
From:

To:

Mark A Johnson; Carmen Benavides

[REDACTED] Elizabeth A. Zatina; Maureen Foley-
Gardner [REDACTED]

CC:

Doug Wachtel

BCC:

Sent Date:

2013-11-04 20:05:27:253

Received Date:

2013-11-04 20:05:23:870

Subject:

2005-7 Cobalt Airbag Presentation

Attachments:

2005-7 Cobalt G5 rev5.pptx

ISR Presentation for 11/5/13

Brian

From: Mark A Johnson

Sent: Monday, November 04, 2013 2:12 PM

To: Christopher Janik; Gregory Baron; Joe Voyt; Brian Stouffer

Cc: Doug Wachtel

Subject: Reminder to send mailouts for ISR today

All - Please remember to send your ISR presentation prior to close of business for tomorrow's ISR meeting -
Thanks - Mark

GMX351 HVAC Faceplate / Defrost (N130380) Janik
2013 SRX rear seat entertainment Baron
SRX Spare Wheel Marking Voyt
Cobalt/Ion/HHR Potential Airbag Non Deploy Stouffer

2005-7 Cobalt, G5, Pursuit, 2003-2007 Ion, 2006-2007 HHR

Condition:

A review of selected Cobalt & G5 frontal crash events indicates some airbag non deploys have occurred where the ignition switch was in accessory or off. The condition appears to be limited to 2005-07 Cobalt & G5 vehicles. The noted field events involve vehicles going off the road and/or hitting smaller objects shortly before a more significant impact.

Questions:

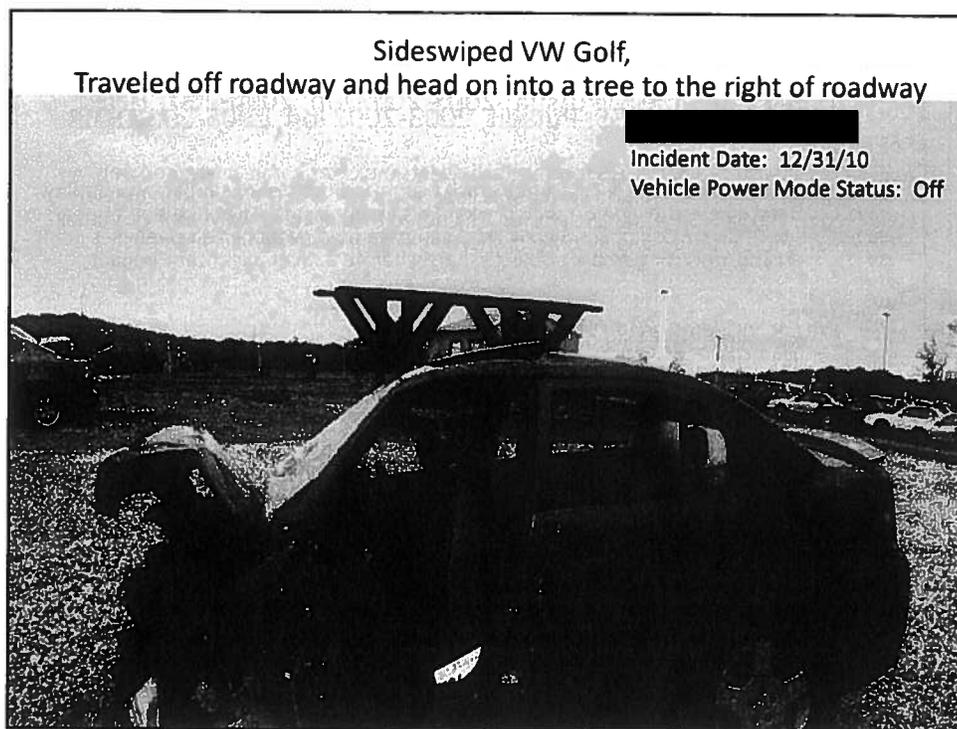
- Why no incidents on Ion or HHR
 - Ion is Class 2 architecture vs GM LAN on Cobalt
 - Both disable SDM with key off, but Cobalt will store ignition state and crash record while Ion will not
 - Ion has different column shroud which could affect potential for key interaction
 - Ion customers may be less likely to have the type of crash needed for the condition
 - Ion has different SDM and supplier than Cobalt
 - HHR has more clearance to the driver's knee
- Why no incidents on 2008-10 Cobalt?
 - Ignition switch was revised to have longer plunger and spring to increase effort (confirmed 10/29/13)
 - Part number not changed, so implementation date is unknown (Validation complete 4/26/06). Salvage yard samples included 2007 vehicles with longer plunger (unknown if any had been replaced in service).

