



U.S. Department
of Transportation
National Highway
Traffic Safety
Administration

Memorandum

Subject: Engineering Analysis E80-074: 1975 through 1978 Toyota Throttle Sticking Problem, All Models Date: SEP 28 1983

From: John A. Dunsmoor *John A. Dunsmoor*
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Reply to NEF-12 Du
Att. of: E80-074

RFH To: Robert F. Hellmuth
Chief, Defects Evaluation Division

BASIS

This analysis was opened April 17, 1980, based on several accidents reported to the Office of Defects Investigation (ODI), some involving personal injuries.

Eight reports of throttle or accelerator pedal sticking in the open position were received by ODI alleging one or more instances which resulted in loss of vehicle control.

ALLEGED PROBLEM AND POTENTIAL SAFETY RELATED CONSEQUENCES

It is alleged that moisture or dirt collects around the accelerator pivot shaft and causes corrosion with consequent binding of the shaft and/or bracket bearings. If this occurs, it is possible for the resulting friction to exceed the ability of the return spring to return the accelerator pedal to its normal idle position.

The potential safety-related consequence of this condition occurs when the accelerator pedal is released and the operator expects a reduction in vehicle speed. Several operators have reported that excessive brake pedal pressure using both feet was needed to stop the vehicle to avoid collision.

DESCRIPTION OF COMPONENTS

Documentation provided by the Toyota Motor Company, Ltd., (Toyota) revealed that three types of accelerator pedal systems were used in Toyota vehicles for the period 1973-1978. Their usage is depicted in Chart I.

OWNER REPORTS

A search of ODI's computer data bank on December 24, 1981, revealed 23 owner reports which related to the alleged throttle system problems. A summary of these reports and reports supplied by Toyota are shown below:

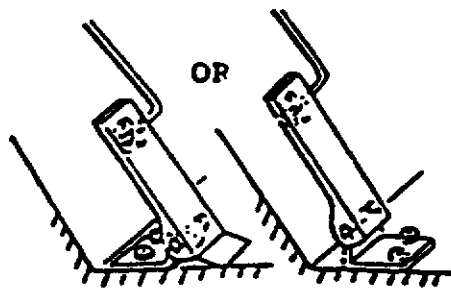
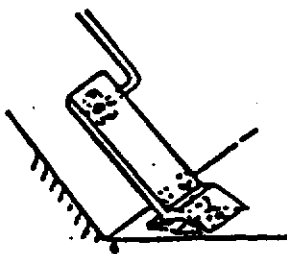
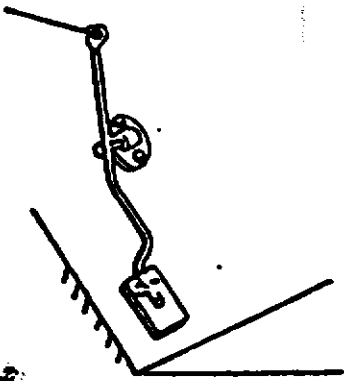
TYPE	MECHANISM	MODEL	PART NUMBER
ORGAN PEDAL TYPE (Pin Hinge)		'73 Corona	78010-20020
		'74-'78 Corona	78010-20030
		'73-'77 Celica	78010-14011
		'78 Celica	78010-14020
		'73-'74 Corolla	78101-12040
		'73 Carina	78010-14011
		'73-'76 Corona Mark II	78010-22030
		'78 Cressida	78010-22050
		'75-'78 Hilux	78010-89101
		ORGAN PEDAL TYPE (Ball Hinge)	
PENDANT TYPE		'77-'78 Corolla	78111-12100
		'73 Landcruiser	78101-90300
		'74 Landcruiser	78101-90301
		'75 Landcruiser	78101-90303
		'76-'78 Landcruiser	78101-90305
		'78 Landcruiser	78101-90310
		'78 Landcruiser	78101-90312
		'73 Landcruiser	78101-90351
		'74 Landcruiser	78101-90353
		'75 Landcruiser	78101-90355
		'76-'78 Landcruiser	78101-90357
		'76-'78 Landcruiser	78101-90359
		'78 Landcruiser	78101-90361
		'78 Landcruiser	78101-90363

Chart I

OWNER REPORTS
1975-1979 Vehicles

<u>ODI Reports</u>	<u>Toyota Reports</u>	<u>Property Damage</u>	<u>Injuries</u>	<u>Fatalities</u>
23	8	2	2	1*

*Single car unwitnessed accident, parents of deceased hypothesized that throttle stuck.

