2005-7 Cobalt/G5

Team Members:

- Brian Stouffer PI - Team Leader
- Jeff Konchan, Bruce Jackson - Body
- Terry Connolly, John Zuzelski - Chassis
- Kristen Siemen, David Carey – Electrical Systems
- John Capp, Lisa Weber – Passive Safety Systems
- Dave Defrain, Brian Thompson – Electrical Controls
- Carmen Benavides, Doug Wachtel - PI
- Terry Woychowski – VP Global Prod Development

2005-7 Cobalt/G5

Project Statement:

A review of selected GMX001 field events shows a voltage drop out to the SDM has occurred under certain conditions. The condition appears to be limited to 2005-07 MY vehicles (1 report on 2008). The noted field events involve vehicles going off the road and/or hitting smaller objects shortly before a significant impact.
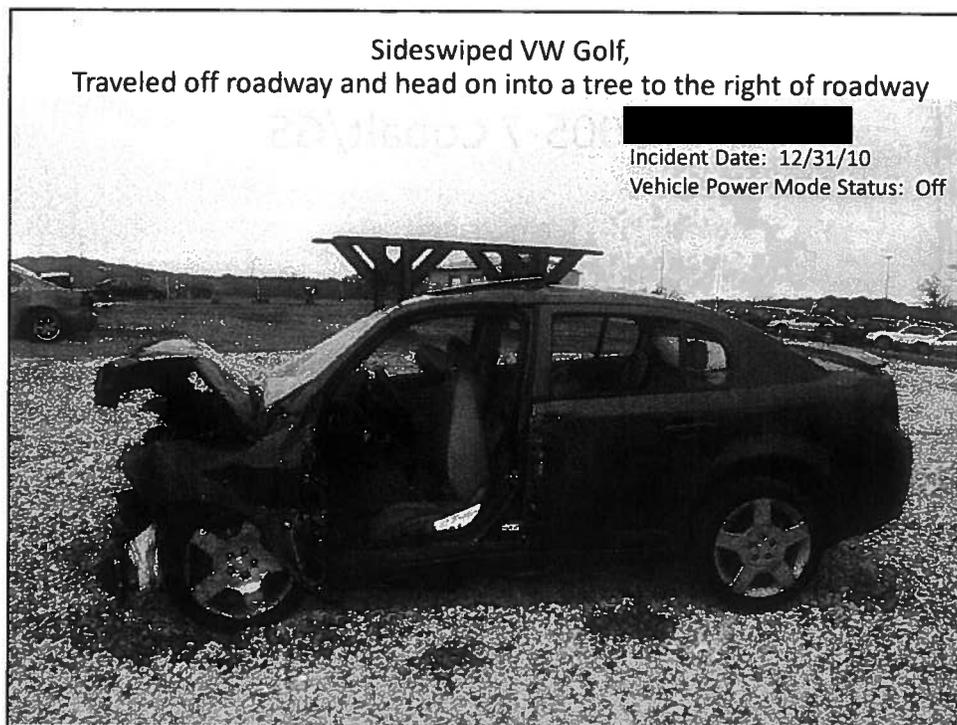
Initial Questions:

- Why no incidents on Ion or HHR?
- Why limited or no incidents on 2008/09/10 Cobalt?

Objectives:
- Determine:
  - the technical root cause of the issue
  - vehicle operating conditions that can cause voltage dropout

Develop countermeasure alternatives once the technical root cause has been developed

Sideswiped VW Golf,
Traveled off roadway and head on into a tree to the right of roadway

Incident Date: 12/31/10
Vehicle Power Mode Status: Off

2005-7 Cobalt/G5

Refine the statements of fact:

- What additional clues are in EDR data?
- Generate clues from post crash inspections (is there any indication of key/ignition cylinder position after crash)
- What are switch detent requirements?
- When did key p/n change from a slot to a hole? (Aug 2009)
- List of changes in system (column, key, switch, SDM, sensing , architecture, etc.) between 2007 and 2008 Cobalt
  - Switch went from Passlock-3 to Passkey theft prevention
- What makes the 2005-7 Ion and 2006-7 HHR different than Cobalt?
  - Ion is Class 2 architecture vs GM LAN on Cobalt
    - Both disable SDM with key off, but Cobalt will store ignition state while Ion will not.
  - Ion has different SDM and supplier than Cobalt