Root Cause:

- The hypothesis is that during the off road event the driver's knee is interacting with the keys and/or the mass of the keys is causing the ignition to rotate

Ignition Switch Position from SDM Download 2005-7 Cobalt & G5

- 13 Accessory
- 1 Off
- 8 Run
 - 2 in "Run" showed that algorithm was disabled when Continental downloaded the EEPROM and looked at all of the data in the SDM.
- 1 No Event (not recorded)



Vehicle Population & Incident Rate 2005-2007 Cobalt & G5

Vehicles Sold in US

	<u>2005</u>	<u>2006</u>	<u>2007#</u>
Cobalt/G5# Pursuit	140,464	229,231	248,137

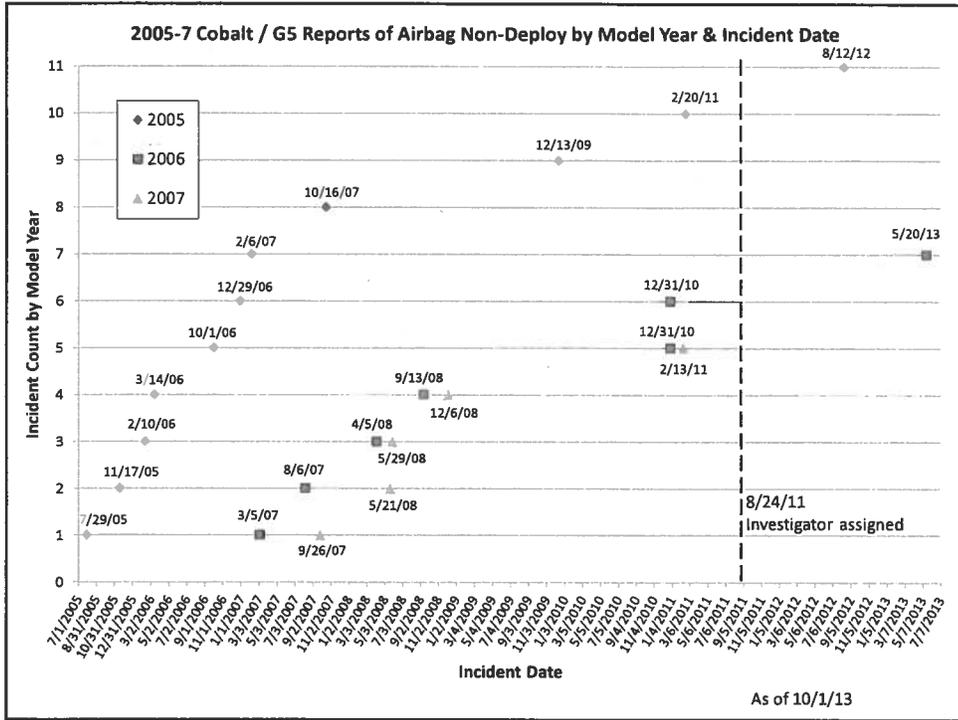
	<u>2005</u>	<u>2006</u>	<u>2007</u>
Incidents*	11	7	5
IPTV/Yrs Exposure <small>(as of 10/1/13)</small>	0.0089	0.0039	0.0030

Incident rate for 2005 is over 2 times higher than 2006 and about 3 times higher than 2007

Combined IPTV/Yrs Exposure 0.0053

*Except for 1 2007 G5, all reports are Cobalt. There is 1 incident reported on a 2008 vehicle. 2008 vehicle had front sensor fault that disabled system prior to crash.

G5 was 2007 start.

