with and without full acceleration.

the given level of effort stops producing deceleration, stop the test run to prevent brake damage.

Did you experience any unwanted acceleration incidents during this testing? \_\_\_YES \_\_\_NO. If YES, Please explain:

TF107: Braking Performance

****	PROJ.	9157	PROJ.TITLE:	Toyot	a 9157	Page/s	1 of 1
NHTSA	TEST		Cruise Control	Performance		Form	TF108
www.nhtsa.gov	Date:		Start Time/M	lileage:	_:/_		Signature When Complete
	Driver:		Vehicle Lot I	dentifier			

VEHICLE MAKE:	COMPLAINT VEHICLE [ YES/NO ]	
VEHICLE MODEL:		
VEHICLE MODEL YEAR:		

Note: Prior to the start of this module, the brake ram cylinder should be removed. Verify that brake system functions normally. **Static Tests**:

	Does the brake lamp illuminate when the brake pedal is depressed?		NO
2)	Does the control button at the end of the stalk move freely?	_YES	NO
	Does the control stalk move in all indicated directions and return normally?	YES _	NO
4)	Does the master cruise switch properly illuminate and extinguish the cruise light on the dash?	YES	NO
5)	With the ignition on, enable the master cruise switch. Turn the ignition off and then		
	on again. Does the cruise light remain off?	_YES _	NO
Driving	a Tests on the High Speed Test Track (Abort any test if there are any safety concerns)	-	
	With the master cruise switch off (no green cruise lamp), drive at 40 mph. Do any of the		
	functions RES, SET, and Cancel have any effect on the vehicle's operation?	YES	NO
2)	Enable the master cruise switch. Drive at 40 mph, use the SET function of the cruise		
-/	stalk to set cruise speed. Does the vehicle hold 40 mph for at least 3/10's of a mile?	YES	NO
3)	Apply the brake. Does the cruise immediately disengage?	YES	NO
	Set the cruise at 60 MPH on straight and level road. Depress brake to release cruise.		
- /	While driving steady state straight and level at 35 mph, select resume from cruise stalk.		
	Does the cruise resume to 60 mph?	YES	NO
5)	Set the cruise at 60 on straight and level road. Use cruise stalk to cancel the cruise		
-/	operation. Does the cruise immediately disengage?	YES	NO
6)	When the speed is decreases to 50 mph, select the resume feature. Does the cruise		
-/	resume to 60 mph?	YES	NO
7)	Select and hold the ACCEL from 60 mph to 90 mph. Does the vehicle downshift to		
- /	accelerate?	YES	NO
8)	Set the cruise at 40 mph. Depress and hold ACCEL for at least five seconds. Without		
	releasing the ACCEL button, rapidly depress the accelerator to the floor. Does pressing		
	the accelerator cause a greater increased engine power or further downshifting?	YES	NO
9)	When ACCEL is released at 90 mph, does the vehicle maintain 90 mph?		
-,	There we are a set of the set of		
10)	Hold ACCEL at 90 mph. Does the cruise accelerate the vehicle to at least 120 mph?	YES	NO
	Hold the DECEL button to 50 mph. Does the cruise maintain 50 mph?		
	With the cruise maintaining a speed of 50 mph, shift to Neutral. Does the cruise		
,	disengage?	YES	NO
13)	With the cruise maintaining a speed of 50 mph, downshift. Does the cruise disengage?	YES	NO
	With the cruise maintaining a speed of 50 mph, push the accelerator to increase speed		
	to 60 mph. Release the accelerator pedal and let the car coast. Does cruise		
	automatically resume speed at 50 mph?	YES	NO
15)	With the cruise maintaining a speed of 60 mph, turn off the master cruise switch.		
	Turn it back on and press resume. Does the cruise control resume speed?	YES	NO
16)	Drive at 40 and set cruise, apply brake, coast to 10 mph. Verify cruise will not resume		
	at this speed. Slowly increase speed in 2 mph increments to establish minimum speed		
	for resume function. What is the minimum speed that cruise will begin to resume?		mph
Comme	nts/Concerns?:		Did you
			0.0 900
experier	nce any unwanted acceleration incidents during this testing?YESNO. If YES, Please explain		

TF108: Cruise Control Performance

*****	PROJ.	9157	PROJ.TITLE:	Toyota	a 9157	Page/s	1 of 1
NHTSA	TEST		Brake B	umish		Form	TF109
www.nhtse.gcv	Date:		Start Time/M	ileage:	_:/_		Signature When Complete
	Driver:		Vehicle Lot lo	dentifier			

VEHICLE MAKE:	COMPLAINT VEHICLE [ YES/NO ]	
VEHICLE MODEL:		
VEHICLE MODEL YEAR:		

### 200-Stop Burnish Procedure

Make 200 burnish stops from 40 mph at 12 ft/sec/sec. Begin the burnish set with a one-mile interval between burnish stops. After the 25th burnish stop, continue making stops as before to app 1 mile before the pit lane. Proceed to the pit lane and use the parking (emergency) brake to stop, and check each front <u>rotor</u>. The target temperature for this burnish is 250°F +/-20°F IBT (Initial Brake Temperature). If IBT is less than 240°F shorten the one-mile burnish interval by ~0.1 mile. If the IBT is above 260°F, lengthen the burnish interval by ~0.1 mile. If the cooling interval becomes increased to 1.5 mile or more, then decrease the vehicle speed by 5 mph and reset the cooling interval becomes the cooling interval decreases to 0.5 mile or less, then increase the vehicle speed by 5 mph and reset the cooling interval decreases the unrish set, stop in the pit lane and check the IBT before making the next burnish stop. Record time and ambient temperature of each IBT stop and each time burnish is stopped (breaks, lunch, etc). Use the "Comments" section for length of cooling interval, weather conditions, and other notes.

Start: Odometer:					
Ambient Temp:	(°F)	Wind Velocity:	(mph)	Wind Direction:	
Weather conditions:					

Prior to Stop Number	Time	Odometer Reading	perature(°F)   Right	Burnish Comments (weather, length of cooling interval, etc)
1				
26				
51				
76				
101				
126				
151				
176				
201				

End: Odometer:		Date:		Time:	
Ambient Temp:	(°F)	Wind Velocity:	(mph)	Wind Direction:	
Weather conditions:					

TF109: Brake Burnish

****	PROJ.	9157	PROJ.TITLE:	Toyota	a 9157	Page/s	1 of 1
NHTSA	TEST		Steering Per	formance		Form	TF110
www.nhtsa.gov	Date:		Start Time/M	ileage:	_:/_		Signature When Complete
	Driver:		Vehicle Lot k	dentifier			-

VEHICLE MAKE:	COMPLAINT VEHICLE [ YES/NO ]	
VEHICLE MODEL:		
VEHICLE MODEL YEAR:		

Collect a data acquisition file for each run. Record the file number next to the corresponding test.

Maneuver 1 - Steering Into a Parking Space - This maneuver will measure the effect of power steering and air conditioning on engine speed. Collect a file:

- a. Using the parking course, make a right turn into the first parking space and stop.
- b. Make a left turn into the second space and stop.
  c. Make a right turn into the third space and stop.
  d. Make a left turn into the fourth space and stop.

Steering Into a Parking Space	File #
Steer Test 1 – No A/C, Non-Aggressive Parking	(1)
Steer Test 2 – No A/C, Non-Aggressive Parking	(2)
Steer Test 3 - A/C ON, Aggressive Parking	(3)
Steer Test 4 – A/C ON, Aggressive Parking	(4)

Other Observations or Concerns?:\_

Did you experience any unwanted acceleration incidents during this testing? \_\_\_YES \_\_\_NO. If YES, Please explain:

TF110: Steering Performance

	PROJ.	9157	PROJ.TITLE:	Toyota 9157	Page/s	1 of 3
www.nhtsa.gov	TEST	Transmission Shift Lever Operation			Form	TF111
	Date:		Start Time/M	ileage:	:/	Signature When Complete
	Driver:		Vehicle Lot l	dentifier		

VEHICLE MAKE:	COMPLAINT VEHICLE [ YES/NO ]	
VEHICLE MODEL:		
VEHICLE MODEL YEAR:		

Item 1: Are all gear position labels immediately adjacent to the actual shifter position when placed in these locations? If no, list these discrepancies in the comment area below. \_\_\_Yes\_\_\_No

Comments:

Item 2: Record in the following table the number of and types of movements required to place the shift lever in the six different listed conditions.