2005-7 Cobalt/G5

Potential evaluation techniques:

- Evaluate a car on the 4 Post test
  - What to include on key ring?
- Evaluate an instrumented car driven off-road
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2005-7 Cobalt/G5

Potential countermeasures:

- Change switch to increase detent forces
- Change keys to only use centered hole
- Keep BCM / SDM powered after key – off
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Backup

#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 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, 13mm (0.5 in) design. This will result in the keys not hanging as low as in the past.

GMX001 Airbag Local Area Network (LAN)
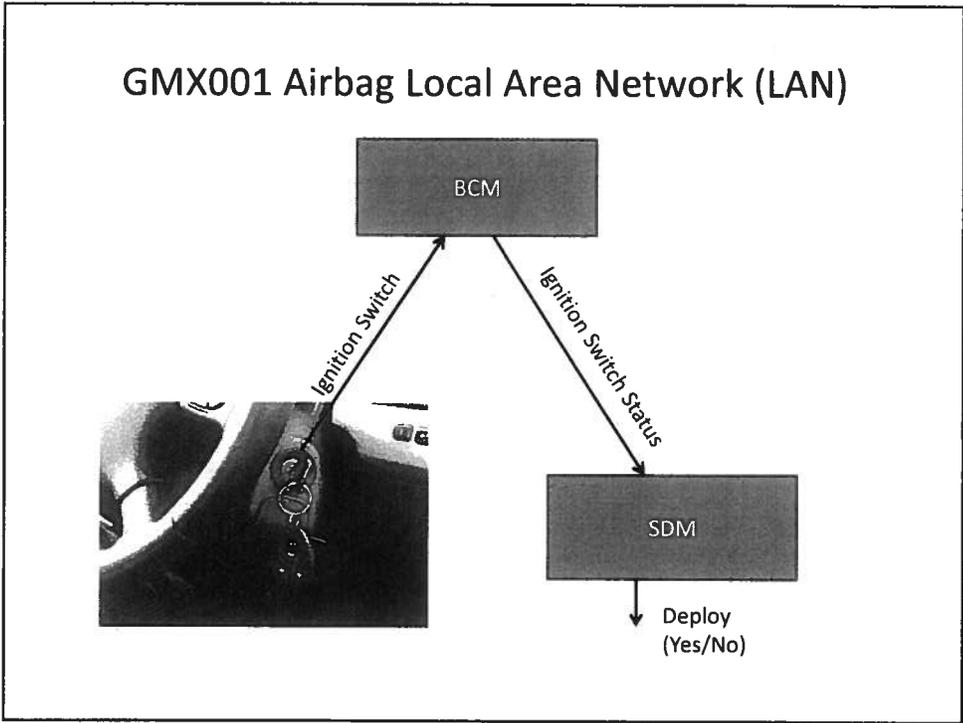
2005-7 Cobalt/G5 Potential Non-Deployments (Ignition Switch)

US (Cobalt & G5)

18 incidents/6 yrs avg exposure or 3 incidents/year
18 incidents/617,832 vehicles/6 yrs avg exposure = 0.049 incidents/10,000 vehicles
2000 C/K rate is 3.2 times higher

TREAD Search as of 3/7/12: 57 alleged non-deploy cases (2 indicate fatality) do not have sufficient data to exclude them.