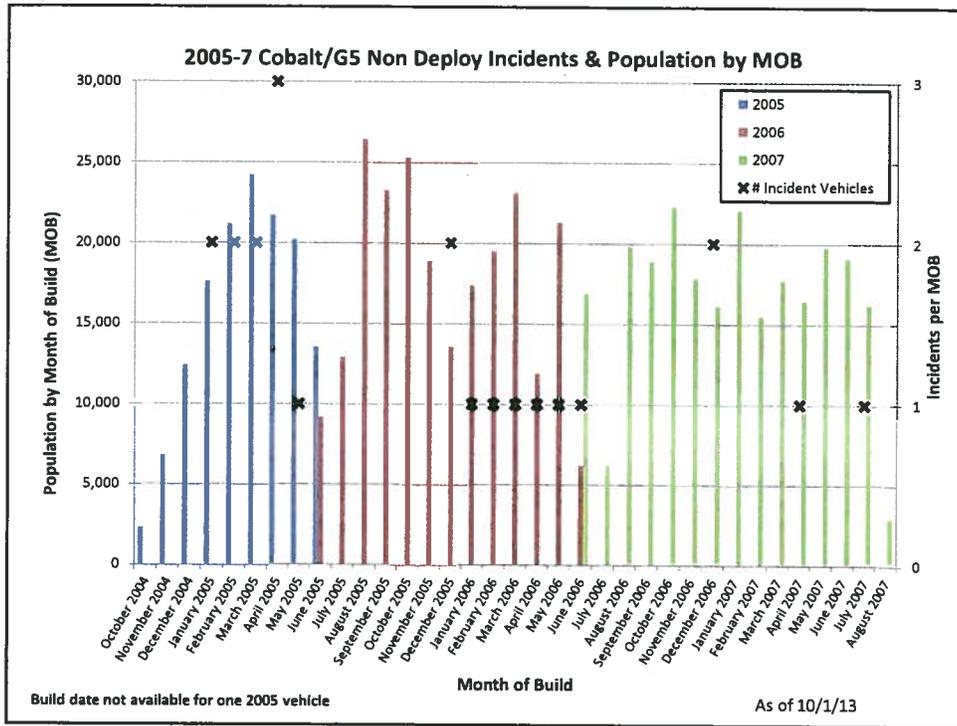


Vehicle Population & Incident Rate 2005-2007

Vehicles Sold in US

	<u>2005</u>	<u>2006</u>	<u>2007</u>
Cobalt/G5# Pursuit	140,464	229,231	248,137
Incidents	11	7	5
IPTV/Yrs Exposure	0.0089	0.0039	0.0030
 SOP – 1/1/09	 8	 4	 4
IPTV/Yrs Exposure	0.0142	0.0058	0.0081
 1/1/09-10/1/13	 3	 3	 1
IPTV/Yrs Exposure	0.0045	0.0028	0.00085

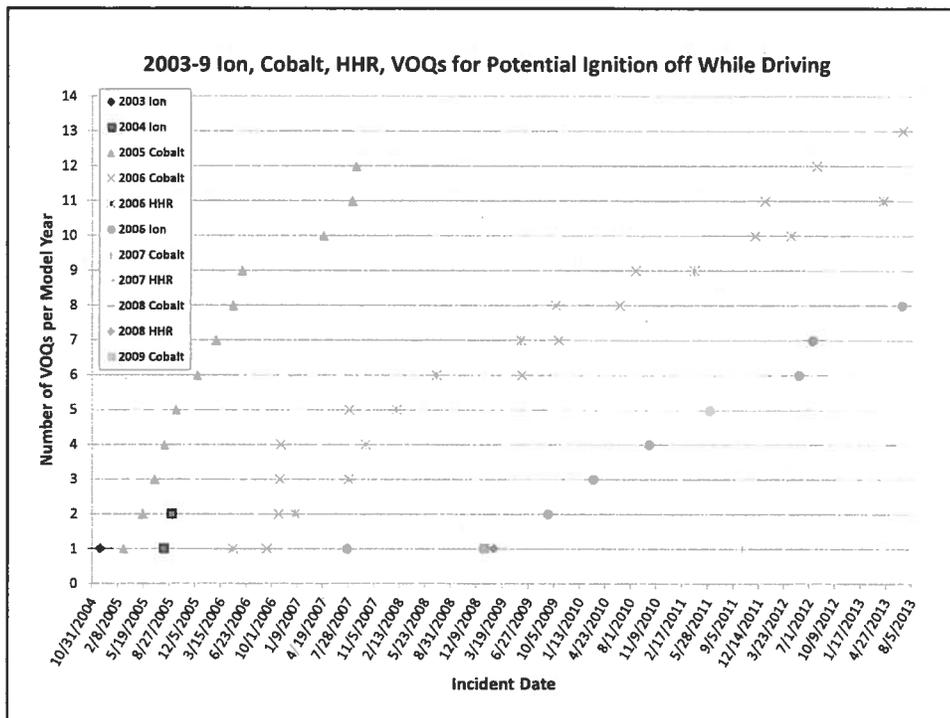
2000 GMT800 0.00698 IPTV/yr (approx 2 yrs exposure @ decision)