- Column A is longitudinal (forward or backwards) motion. Fill in the box with the number of times this motion was used.
- Column B is lateral (side to side) motion. Fill in the box with the number of times this motion was used.
- Column C Does the pushbutton lock have to be used to move the lever to the position? If Yes, fill in the box with a 1.

"Note" Enter a 0 in any entry that was not required to move the shift lever to the specified position.

TF111: Transmission Shift Lever Operation

	PROJ.	9157	PROJ.TITLE:	Toyot	a 9157	Page/s	1 of 3
www.nktsa.gor	TEST	Igni	tion Control Sw	itch Operation		Form	TF112
	Date:		Start Time/N	fileage:	_:/_		Signature When Complete
	Driver:		Vehicle Lot	ldentifier			

VEHICLE MAKE:	COMPLAINT VEHICLE [YES/NO]	
VEHICLE MODEL:		
VEHICLE MODEL YEAR:		

Identify the style of ignition switch the vehicle has as either a key type or pushbutton type.

Complete the questionnaire below that represents the chosen style of ignition switch.

### Key Type\_\_\_\_

- Can the engine be started without stepping on the brake pedal when in Park? Yes\_\_\_\_No\_\_\_\_
- Can the engine be started when in the Neutral position? Yes\_\_\_\_No\_\_\_\_
- Can the engine be started without stepping on the brake pedal when in Neutral? Yes\_\_\_ No\_\_\_
- Can the engine be started with the transmission in Drive? Yes No\_\_\_\_
- 5. Can the engine be started with the transmission in Reverse? Yes No\_\_\_\_
- Can the key be removed with the vehicle in gear? Yes\_\_\_ No\_\_\_
- Is there an audible alarm if you open the door with the engine running? Yes No
- Is there an audible alarm if you open the door with the engine off? Yes\_\_\_ No\_\_\_
- Does the steering wheel lock when the key is in the off position and in Park? Yes No\_\_\_\_
- Does the steering wheel lock when the key is in the off position and in gear?
   Yes No\_\_\_\_
- 11. Will the vehicle restart in Drive when moving? Yes\_\_\_ No\_\_\_
- 12. Will the vehicle restart in Neutral when moving? Yes\_\_\_\_No\_\_\_\_

Form TF112': Ignition Control Switch Operation

	PROJ.	9157	PROJ.TITLE:	Toyot	a 9157	Page/s	l of 1
www.chtaa.gov	TEST	Critical Vertical Offset				Form	TF113
	Date:	Mileage:				Signature When Completed	
	Tech:		Vehicle Lot I	dentifier			

Test Conditions: \_\_\_\_\_ Transmission Gear: \_\_\_\_ Drive or Reverse

CVO Offset	Applied Brake Force 20 lb.	Applied Brake Force 40 lb.	Applied Brake Force 60 lb.
0.50 inches			
0.75			
1.00			
1.25			
1.50			
1.75			
2.00			
2.25			
2.50			

How is the accelerator pedal mounted to the lever? (Mark one) One piece pedal - pedal attached to the lever arm. Two piece pedal - separate pivoting pedal mounted to the lever arm at the pedal: Top I Middle Bottom

-For Two-piece pedal assemblies, position the CVO device pedestal over the pivot point.

-Note whether vehicle remains stationary, accelerates, or decelerates in each box of the table.

-Determine range from 0.50 inch offset value and repeat with increasing offset until the vehicle remains in motion for all three levels of pedal force.

\*Ratio: 3.25 screw rotations = 0.25 inch longitudinal displacement.

TF113: Critical Vertical Offset

	PROJ.		PROJ.TITLE:		a 9157	Page/s	1 of 3
www.nhtsa.gov	TEST	Accelera	ator Pedal Insp	ection/Functio	onal Test	Form	TF114
-	Date:		Mileage:				Signature When Completed
	Tech:		Vehicle Lot I	dentifier			

Item 1: Complete the following questions that characterize the vehicle accelerator pedal.

- 1. Who is the manufacturer or the pedal?
  - a. Denso b. CTS c. Other\_
- Has the pedal in this vehicle had a recall performed by the dealer (metal shim and/or trimmed at the bottom)?

Yes\_\_\_\_ No\_\_\_

- Has the pedal in this vehicle been trimmed at the bottom? Yes \_\_\_\_ No\_\_\_\_
- Has the pedal in this vehicle been shimmed in the arm pivot (CTS Only)? Yes\_\_\_\_ No\_\_\_\_
- 5. Does the pedal have a fixed non moving style shoe? Yes\_\_\_\_ No\_\_\_\_
- 6. Does the pedal have a hinged movable style shoe? Yes\_\_\_\_ No\_\_\_\_
- 7. Is the return spring internal or external on the assembly housing? Internal\_\_\_\_ External\_\_\_\_
- 8. At full application, what are the two contact points for the positive stop?
  - a. The lower edge/radius of the pedal and the floor pan
  - b. The Pedal arm and the floor pan
  - c. The Pedal arm and the pedal housing
  - d. Other\_
- Describe the visual condition of the pedal (i.e. contacting marks on the bottom edge of the shoe, any cracking of the assembly parts, corrosion, or contamination). Comments
- 10. Is the electrical connector clean and free of corrosion and well connected? Yes\_\_\_\_ No\_\_\_\_

TF114: Accelerator Pedal Functional Test

	PROJ.	9157	PROJ.TITLE:	Toyot	a 9157	Page/s	1 of 2
www.nhtsa.gov	TEST	Driver Floor Area 3D Measurement & Rendering			Form	TF115	
	Date:		Mileage:				Signature When Completed
	Tech:		Vehicle Lot	dentifier			

Measurement Device Identification:

Drive Line: () 2WD () 4WD () AWD

Telescoping steering wheel: ( ) Yes ( ) No Tilt steering wheel: ( ) Yes ( ) No

Range of Motion: \_\_\_\_\_\_ (chord measured from steering wheel center bolt, front face)

### 3D Scan Procedure – (For later dimensional comparison):

- 1) Place driver seat in the rearward most position.
- 2) Place Tilt/Telescoping Steering Wheel in downward most and rearward most position.
- 3) Remove floor mats.
- Record Y-Axis Datum Reference from the center of the front face of the steering wheel retention bolt (Airbag must be removed).
- 5) Record Z-Axis Datum Reference from Floor Pan horizontal surface on factory carpet.
- 6) Scan:
  - a. Steering Wheel
  - b. Floor Pan, including exhaust tunnel and transition to vertical portion of firewall
  - c. Brake Pedal (Face and Arm) in the Idle position (Repeat for Clutch Pedal if Equipped)
  - d. Accelerator Pedal (Face and Arm) in the Idle position
  - e. Accelerator Pedal (Face and Arm) in the Depressed Condition
  - f. Seat bottom Cushion, Top Face (Bottom Cushion), edge to edge
  - g. Seatback, Front Face, edge to edge

Driver Floor Area - 3D Measurement & Rendering

	PROJ.	9157	PROJ.TITLE:	Toyot	a 9157	Page/s	1 of 2
www.nhtsa.gov	TEST	Pedal Placement Profile				Form	TF116
	Date:	Mileage:				Signature When Completed	
	Tech:		Vehicle Lot I	dentifier			

Measurement Device Identification:

Power Brakes: ( ) Yes ( ) No ( ) Vacuum Drive Line: ( ) 2WD ( ) 4WD ( ) AWD

Engine: L4 L6 V6 V8 ( ) Gasoline ( ) Diesel Displacement:\_\_\_\_\_ L or CID

Telescoping steering wheel: ( ) Yes ( ) No

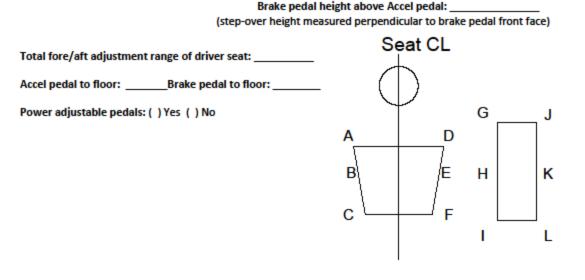
Tilt steering wheel: ( ) Yes ( ) No Seat center line (CL) to steering wheel CL:

