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To: David Carey; John Capp
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BCC:
Sent Date: 2012-05-15 13:50:22:000
Received Date:
Subject: Slides for Cobalt Issue
Attachments: cobalt key.pptx *Attached*

If needed for this mornings meeting, here are some slides that summerize activities for the Cobalt issue. We were not asked to put slides together, this is just in case.

We did a brief assesment of the impact to change the SDM on slide 7, should this be moved to backup?



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Cobalt Issue Activities

- Review of crash records
- SDM Investigation
- IGN Switch
- Change Analysis

Crash Records

- Review of EDR and Incident Reports
 - The SDM indicates that the vehicle power mode is ACC or OFF in the majority of reported incidents.
 - In the vehicles where EDR recorded RUN power mode have the crash sensing algorithm recorded as being inactive. The crash algorithm is inactive during the initial 3 seconds after transitioning from power mode OFF/ACC to RUN to run self diagnostics
 - All reviewed crash incidents had some form of pre-impact rough road input.
 - Some SDMs have no recorded history of an event – indicating that the module was not online during the event.
- If a crash event has started while in power mode RUN, any transition from power mode RUN is ignored until the crash event is completed – and the power mode is recorded as RUN in EDR.
- The power mode behavior of this SDM is the same as all other SDMs in GM vehicles.

SDM Analysis

- Background
 - The SDM used on the Cobalt was originally designed in 1999 by Siemens Safety Electronics. In 2007 Siemens Safety Electronics was bought by Continental-Temic. The SDM is designed for the 11 bit GMLAN and the only SDM designed for that architecture.
 - This SDM is preprogrammed at the supplier and not field programmable – replacement is how this vintage SDM is serviced.
- Analysis of SDM involved in field incident indicate the SDM was working per design.
- Fishbone analysis indicates the only way the recorded EDR could have occurred is if the SDM received a change in power mode from RUN.
- The power mode behavior of this SDM is the same as all other SDMs in GM vehicles.

IGN Cylinder/Key

- IGN Switch Investigation

- July 09 testing at the MPG demonstrated 1 of the 3 contacts lifting during rough road events. This occurred once during multiple tests. 2 contacts lifting (open) would be required for the a power mode OFF to be generated with the key in the RUN position. Though this test did not duplicate the field conditions, it did show it may be possible to cause errant IGN switch behavior with rough road input.
- During April 12 investigation at the Davison Salvage Yard, an IGN switch and BCM was removed from a vehicle that had this issue to determine if there was any evidence that the contacts had lifted. During the attempt to power up the BCM in a fault free environment to pull history DTCs, it was found that the donor vehicle IGN switch required low force to rotate the cylinder. The tangential force of the crashed vehicle with the issue could not be measured.
 - The force was measured by pulling on a ring attached to the key ring slot of the key (Fig 1)
 - Rotational force measured in 8 2005 - 2006 at the Davison Salvage Yard indicate some vehicle require low force to rotate the key (Table 1).
 - On one of the 8 Cobalts, the force required to rotate the key was greater than 25lbs (limit of the available force meter), this was the only vehicle that had a hole style key ring slot.
 - A salvage yard HHR, which has a similar key cylinder and a key with a hole was also beyond the limit of the available measurement tool