Stalling VOQs by Model Year (Search 10-7-13) Potential Key Motion (Stall with No DTCs & Immediate Restart)

Model	2003	2004	2005	2006	2007	2008	2009	Grand Total
COBALT			12	13	1	1	1	28
HHR				11	2	1		14
ION	1	2		8				11
Grand Total	1	2	12	32	3	2	1	53

Several HHR VOQs state that just prior to stall they hit a pothole or other discontinuity in road



TREAD Search July 2012 (TAC & CAC) Stalling with No DTCs

IPTV/yr	2003	2004	2005	2006	2007	2008	2009
Cobalt, GS	N/A	N/A	0.05316	0.02886	0.00733	~0	0
Ion	0.04046	0.02526	0.04346	0.01826	0.0	N/A	N/A

Cobalt, Ion & HHR Ignition Switch Measurement

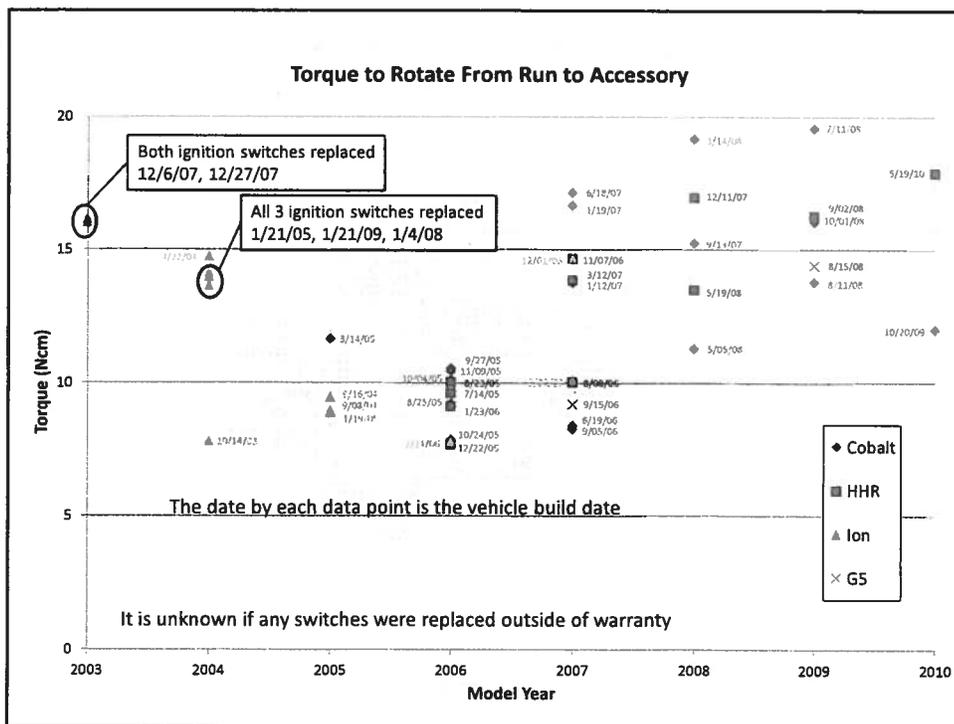
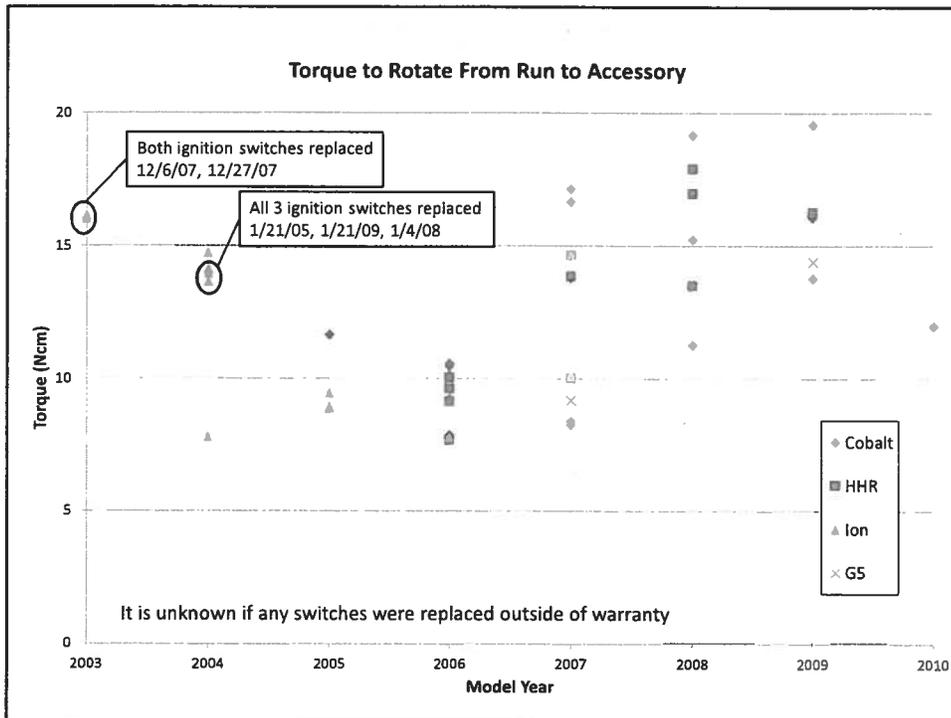
- 5/22/12 44 vehicles in Davison salvage yard
 - Measured torque (Ncm) and force (N) to turn the ignition switch from Run to Accessory.
 - Five of the vehicles had a replacement key, or a key with a hole vs slot (force not measured)