	Seat CL to ke Pedal (in)	Seat CL to Accel Pedal (in)				
Α		G				
в		н				
с		1				
D		J.				
E		к				
F		L				

Brake pedal to Accel pedal: \_\_\_\_\_\_ (greatest D, E, or F subtracted from smallest G, H. or I)

Top of brake pedal to top of Accel pedal: \_\_\_\_\_\_ (depress brake, measure vertical distance D to G)

Bottom of brake pedal to bottom of Accel pedal: \_\_\_\_\_\_ (depress brake, measure vertical distance F to I)



NHTSA	PROJ.	9157	PROJ.TITLE: As Received	-	a 9157	Page/s Form	1 of 1 TF117
www.nhtsa.gov	Date:		Mileage:				Signature When Completed
	Tech:		Vehicle Lot I	dentifier			

# Photograph the listed item views below. Place images in the photo folder under the corresponding test unit.

1 Windshield Identifier	12 Tight View- brake booster
2 Door placard	13 Overall View-engine compartment
3 Driver floor mats installed	14 Side View #1 -vehicle overall
4 Driver floor mats out	15 Front View #2 -vehicle overall
Page View Wide, driver	
Rear View Wide- driver 5 compartment	16 Side View #3 -vehicle overall
6 Tight View -shift gate	17 Rear view #4 -vehicle overall
7 Tight View- ignition	18 Oblique View #1 -vehicle overall
8 Tight View -steering wheel controls	19 Oblique View #2 -vehicle overall
9 Tight Rear View- pedals	20 Oblique View #3 -vehicle overall
10 Tight View -ABS module	21 Oblique View #4 -vehicle overall
11 Tight View -throttle body	

****	PROJ.	9157	PROJ.TITLE:	Toyota	a 9157	Page/s	1 of 2
NHTSA	TEST	Transr	nission Docume	ntation/Photo	graphy	Form	TF118
www.nhtsa.gov	Date:		Start Time/M	ileage:	<u>_:_</u> /_		Signature When Complete
	Driver:		Vehicle Lot lo	lentifier			

VEHICLE MAKE:	COMPLAINT VEHICLE [ YES/NO ]	
VEHICLE MODEL:		
VEHICLE MODEL YEAR:		

- 1. Engine Size L4 \_\_\_\_ V6 \_\_\_\_
- 2. Total number of engine and transmission mounts combined.

Comments:

- 3. Type of mount. (check all that apply and the number of each type)
  - \_\_ Solid \_\_\_\_
  - \_\_\_Rubber \_\_\_\_
  - \_\_\_Fluid Filled \_\_\_\_\_

\_\_ Strut \_\_\_\_

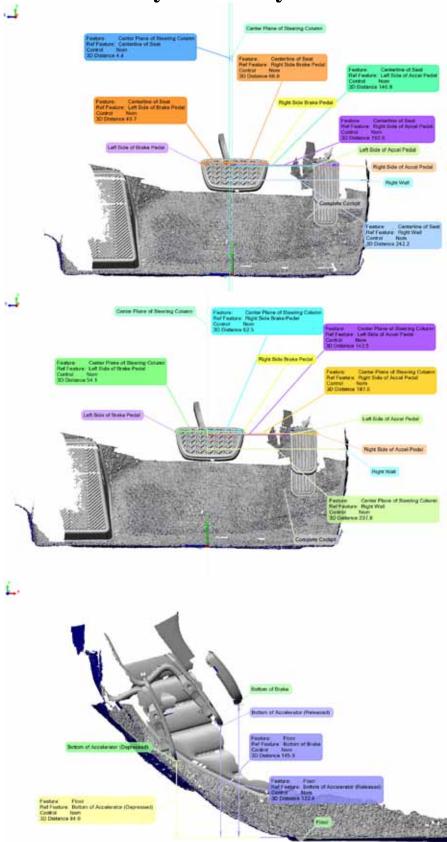
Comments:

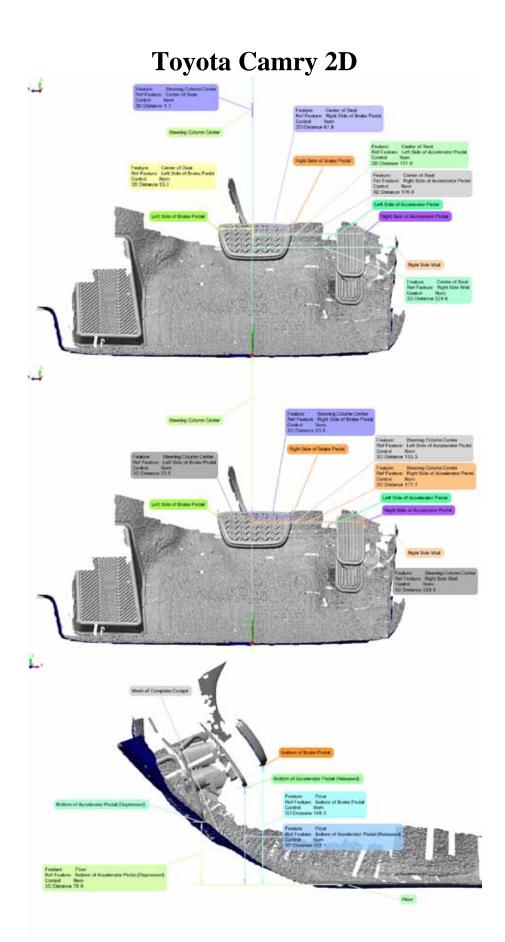
4. Condition of mounts. (explain location and number of mounts for the condition)

Good condition
Cracking condition
Torn condition
Broken condition
Leaking (fluid filled, source of leak)
Other damage
Comments:

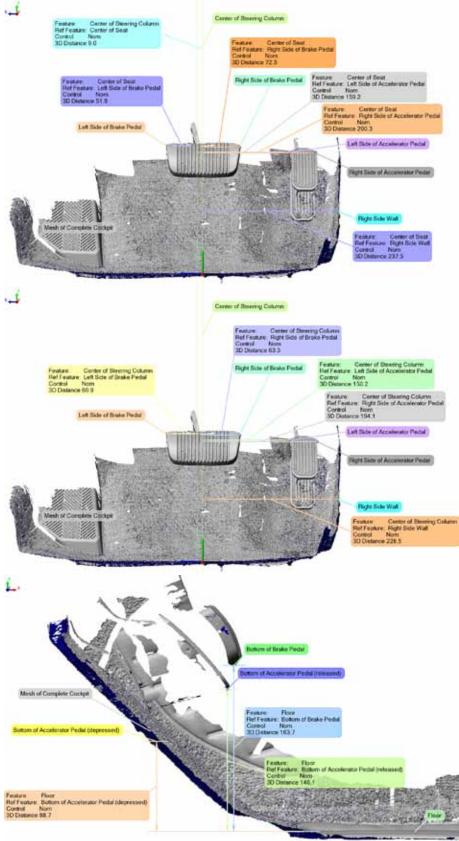
# APPENDIX H - Three Dimensional Renderings of Floor Pan and Pedals by Vehicle