Fig 1. Key Styles

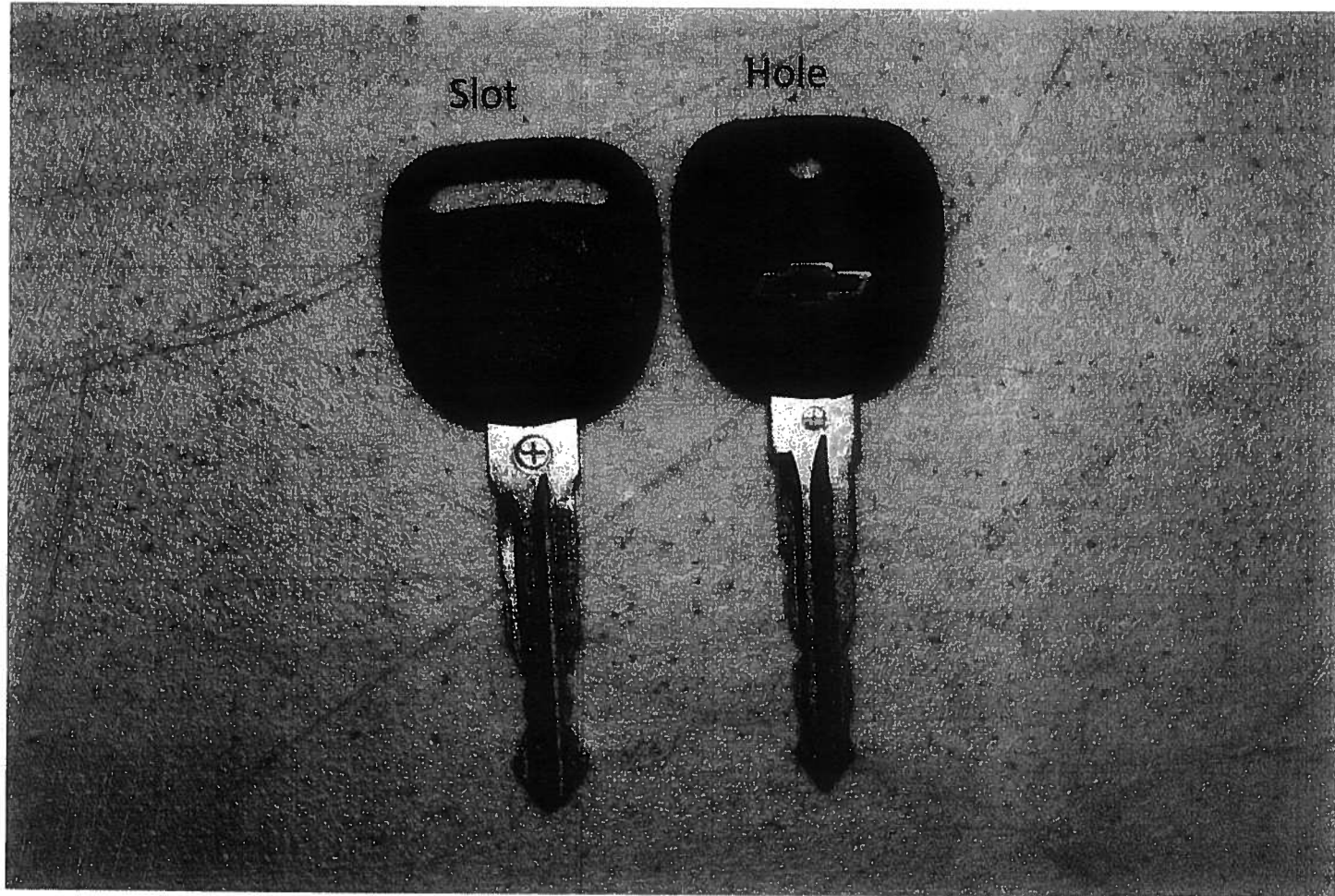


Table 1: Force To Rotate Key From Run to Acc

Rotational Force Required to Transition From Run to Accessory (Pounds)

Trial	Veh 1	Veh 2	Veh 3	Veh 4	Veh 5	Veh 6	Veh 7
1	0.6	3.8	8.6	0.9	3.1	1.4	2.5
2	1.0	3.9	12.0	1.4	4.8	1.4	2.5
3	1.0	4.3	13.0	2.3	4.9	1.7	3.3
4	1.0	5.3	14.0	2.3			
5	1.3			4.8			
6	1.3						
7	1.3						
8	1.4						
9	1.5						
10	2.4						
11	2.4						
12	2.7						
13	3.1						
14	3.1						
15	3.9						
Mean	1.9	4.3	11.9	2.3	4.3	1.5	2.8
STD	0.99	0.68	2.35	1.51	1.01	0.17	0.46