Model	Model Year								Grand Total
	2003	2004	2005	2006	2007	2008	2009	2010	
Cobalt			1	5	5	3	3	1	18
G5					1		1		2
HHR				4	3	2	1	1	11
Ion	2	5	3	1	2				13
Grand Total	2	5	4	10	11	5	5	2	44

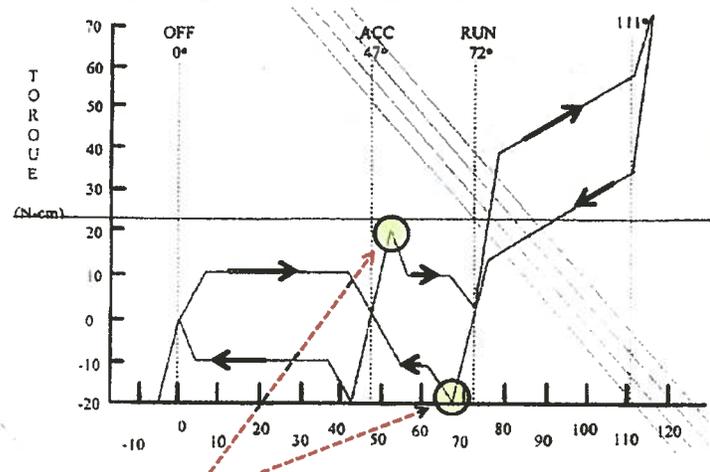
Test Set-up Using Torque Tool



Measure torque (Ncm)
to rotate key from Run
To Accessory



Switch Torque vs Rotation Specification



- 20 +/- 5 N-cm specification for
- Acc → Run
 - Run → Acc

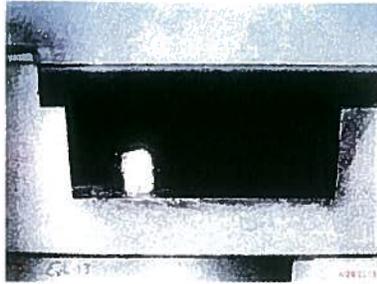
Cobalt Ignition Switch P/N 10392423
Plaintiff (Melton) Exhibit 12