TECHNICAL INFORMATION

The number of subject Toyota vehicles imported in the U.S. by model and model year are listed in the table below:

Number of Vehicles Imported

<u>Model</u>	<u>Year</u>	<u>Total by Model Year</u>	<u>Total</u>
Corolla	1975	136,873	846,816
	1976	209,306	
	1977	244,594	
	1978	256,043	
Corona	1975	29,168	159,994
	1976	42,320	
	1977	46,012	
	1978	42,494	
Celica	1975	58,615	492,375
	1976	89,273	
	1977	164,791	
	1978	179,696	
GRAND TOTAL			1,499,185

The pin hinge organ pedal type is used in the majority of the subject vehicles. The stainless steel hinge pin and the return spring wound around the hinge pin are located at the base of the pedal. A nylon bushing is used to reduce friction. This, of the three designs used, is most susceptible to increased friction due to build-up of and corrosion in the area of the hinge pin.

The ball hinge organ pedal type (used only on the Corolla 1975 and 1976 models) appears to be similar to the pin hinge type pedal. The return spring is located upward along the accelerator pedal rod and

produces a higher closing moment than the pin hinge type. The design of the ball hinge pivot is such that corrosion and dirt would have minimal effect on throttle closing.

The pendant type pedal is not fastened to the floor. It rotates about a dash-mounted pivot bracket up and away from the floor board. This configuration prevents moisture and dirt from contacting the pivot bracket bearing.

A summary of Toyota's response to NHTSA's inquiry indicates:

- o Only seven warranty claims have been filed for pedal assembly and support bracket problems for all models and model years.
- o Total aftermarket sales of accelerator pedal assemblies were 2,782 for all model years. Corolla accounted for 2,029 of the total.
- o Toyota has issued no special treatment for this matter through either its service manuals or service bulletins.

ENGINEERING ANALYSIS

The Office of Defects Investigation computerized complaint data may be misleading due to the influence of a previous Environmental Protection Agency recall and a related ODI investigation, Case No. C5-08. That case involved poor engine performance because of a heat tube-choke problem. Fresh air passes through and is heated in a heat tube in the exhaust manifold. It is directed to the choke where it causes the bi-metallic spring to release the choke (See Figure 1). Cracking of the heat tube allows exhaust contaminants to clog the choke mechanism with resultant

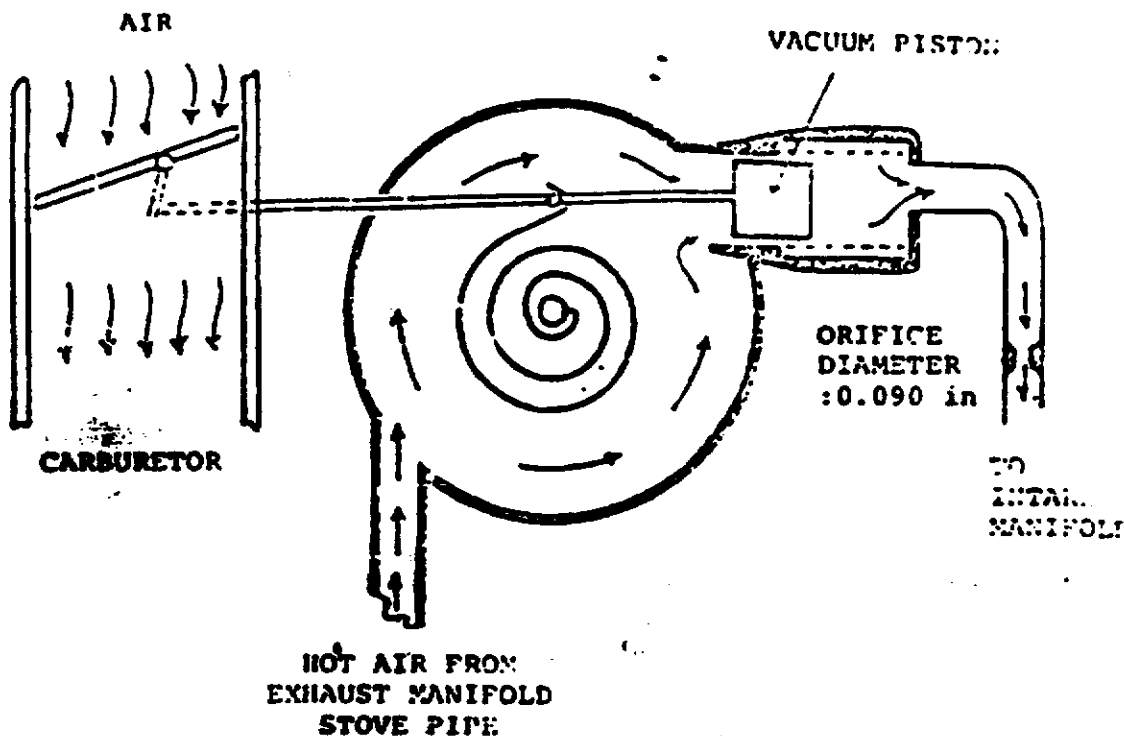


Fig. 1 Toyota Automatic Choke System

effect on engine speed and performance. This condition could have resulted in a complaint of a stuck accelerator or throttle.