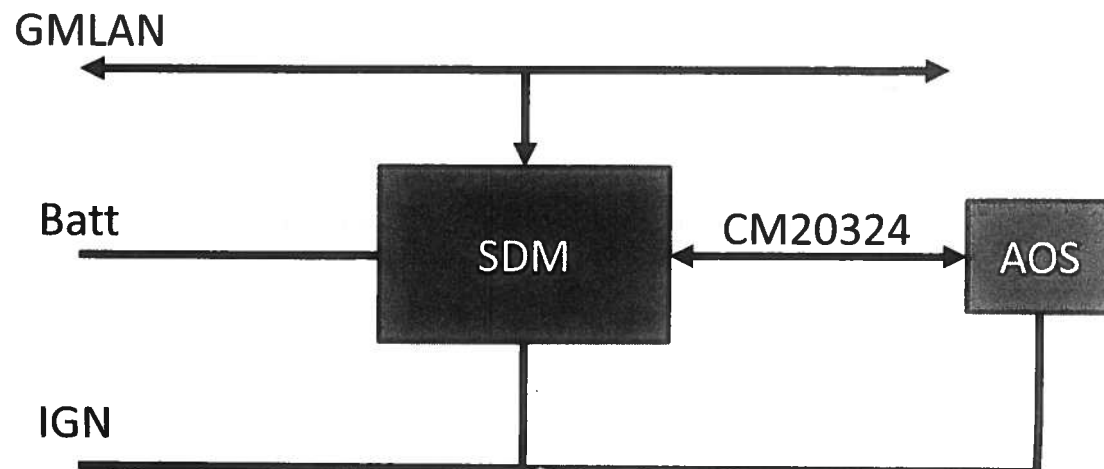
* Pulling tangentially on ring in key slot with a force meter.

Only 1 of the 8 Cobalts inspected had a circular key ring hole; the cylinder would not rotate with the application of more than 25lbs force