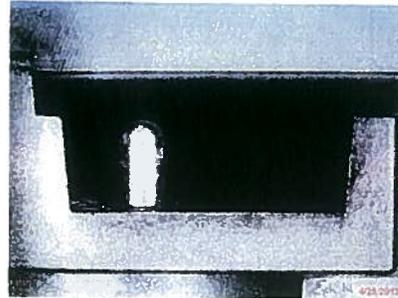
Exh 12

Plunger from 2005 and Current Service
Plaintiff (Melton) Exhibits 13 and 14

2005



Current Service



Plunger and Spring from 2005 and Current Service
Plaintiff (Melton) Exhibit 14

2005



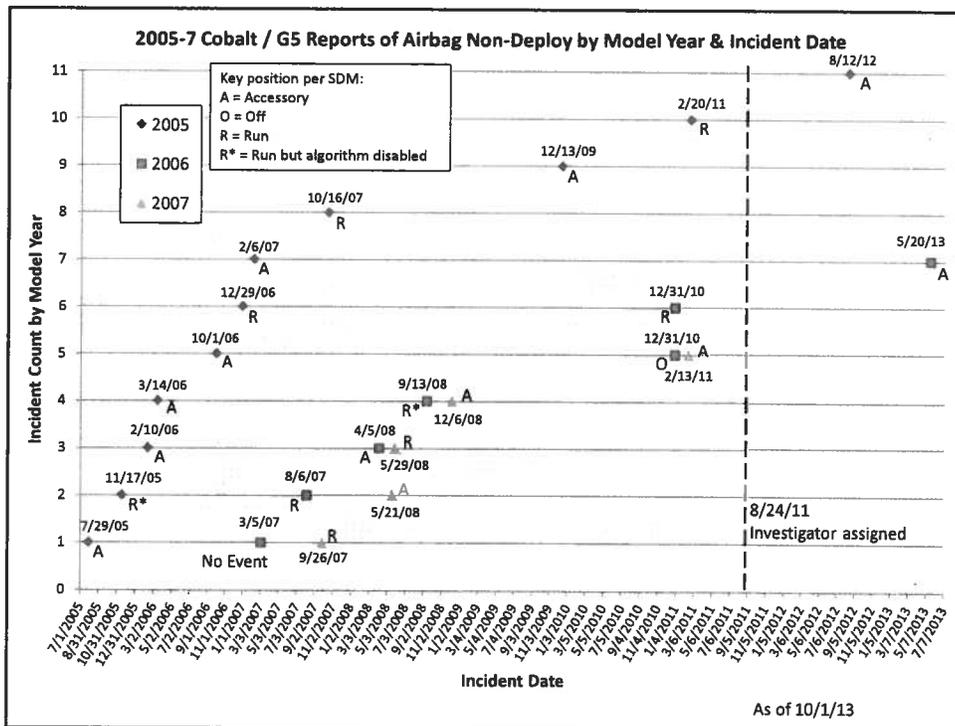
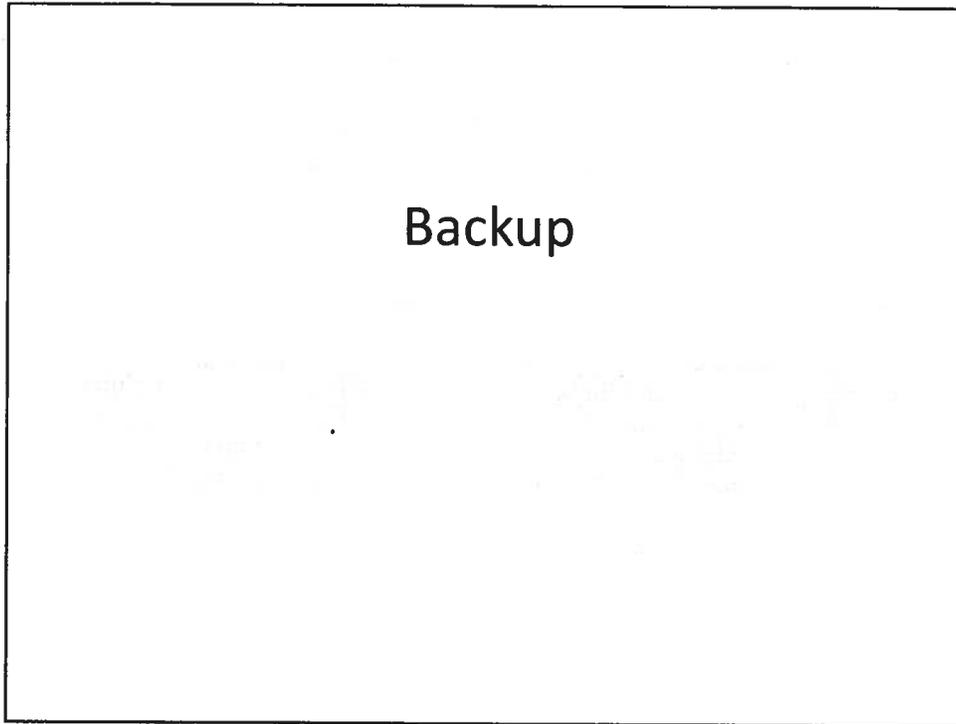
New
Replacement