A records check was made of ODI's computerized consumer complaint file for the same model years for Honda and Datsun for similar complaints. The results are shown below.

PEER GROUP COMPARISON
"Throttle Sticking" December 23, 1981

<u>Manufacturer</u>	<u>Model</u>	<u>Complaints</u>	<u>Accidents</u>	<u>Injuries</u>	<u>Property Damage</u>	<u>Fatalities</u>
Honda	Accord	4	3	1	3	0
	Civic	8	0	0	0	0
		<u>12</u>	<u>3</u>	<u>1</u>	<u>3</u>	<u>0</u>
<hr/>						
Datsun	B-210	8	1	0	1	0
	F-10	1	0	0	0	0
		<u>9</u>	<u>1</u>	<u>0</u>	<u>1</u>	<u>0</u>

Total for Peer Group: 21 complaints, 4 accidents, 1 injury and 4 property damage.

A comparison of Toyota with peer group cars is as follows using ODI complaint data:

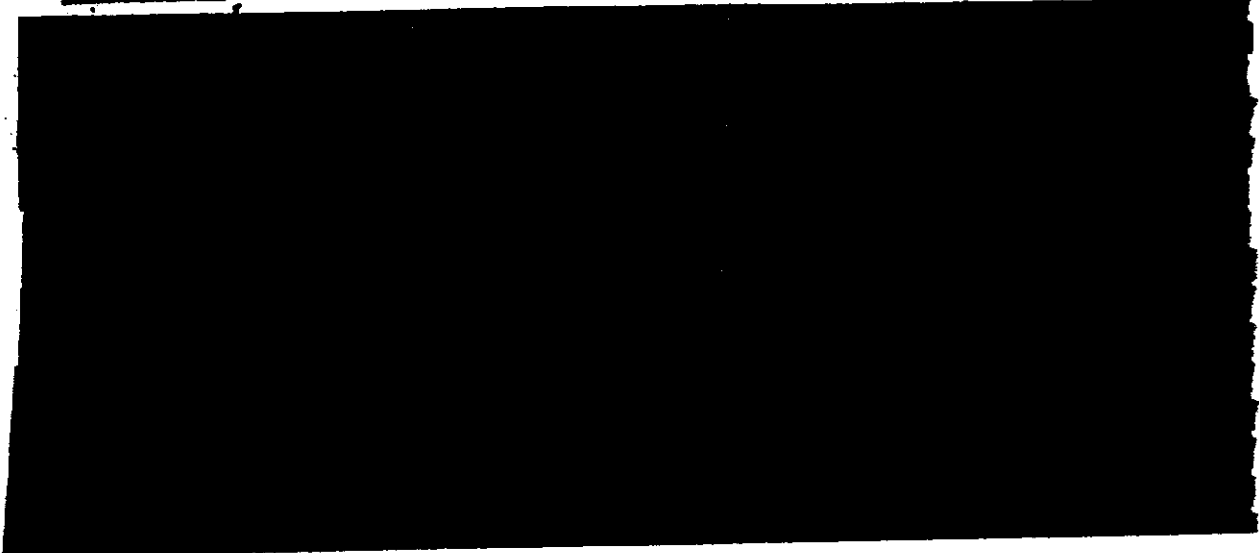
	<u>Complaints</u>	<u>Population</u>	<u>Complaint Rate per 1,000 Vehicles</u>
Toyota	23	1.983	.015
Honda	12	1.854*	.00647
Datsun	9	0.722	.0125

* Production worldwide (U.S. import data not available)

As can be seen, the complaint rate is miniscule and reasonably comparable for all three makes.

The total number of replacement parts (2,782) is extremely low when compared to the total vehicle population (1,499,185). This amounts to less than two parts (1.88) per thousand vehicles.

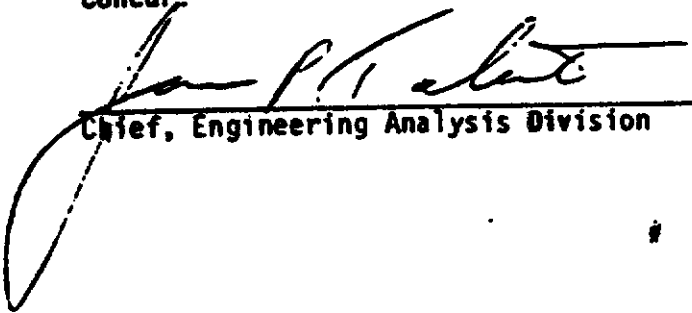
CONCLUSION



RECOMMENDATION



Concur:


Chief, Engineering Analysis Division

9/27/83
Date

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