Weight of Large Key Rings: J. D. - .2lbs, M.D. - .3lbs, C.T. - .5lbs

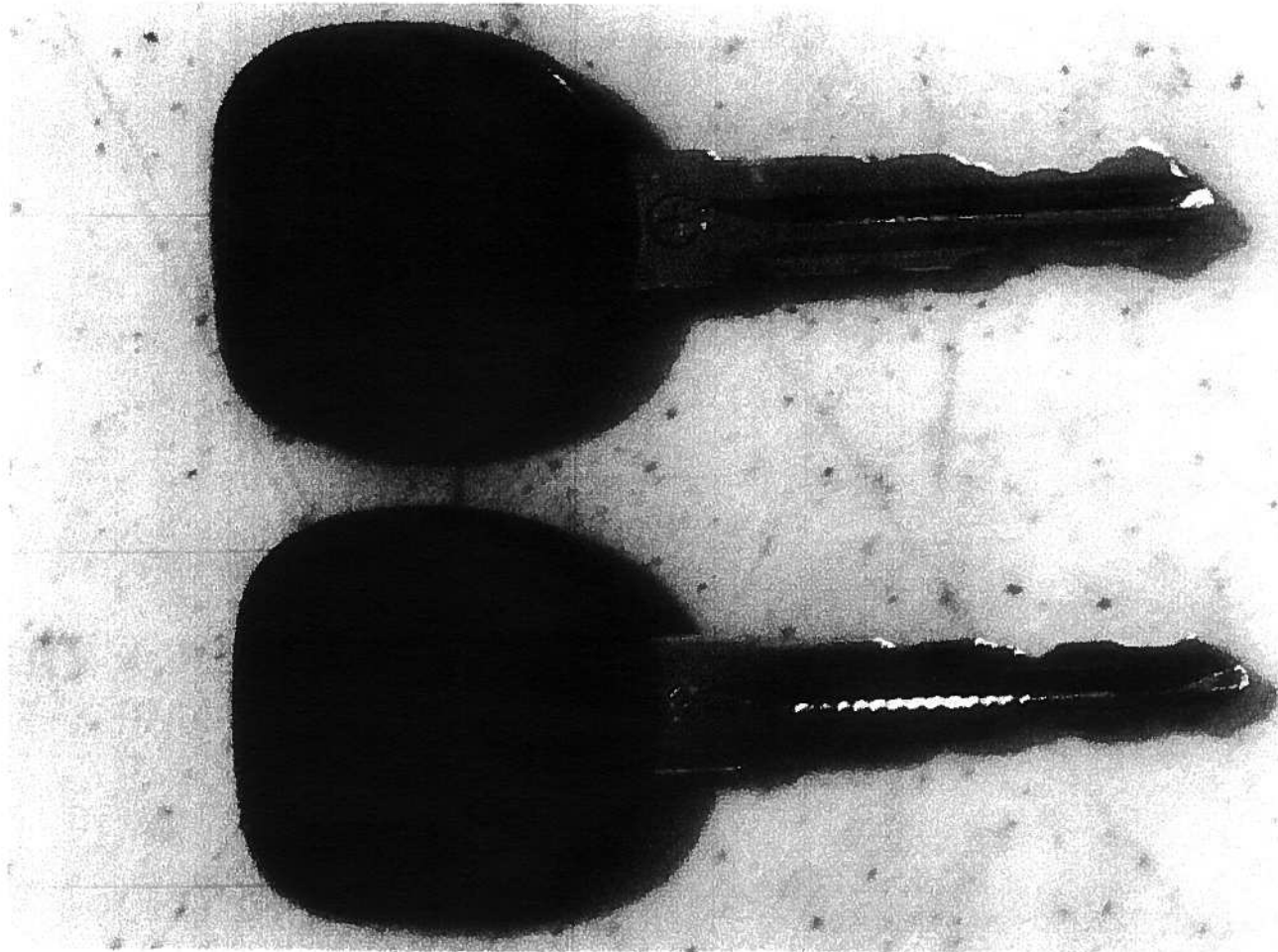
Assessment SDM Change

- Changing the SDM power down behavior is high risk. The power moding, fail safe operation, and diagnostics portion of the SW would need to be modified.
 - The start up behavior, i.e. driver seat belt reminder would still need to be compliant – even though there was no change to the “internal power mode” of the SDM on a quick IGN cycle.
 - Diagnostics of the IGN line and AOS module (perhaps other U-Codes) would need to be modified
 - Changes to the design of the SDM will need to be done by engineers who were not part of the original design team.
- Note that the AOS module is powered from IGN not battery – so it will power off when the key transitions from run. The FMVSS requirement is that the correct airbag state be displayed within 10 secs – so if the SDM shut off delay lasted longer than 10 seconds or if a transition of airbag state happened with 2-3 seconds of power mode change, there may be a violation of this requirement.