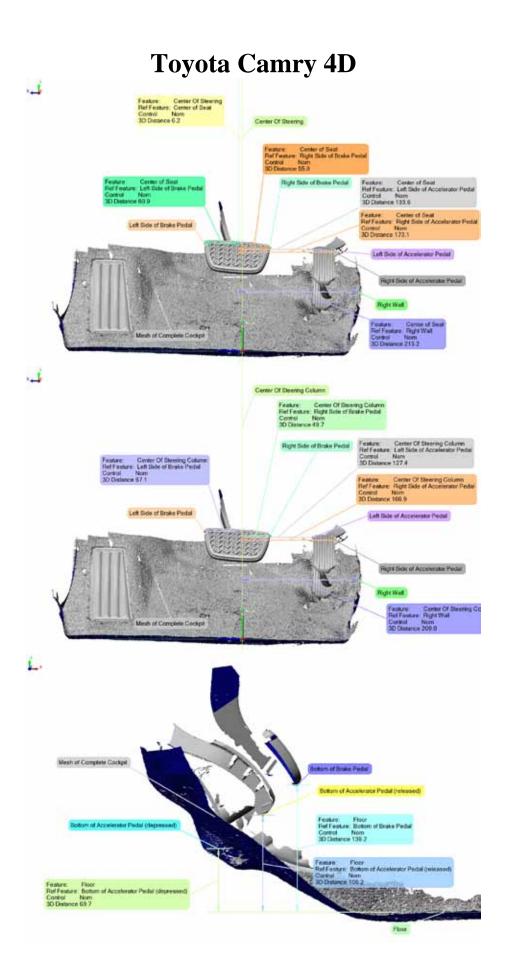
# **Toyota Camry 1D**

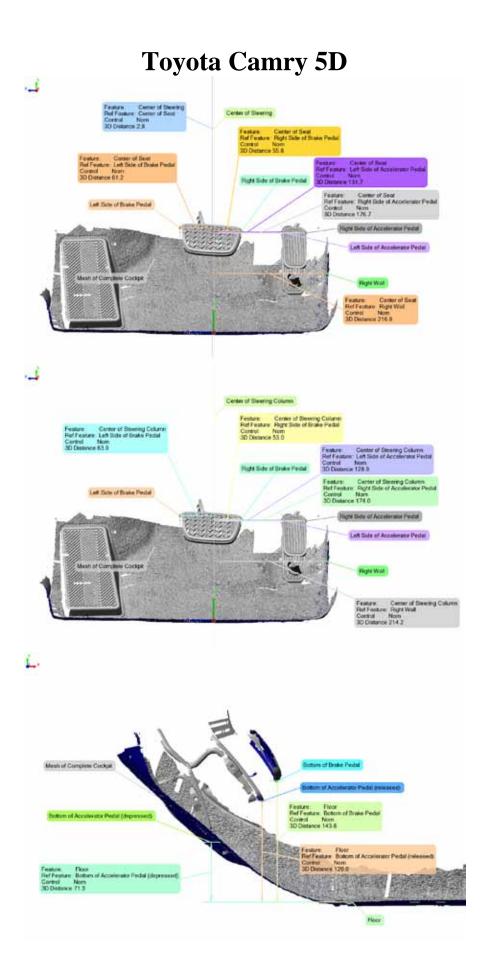


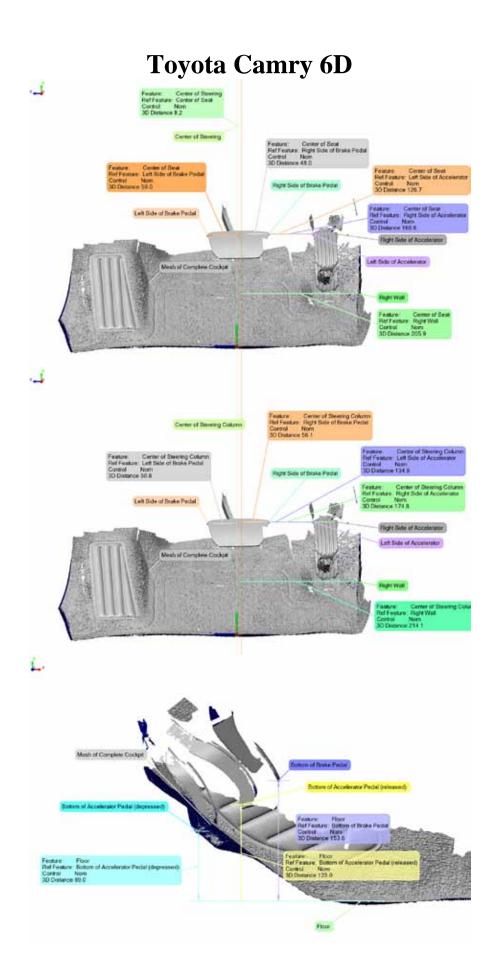


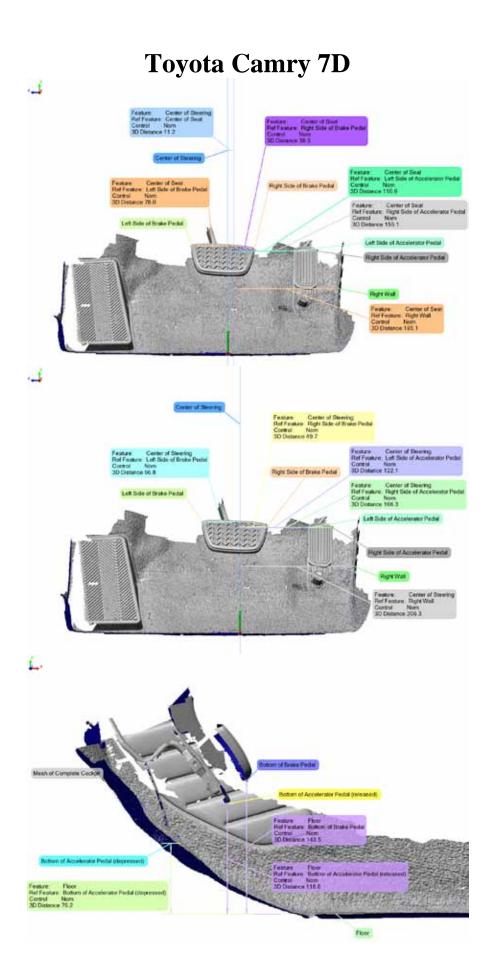
# **Toyota Camry 3D**

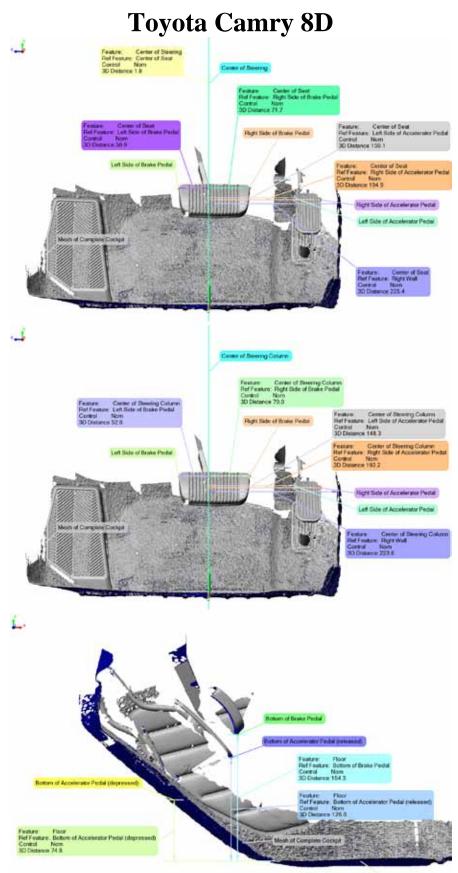




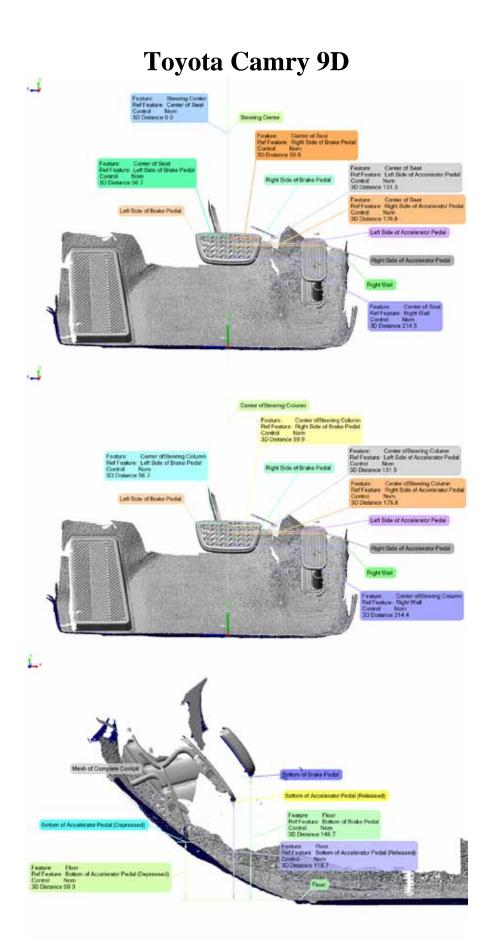