1 mm

Exh 15

4/26/2013

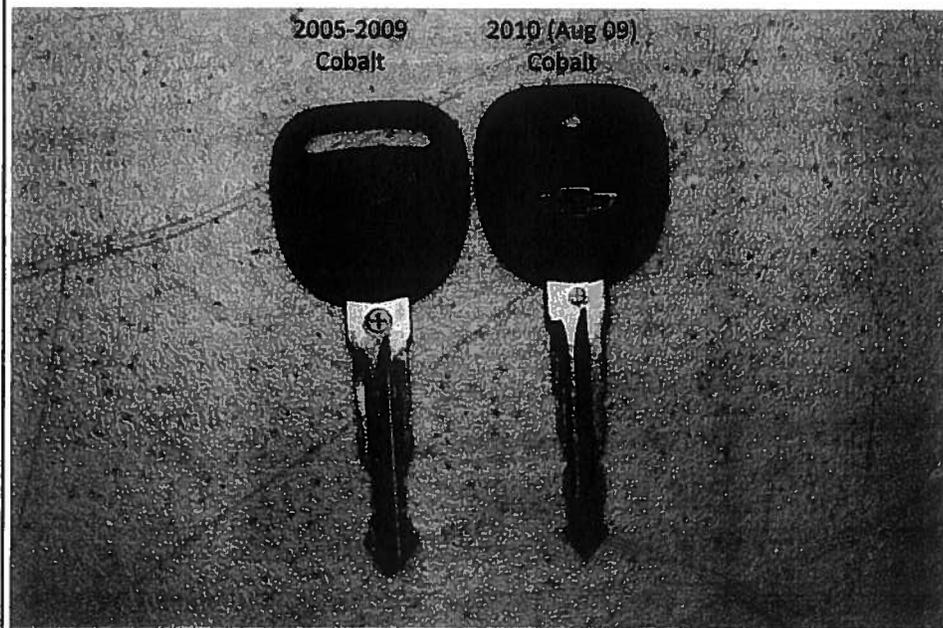


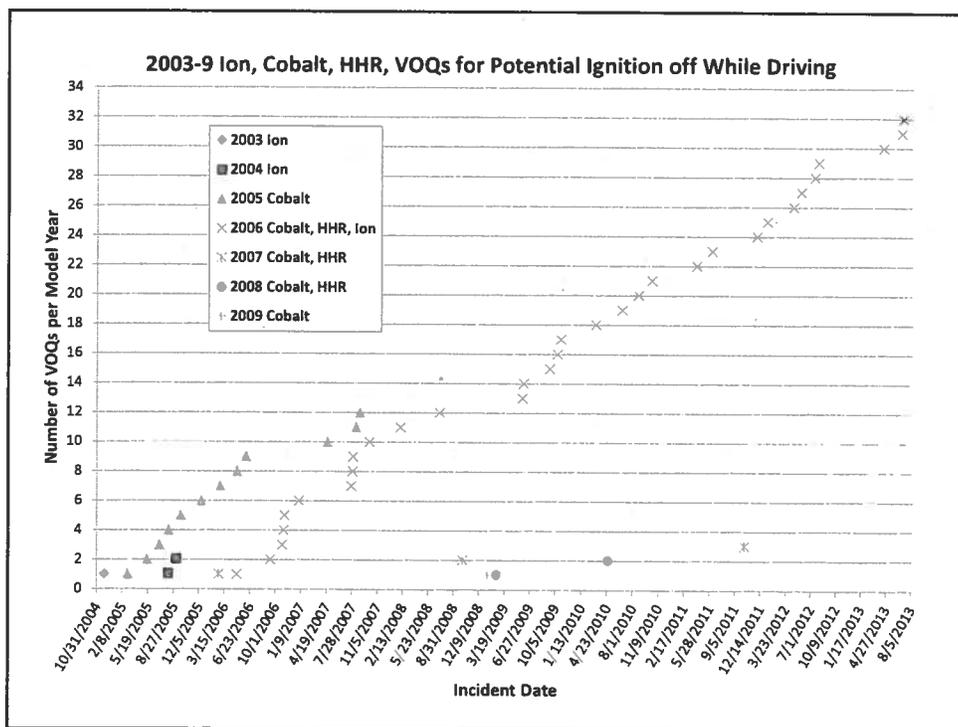
Switch Background

- Ion switch original for 2003. For 2005 capacity tooling was needed for Cobalt. The part number is the same, so it is not known what cavities were used for Ion and then for Cobalt. HHR added in 2006
 - A change was initiated in 2006 to implement a new printed circuit board (12861211 Rev 5) and a new detent plunger (741-79378). The taller plunger and spring with more coils completed validation testing 4/24/06. The switch p/n was not changed, so it is unknown when switches with the new content were put into production or service.*