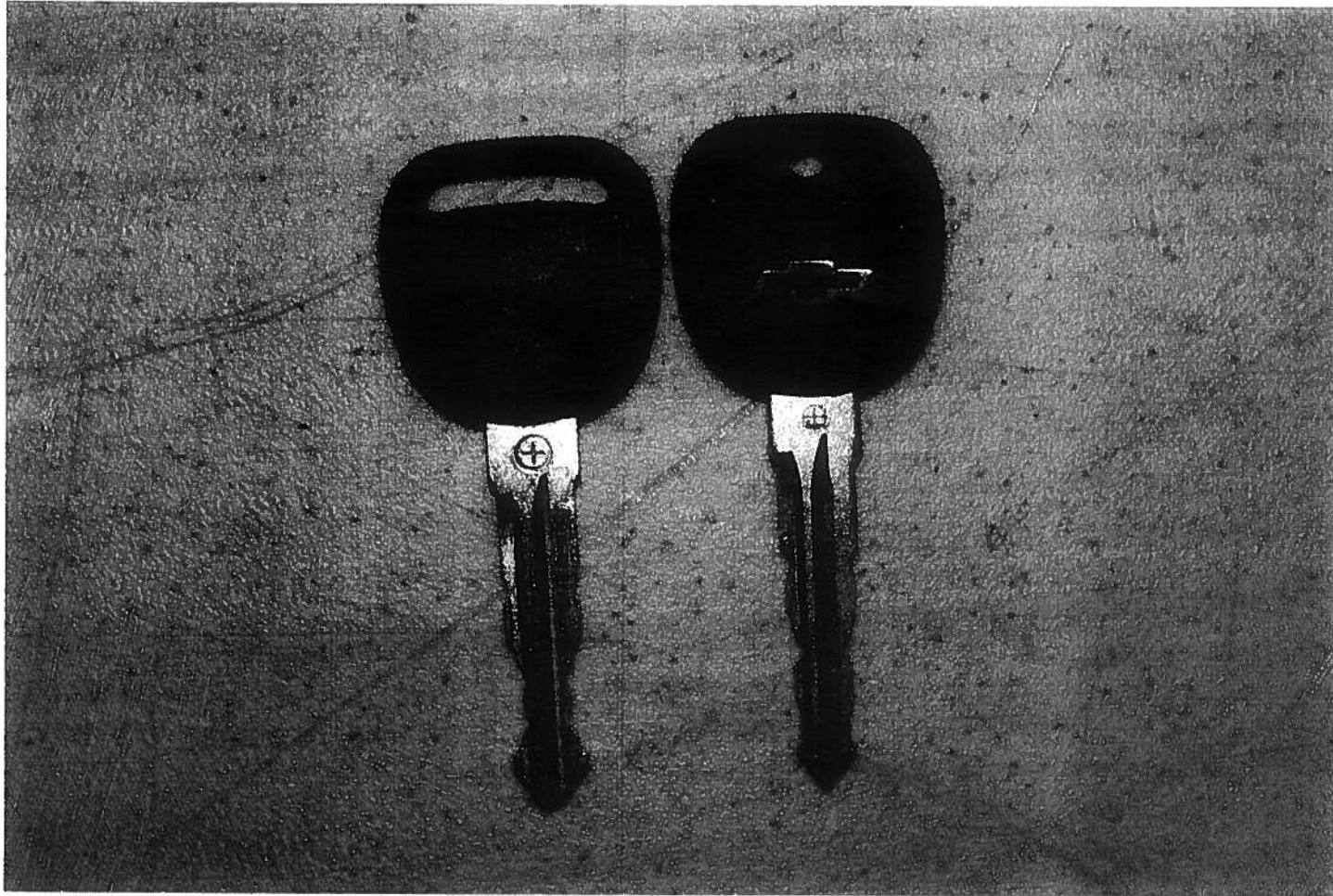


- Backup

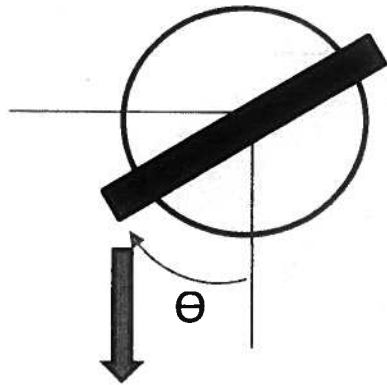
Key Pictures



Key Pictures



Key Drawing



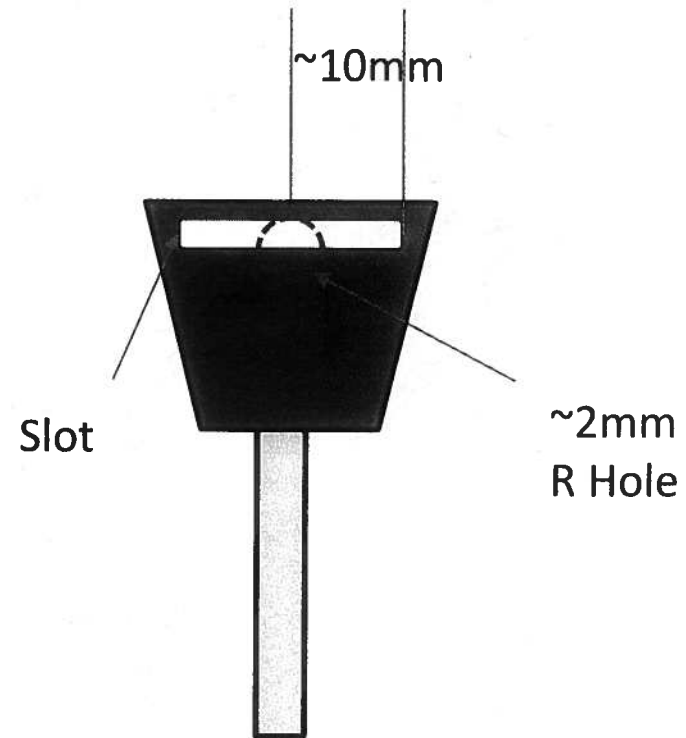
Weight

θ for Cobalt > 60

$\sin(60) = .866$

θ for Lambda < 20

$\sin(20) = .34$



The moment arm
on the slotted part
is $\sim 5\text{x}$ bigger

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Bulletin: #05-02-35-007A

Initial Release: Oct 25, 2006

[2007 Chevrolet Cobalt](#) | [Cobalt, G5 VIN A Service Manual](#) | [View All Bulletins](#) | Document ID: 1869035

#05-02-35-007A: Information on Inadvertent Turning of Key Cylinder, Loss of Electrical System and No DTCs - (Jul 1, 2011)

Subject: Information on Inadvertent Turning of Key Cylinder, Loss of Electrical System and No DTCs

Models: 2005–2007 Chevrolet Cobalt

2006–2007 Chevrolet HHR

2005–2006 Pontiac Pursuit (Canada Only)

2007 Pontiac G5

2006–2007 Pontiac Solstice

2003–2007 Saturn ION

2007 Saturn Sky

This bulletin is being revised to add a model year. Please discard Corporate Bulletin Number 05-02-35-007 (Section 02 – Steering). There is potential for the driver to inadvertently turn off the ignition due to low ignition key cylinder torque/effort.

The concern is more likely to occur if the driver is short and has a large and/or heavy key chain. In these cases, this condition was documented and the driver's knee would contact the key chain while the vehicle was turning and the steering column was adjusted all the way down. This is more likely to happen to a person who is short, as they will have the seat positioned closer to the steering column.

In cases that fit this profile, question the customer thoroughly to determine if this may be the cause. The customer should be advised of this potential and should take steps to prevent it – such as removing unessential items from their key chain.

Engineering has come up with an insert for the key ring so that it goes from a "slot" design to a hole design. As a result, the key ring cannot move up and down in the slot any longer – it can only rotate on the hole. In addition, the previous key ring has been replaced with a smaller, 13 mm (0.5 in) design. This will result in the keys not hanging as low as in the past.

Parts Information

Part Number

Description

15842334

Cover, Dr Lk & Ign Lk Key

GM bulletins are intended for use by professional technicians, NOT a "do-it-yourselfer". They are written to inform these technicians of conditions that may occur on some vehicles, or to provide information that could assist in the proper service of a vehicle. Properly trained technicians have the equipment, tools, safety instructions, and know-how to do a job properly and safely. If a condition is described, DO NOT assume that the bulletin applies to your vehicle, or that your vehicle will have that condition. See your GM dealer for information on whether your vehicle may benefit from the information.

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