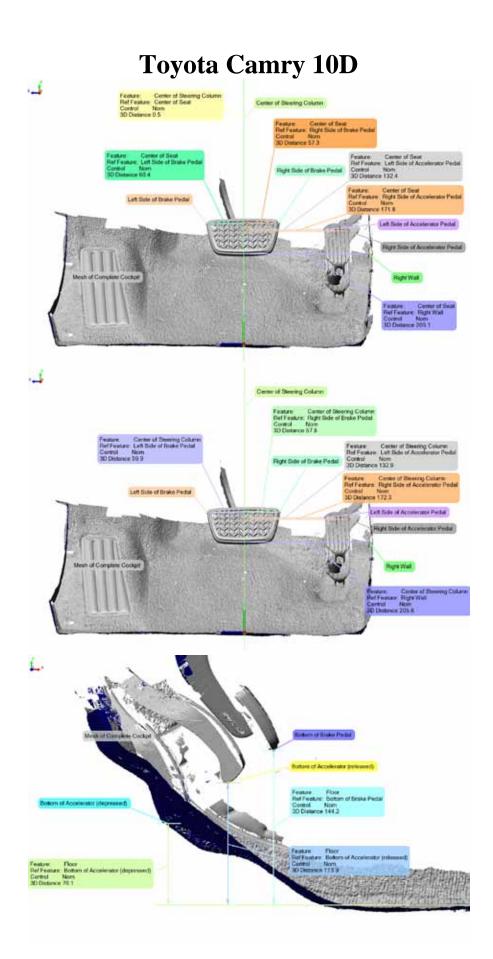


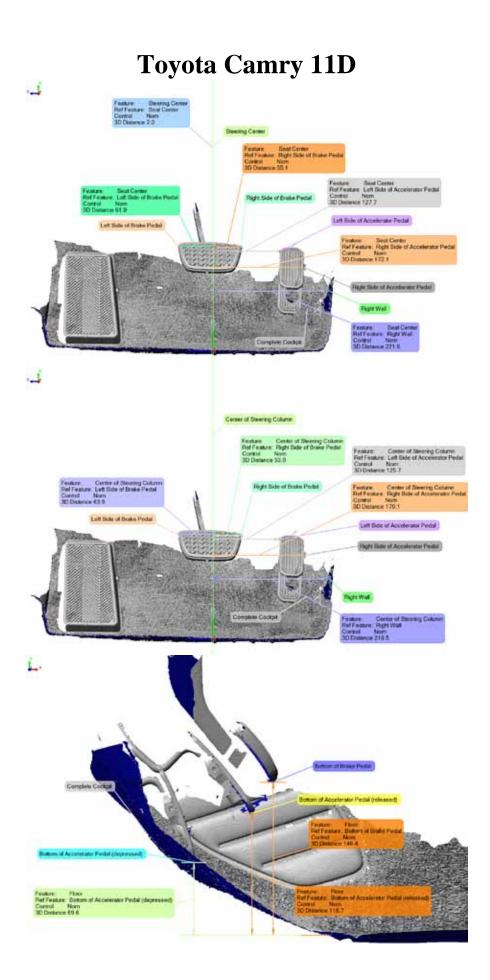


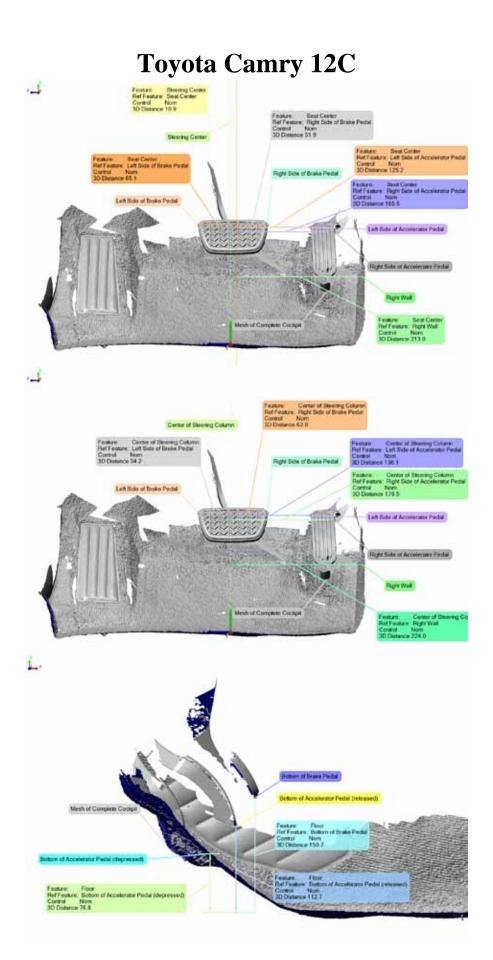


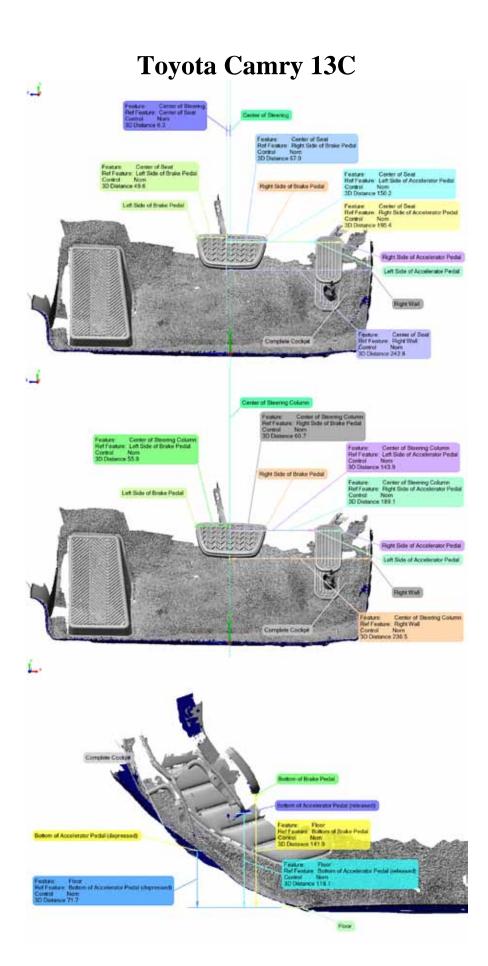
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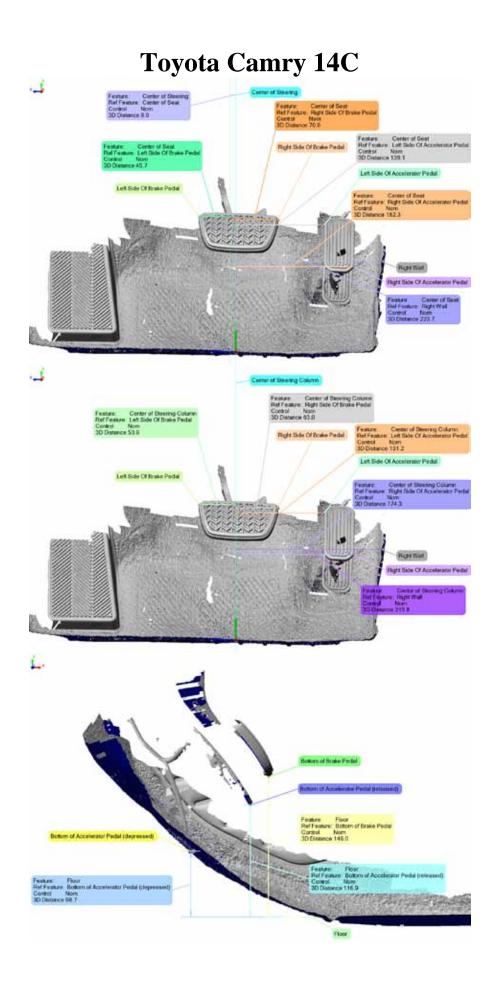