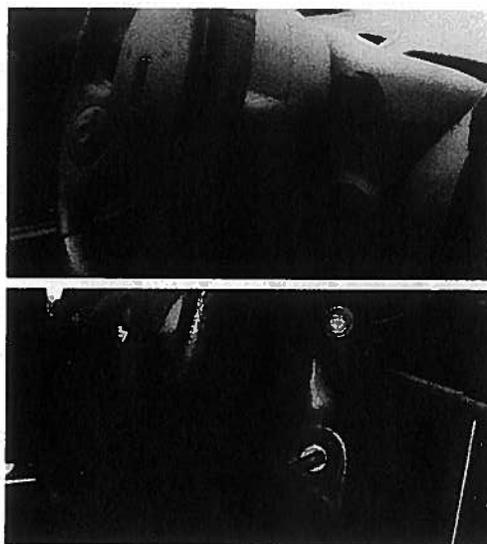
**The change to the plunger and spring was not confirmed until Delphi provided details with that information on 10/29/13*

Slot vs Hole Key Pictures





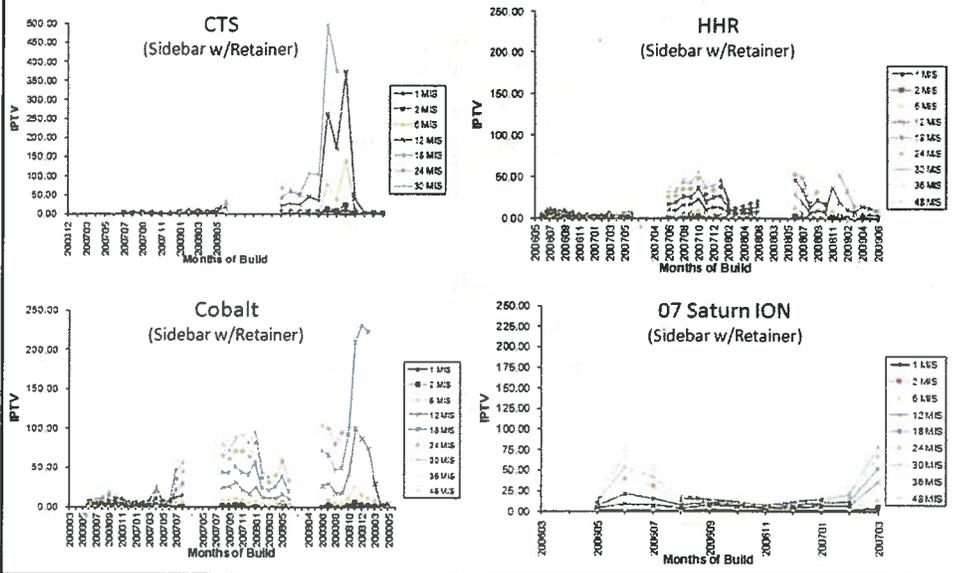
2003 Ion vs 2007 Cobalt



HHR Knee Clearance to Ignition (6'1" driver)

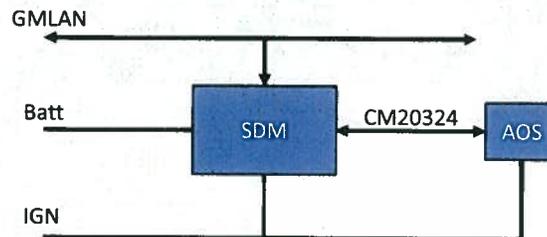


Ignition Cylinder Warranty (N100256)



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.



Vehicle Scrap Rates

AGE	TRUCKS (Full Size Trucks and Vans)	CARS (All others)
1	100%	100%
2	99%	99%
3	99%	99%
4	98%	97%
5	95%	95%
6	94%	93%
7	93%	92%
8	92%	91%
9	92%	89%
10	91%	85%
11	88%	82%
12	79%	76%

**data pulled by RL Polk in March 2012*