NOTE: FPA has one case for 2008

2005	2006	2007	Total
140,464	229,231	248,137	617,832

US/Canada/Mexico Sales (Cobalt, G5 & Pursuit)

2005	2006	2007	Total
173,450	287,400	317,712	778,562

Cobalt Ignition System Changes

Ignition Switch

P/N	Initiated	EWO#	Work Order #	Effective Point	Title	Reason (from EWO)
	28-Feb-02		32842		GMX001 Program-DLIS Ignition Switch	Tooling Capacity Increase (Cancelled since costs were captured in another EWO)
12450250	9-Jan-03	APVSR	126797	2005 SOP	GMX001 - DLIS Ignition Switch	GMX001 - Beta Integration Vehicle Builds (Release parts for production)
	23-May-03	AWKAL	188160		GMX001 - DLIS Ignition Switch	Delete following parts from GMX 001 BOM: Ignition Switch and Two Fastners (12450250)
10392423	19-Feb-04	BGDMG	302726	2004/ 2005 Urgent	GMX357 - DLIS Ignition Switch	Intermittent No Starts; Release modified ignition switch design P/N 10392423 for production to improve switch performance at cold temps. New grease; lower contact force; new PCB - FR4 Board
						When the vehicle goes into "crank", the ignition switch sends a "signal to the BCM and the ECM/PCM. Both modules must decode the signal within 10 ms of each other. When that happens, both modules agree that it's a "good signal" and will start the engine. In cold conditions, the grease inside the original ignition switch caused the "bounce time" to exceed 10 ms and prevent an engine start. A change to a new grease with, a lower viscosity below -20C, was implemented to address the issue of intermittent no starts.
	19-Feb-04	BFYLM	302729		GMT191 MY05 and GMT191/192 MYD6 software release	Revised BCM software for GMT191/192 (Not directly related, appears to be a typo on Work Order 333314)
10392423	19-Apr-04	BJDTSA	333314	2005 ASAP	GMX001-Steering Column Ignition Switch	Revised Ignition Switch (Refer to PWO 302729-BGDMG) Intermittent No Starts; Release modified ignition switch design P/N 10392423 for production to improve switch performance at cold temps. New grease; lower contact force; new PCB - FR4 Board
10392423	12-Oct-04	BRLLD	414057	2005 ASAP	GMX001 Steering Column - Correct POA Content	Early Hex-Chrome free 06MY release created some confusion, that led to mistakes in the 05MY POA content; this WO is to fix those mistakes
						The Cobalt went into production with an ignition switch that was based on the Saturn Ion switch. That switch used a Passlock-3 theft prevention system. For the 2008 MY the Cobalt changed to a "Passkey" system. The "Passkey" system used "rolling codes" for the anti-theft system. Changing to the Pass key system resulted in changing to a fixed resistor value for the ignition switch. As a result, ignition switch changed part numbers for 2008 MY.
15886190	12-Oct-05	CFAMG	573556	2008 SOP	GMX001/GMX020/023 and GMT001 - Release DLIS Ignition Switch for 08 MY	Revise crank circuit resistor value to 1.3 kohm; 1%; 1/4 Watt. Updated PCB artwork. (-Revise OFF/RUN/CRANK circuit to include 1.3 kohm; 1% Tolerance; 1/4 Watt -revise art work on PCB i.e. move VIAs, increase trace width.)
	30-Aug-06	CHCMA	700257	2008 SOP	GMX001 -08,09MY Electric Power Steering Column Changes	Covers 3 design changes: 1. 08 MY 09 MY GMX001 steering column use GMT001 Jacket 2. Update GPDS for 2008,2009 GMX001 Steering Column 3. Release ignition switch for initial production of 08MY GMX001 (per WO 573556)
	14-Sep-06		705982	2008 SOP	GMX 001 - Release DLIS Ignition Switch for 08 MY	This work order is to release the ignition switch for initial production for 2008 GMX001 program. -Revise crank circuit resistor value to 1.3 kohm; 1%; 1/4 watt. -Updated PCB art work
	18-Jan-07	CVJYY	752787		GMX001 - HPVO Turbo EPS Column design changes	1. Carry over from 08MY base GMX001 steering column 2. Ignition switch carry over from 08 MY base GMX001 steering column (refer to original WO573556)

P/N	EWO
10392423 2005 MY	
10392423 2006 MY	
10392423 2007 MY	
15886190 2008 MY	per EWO CFAMG
2009 MY	
2010 MY	

Field Incident Summary from SDM Download

- 8 in Accessory
- 2 in "Run" showed that algorithm was disabled when Conti downloaded the EEPROM and looked at all of the data in the SDM.