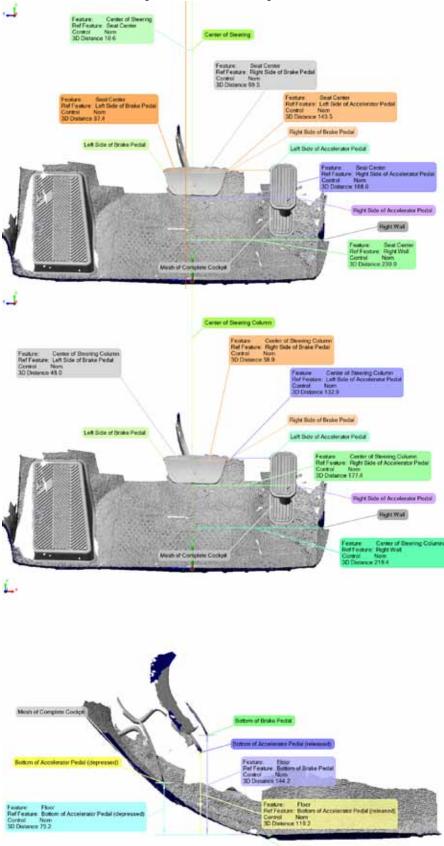


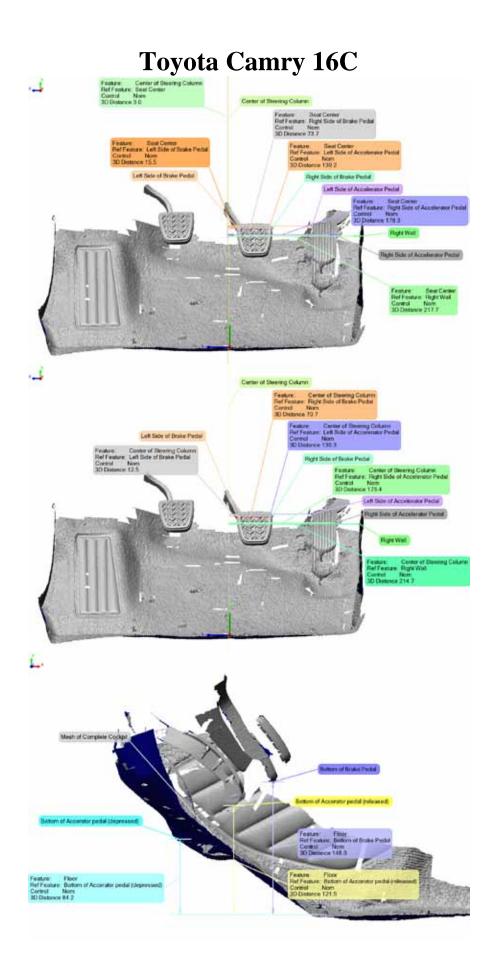


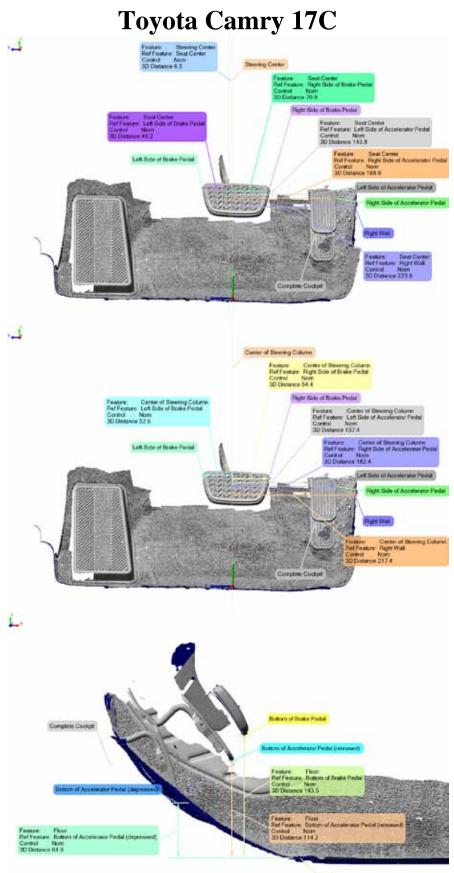


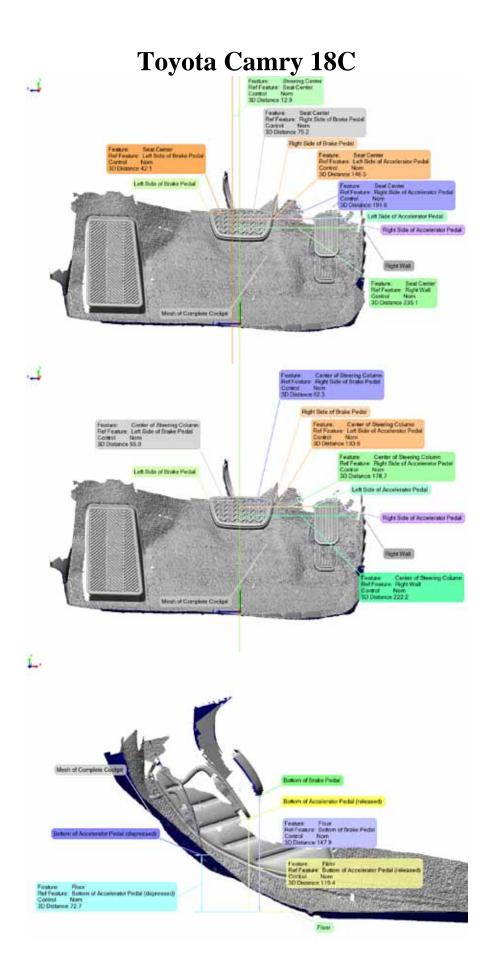


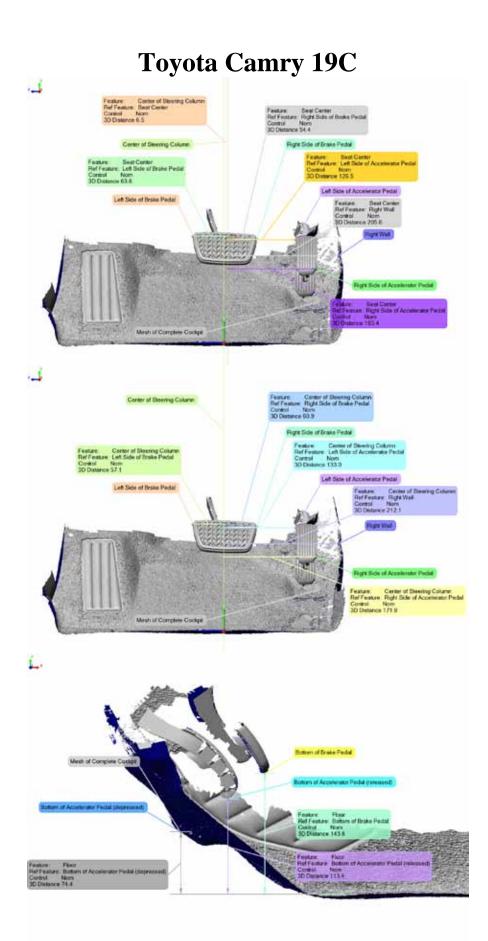
# **Toyota Camry 15C**

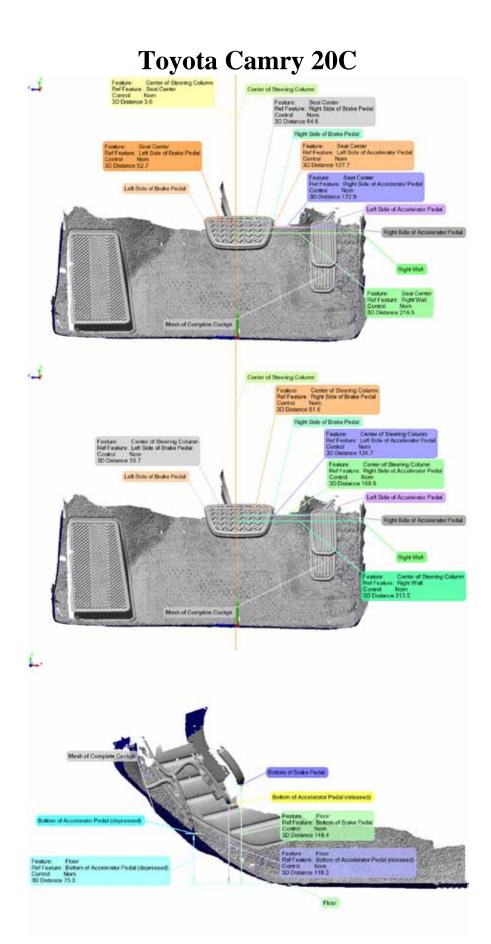






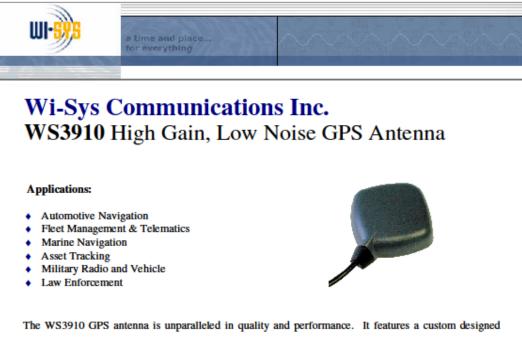




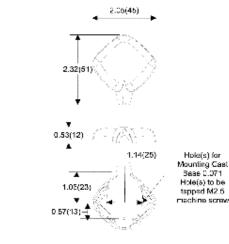


# **APPENDIX I - Test Equipment Specifications And Calibrations**

### **Test Equipment**



ceramic patch element that minimizes detuning effects caused by adjacent objects. This element, along with a low noise amplifier and SAW filter, enables the WS3910 to provide a consistent, clear signal while minimizing loss-of-lock if GPS conditions are less than ideal. With both a magnetic base and threaded holes for mounting screws, the WS3910 GPS antenna is ideal for vehicle mounted AVL applications.



### Features:

- High gain: 28 dB @ 3.3 V
- Extremely low noise figure: 0.8 dB
- Excellent out-of-band signal rejection
- Wide range of connector types available
- High performance LNA (patented)
- Wide voltage input range (2.7 5 VDC)
- Excellent low elevation angle coverage



# **VBOX III 100Hz**

### Overview

The VBOX III represents the 3<sup>rd</sup> generation of GPS data logging system from Racelogic. Using a powerful new GPS engine, the VBOX III can log GPS and other data at 100Hz. The logged data is stored directly onto a compact flash card for easy transfer to a PC. Used with a DGPS basestation, the VBOX III is capable of achieving 40cm positional accuracy.

A 2cm 95% CEP (RTK) positional accuracy VBOXIII is available as an option; also requiring an RTK enabled basestation (RLVBBS3).

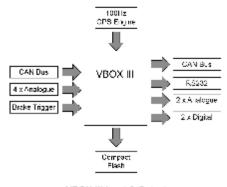
The VBOX III includes 4 high-resolution analogue input channels and 8 user configurable CAN channels.

The 2 CAN bus interfaces allow connection of Racelogic input modules while simultaneously transmitting GPS data or receiving vehicle CAN data on the second bus.

In line with previous VBOX models, the VBOX III is compatible with all of the existing peripherals including the Multifunction display, ADC03, TC8, FIM02 and Yaw rate sensor.

### Features

- Non-contact 100Hz speed and distance measurement using GPS
- 12.5ms Latency
- 4 x 24bit differential analogue input channels with ±50v input range and synchronous capture
- Brake/Event Trigger input, 12µS resolution
- 2 x CAN Bus interface for data input & output
- RS-232 serial interface
- Data logged to industry standard Compact Flash memory cards
- 2 x 16bit User configurable analogue outputs
- 2 x Digital outputs
- User configurable trigger options
- Logging rate selectable to 100Hz, 50Hz, 20Hz, 10Hz, 5Hz, 1Hz
- Wide 5.3V to 30V operating range
- Can be used with a differential basestation for positional accuracies of up to 40cm,
- 2cm 95% CEP positional accuracy, (requiring RTK VBOX (VBOX3R5 and RLVBBS3 Basestation)

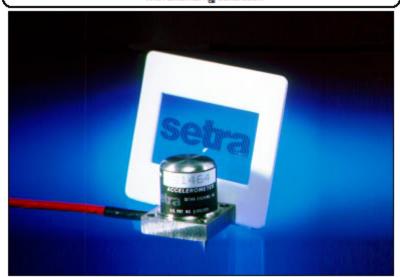


VBOX III Input & Output





Model 141 High Output Linear Accelerometer For Vibration, Shock, Impact Ranges from: ±2g to ±600g With External R\_, Calibration



he Model 141 is a linear accelerometer that produces a high level instantaneous DC output signal proportional to sensed accelerations (ranging from static acceleration up to 3000 Hz as indicated below).

Setra accelerometers are unique in their ability to withstand exceedingly high g overload without damage. The Model 141 incorporates the super-rugged Setra capacitance-type sensor and a miniaturized electronic circuit.

Its excellent dynamic response is maintained by air damping, which varies with temperature

approximately one-tenth as much as the best fluid damping.

The electrical characteristics are compatible with conventional strain-gauge type signal conditioning, including the use of shunt R over any selected range up to 100% full scale. The stainless steel case is O-ring sealed, has a well-defined base plane and is quite insensitive to mounting strain.

Cross axis interference is exceedingly low. The external easy-to-replace cable attachment facilitates installation and service.

### Full Scale Ranges

For each of the available g ranges, the linearity is characterized by this range chart: (Non-linearity as % full range, best straight line)

Nominal Range	Non-Linearity	Natural Frequency	Flat Response
	±1%	(Nominal)	(±3 db) 0 Hz to:
±2g	±2g	300Hz	200Hz
±4g	±4g	440Hz	260Hz
±8g	±8g	570Hz	300Hz
±15g	±15g	840Hz	400Hz
±30g	±30g	1200Hz	700Hz
±60g	±60g	1560Hz	1000Hz
±150g	±150g	2600Hz	1600Hz
±600g	±600g	5000Hz	3000Hz

NOTE: Setra adheres to strict quality standards including ISO 9001 and ANSI-Z540-1. The calibration of this product is NST traceable.

159 Swanson Rd, Boxborough, MA 01719/Telephone: 978-263-1400/Fax: 978-264-0292

### Features

- Excellent Static and Dynamic Response
- Temperature-Insensitive Gas Damping (0.7 Critical)
- High Output Signal
- High Overload Capability, (2000g static)
- Low Transverse Sensitivity (0.012 g/g)
- Wide-Range R<sub>cat</sub> Type Calibration
- Easy-to-Replace Cable Attachment
- Compact, Lightweight
- Optional EMI Filter Upgrade
- Meets (€ Conformance Standards

When it comes to a product to rely on, choose the Model 141. When it comes to a company to trust, choose Setra .



Visit Setra Online: http://www.setra.com



# **Vehicle Sensors**

# 10118

### BRAKE PEDAL FORCE SENSOR

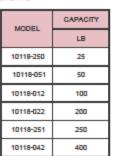
The 10118 Pedal Force sensor is used to evaluate the force requirements of new and existing brake systems. The transducer adapts to pedals in automobiles, trucks, buses, or material handling equipment. It mounts directly to the pedal with spring-loaded, quick-change clamping arms or cable ties for easy installation. The sensor is available in capacities ranging from 25 to 400 lbs. The required capacity needs to be specified at time of order.

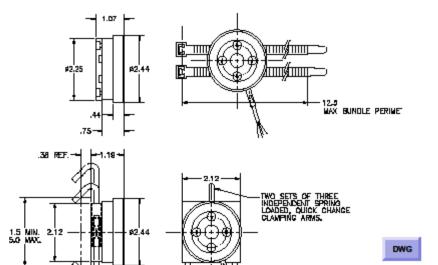


### DIMENSIONS

### SPECIFICATIONS

Capacities	25 to 400 lbs. (See chart)
Overload capacity	150% of F.S.
Output at full scale load	2.0 mV/V nominal
Non-linearity	
Hysteresis	0.10% of F.S.
Zero balance	
Compensated temperature	70 to 170°F
Useable temperature	65 to +250°F
Temperature effect on zero	0.002% of F.S./°F
Temperature effect on span.	0.002% of Rdg./°F
Bridge resistance	700 Ohms
Excitation voltage, maximum	20 Vdc



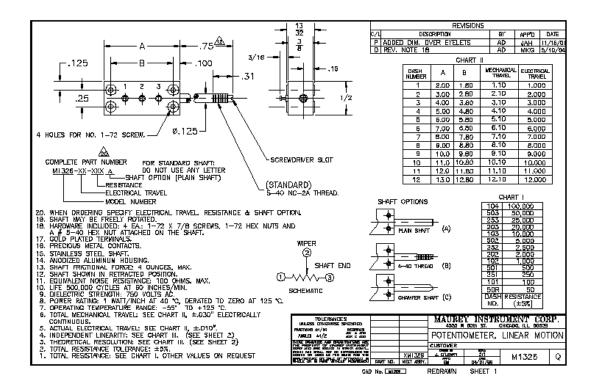




ORDER TOLL FREE 1-888-SENSOR-1

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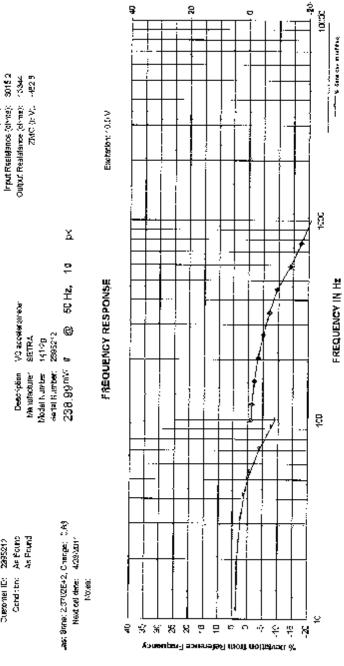
4 COND. SHELDED CABLE B FEET



# Calibration Certificate

Temperature (\*C): 22 Relative Humidicy (%): **30** 

Description VQ accelergineser Manufacture: SIETRA Decimient number: 33155 Model Numb<del>er</del> de tal Kumber: Gendithi - Ae Éours As Found Tit Kotakertee Stens tiv ly: Duesomen ID: 2233243 Customer: VRIC



88 Deviation from Reference Frequency

Transportation Research Centor sity 7.07

10000.0 < 1 <= 20000.0 Hz 20.0 × f en 2003.0 Hz 2006.0 × \* ×= 40300.0 Hz

+/-25% +/-40% 851174

5/04/2010

Coloret on Due: Test, definition:

-WHC.

TRC

Date: 4:392010

By, S, Bazzle

Unuerfainty estimate (\$5% contidence, lar2) s2-11 % 110.0 Hz Sansthift

10.0 × f == 20.0 Hz

€-11% €-53%

VIST (Receased by 8. 622/276051-07

Consels saria number. AC:7 équipment used: 2001 The solid order shall not an approximate for the optimization containing potential  $\mathrm{TR}_{2}$ 

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## **Calibrations**

KRITHLEY INSTRUMENTS, INC. #28775 AURORA.	RD, CLEVELANE, CHEC LEA • 447-248-2400 • 1-688-K1011110/V • www.kathlay.com
	Calibration Certificate
Manufacture: Reitnley	Calibration Date: 27 April 2010
Model No: 2000	Tomperature: 23.70 °C
Sedal No: 1274715	Relative Humidity: 35.2 %
Propedure: QA-7000E.0	Report No; 1274715:1272330720
Data Lype: AFTER DATA	Test Status: IN TOLERANCE
Customor Not Applicable	

The quality system is registered to ISO 9001.2005.

requirements of ISO/IEC 17025:2005.

- This to introlice is a circet comparison of the unit under test to the listed reference standards and did rul involve any sampling plans to complete. No allowance has been made for the instability of the rest device due to use fitte, did. Such allowances would be made by the customer as neares:
- The lost results shown in loss report apply to the calibrated item identified on page 1 of this collificate.

.

- This patronalism detulbate shall not be reproduced except in full without the waiten approval of Keithley Instruments, inc.
- The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM) - A priverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to excress the expanded propagating approximately 95% confidence evel.
- Tost status is FASS unless inducted alterwise.
- estopints marked with a proceeding "\*" are not accredited.

### Standards Used

ż

Control Number	Description	Cal Date	Due Date
7591	Reillney RHT Temperature/Humidity Sensor	05-Jur-2009	05 Jun 2010
7753	Fluke 5720A Multifunction Calibrator	15-Mar-2010	14 May 2010
8231	Fluke 5725A Amplifier	00-Apr-2016	07 Jul 2010

Technician. 0825

Approved By:

Helga, A. Alexander Helga A. Alexandor

Helga A. Alexandor Metrology Services Manager

FX4-2-64076 Rev. ...

Page 1 of 4

٠ LC-182421Nhela 4/27/2010



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### T.R.C. Inc. F111-1,9/02/99

### SL Rt. 347 East

East Liberty, Oh 43319-0367

### **Certificate of Calibration**

· ·**\_** ·· ·**\_** · · **\_** · . .. Certificate Number: (None)

Print Date 4/27/2010	Certificate Nun	nber: (None)
Gage ID	LC-182421Nhsla	Approved Yes
Gage S/N	162421	As Found Condition in
Description	LOAD CELL	Uncertainty:
Asset No.		Coverage Factor k
Model No. 1	0178	Deg. of Freedom (DF)
Unit of Meas.	LBS	NIST No.
Manufacturer	SENSOR DEVELOPMENT	Customer Info.
Cal. Date	4/27/2010	
Next Due	10/27/2010	
Cal. Freq.	8.00 Months	
Location	NHTSA	

### **Certification Statement**

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it is hereby cartified that the above described instrument conforms to the original manufacturer's specifications and has been calibrated identications of the hybrid the specifications and has been calibrated identications of Standards whose socuracy's are traceable to the National Institute of Standards and Technology within the "mitations of the Institute of Standards whose socuracy's are traceable to the National Institute of Standards and Technology within the "mitations of the Institute of Standards and Services or have been derived from accepted values of natural physical constants or have been derived by the ratio type of self (calibration technology). Our calibration ayeters asternee ISO-9000 requirements.

Fieldings					Environment	al Conditi	ans
		•			Temperature	73	
					Humidity	27	
					Pressure	28 55	
					Other		
Shand भूली ID	01 Pedal Force (01 hs)	Uncertainty		Units	Lbs	С\$ Туре	V.
Eimlied Use?	No	Minimum	0	Nominal	0	Maximum	0
Ref Type	OHAUS WEIGHT KIT	Before	Û	Ассильсу	۵	Fail Before	No
		After	0	Accuracy	D	Fell Alter	No
Gage ID of Sta	ndard LBS-KiloMestera						
Site Due Date .015V	342011	Gage SIN		Model No.	2895-00	NIST No.	381000441
Slandard 1D	02 Pedal Forme (5015a)	Uncertainty		Units	Lbs	CS Type	ν
LimBed Use?	No	Minimum	49	Nominal	50	Maximum	51
Rc(Type	OHAUS WEIGHT KIT	Before	50 15	Ассимсу	0,1429583999	Fail Before	No
		After	50.15	Acturaty	0.1498686888	Fall After	No
Gage ID of Sta	ndard LBS-KikiMselais						
<b>êkî Due Dale</b> .1757	342011	Gage &/N		Model No.	239-00	NIST No.	381000/141
Standard ID	03. Pedal Force (*30 Lbs)	Uncertainty	• • • •	Units		CS Type	

Page 1 of S

						Page	
Limited Use?	No	Minimum	985	Nominal	100	Maximum	102
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		After	100.1	Accuracy	\$,939999999999	Fail Atlar	No
Gage ID of Sta	ndarti LBS-KikoMastere						
Sid Due Date	3/4/2011	Gage SIM		Model No.	238-30	NIST NO.	381000441
.3767		_					
Standard D	Mk Pedel Force (150 LLs)	Univertainty		ahaU	l bs	CS Type	v
i, mited Use?	No	Minimum	:47	Norreinal	150	Maximum	151
Ref Type	CHAUS WEIGHT KIT	Gefore	150	Accuracy	D	Fall Before	No
		After	:50	Accuracy	9	Fait After	Ne
Gage ID nt Sta	nitiand THS KtoMasters						
8td Due Date	3/4/2011	Gage S/N		Model No.	238430	NIST No.	3991(21)(2441
55 m							
Standard ID	05. Pedal Force (200 Lbs)	Uncertainty		Units	f bes	С-5 Туре	v
Limited Use?	Na	Mänimum	195	Nominal	200	Maximum	
Ref Type	OHAUS WEICHTIKT	Before	200	Accuracy	<u>u</u>	Fail Betore	
		Affer	200	Ассыгасу	0	Fall After	
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Std Due Date	34%2011	Gage S/N		Model No.	200.00	NIET NO.	3810307441
.748v		,		• · · •			
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Limited Use?	No	Minimum	245	Nominal	259	Maximum	275 - C
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		ABer	209.8	Accuracy	-0.1909999999	Fail After	No
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81d Due Date	3/4/2011	Gage S'M		Model No.	253-00	NIST NO.	S8100D411
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