Hyundai and Kia Crash Data, the Indispensable Compendium

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The Event Data Recorder (EDR) data retrieval tool built by Global Information Technology (GIT) which provides access to data stored in Hyundai and Kia vehicles was first offered for sale in 2012 such that vehicles sold by those manufacturers in the United States after September 2012 would be in compliance with 49CFR563. [1] [2] The basic history of the GIT system, 49CFR563 and the basics related to the Tool are found in "Hyundai and Kia Crash Data, a Preliminary Overview" from Collision Volume 8, Issue 1 included by reference here. [3]

This Compendium is a follow up to the earlier published preliminary review and is the product of a review and examination of crash test data, "real world" crashes, hands-on experiments and analysis of retrieved data. It is separated into five sub-sections:

1. General Functionality of the Hyundai and Kia EDR Tool(s)
2. A Review of Crash Testing involving Hyundai and Kia Vehicles
3. A Review of Hyundai and Kia Crash Data from "Real World" Crashes
4. Coverage Spoofing; Data from Unsupported Hyundai and Kia Vehicles
5. Compendium Conclusions and Summary

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The first section, *"General Functionality of the Hyundai and Kia EDR Tool(s),"* is an examination of the installation and operation of the EDR tool and a limited look at its application. Observations related to potential installation considerations (i.e.: folder or directory choices which might be made during the initial installation process) are addressed. The operation of the Tool as it relates to how connection is made and other aspects of the hands-on use of the Tool are examined as the basis for other activity discussed in later sections of the Compendium such as the "coverage spoofing" section.

This sub-section also offers a general look at the basic report layout for Hyundai and Kia EDR reports and what one might expect to find within the various sections of those reports including the section contents and layout of the hexadecimal data as presented.

In *"Crash Testing involving Hyundai and Kia Vehicles,"* the authors examine a set of crash tests conducted by the Insurance Institute for Highway Safety (IIHS) involving Hyundai and Kia vehicles and compare the data retrieved from the Airbag Control Units (ACUs) to observations and instrumentation from those tests. An associated review of some of that data is also found in the paper "Analysis of Event Data Recorder Delta-V Recording in the IIHS Small Overlap Crash Test" found in this issue of Collision and particularly that information related to Hyundai and Kia vehicles involved in those tests is included by reference here.

The sub-section *"Hyundai and Kia Crash Data from 'Real World' Crashes"* is a look at data retrieved from a small group of those vehicles accessible using the GIT/Hyundai-Kia EDR Tool(s) involved in "real world" crashes and, particularly taken in light of the data retrieved and analyzed from the IIHS tests, it offers a look at some of the EDR data in a setting other than a crash test.

Referring, in part, back to the section on functionality, the authors examine the potential for retrieving data from unsupported Hyundai an Kia vehicles in the sub-section *"Coverage Spoofing; Data from Unsupported Hyundai and Kia Vehicles."* The authors examine the potential process and variations on that process and illustrate the possible dangers of this approach to data retrieval.

In the previously published "Hyundai and Kia Crash Data, a Preliminary Overview," the authors briefly discussed what is otherwise identified as "VIN spoofing" (using Bosch CDR Tool related terminology as a frame of reference) and suggested then that there had been some "success," limited to the notion that "data has been retrieved," not that it has been successfully translated accurately. This section looks at that investigation and experimentation in more detail including some analysis of the issues arising from this otherwise ill-advised

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practice at least in part in an effort to be able to potentially identify when it is undertaken later with unanticipated results.

The last section of the Compendium is the *"Conclusions and Summary"* in which the authors have made an effort to further connect the other sub-sections and associated observations. Without a doubt, the Hyundai-Kia EDR Tool(s) is a developing and evolving system which will undergo changes in the coming months and years as a function of this and other research. As there have already been changes to, for example the Data Limitations text found in the reports for the Hyundai and Kia EDR reports since publication of the preliminary review, one might reasonably anticipate that other changes or modifications might be made later in the functionality, operation and/or output in the GIT EDR Tool which may make part(s) of this compendium obsolete or at least "dated."

Again using a comparison to (and with a "tip of the hat" to) the Bosch CDR Tool, the end users of the information found in this Compendium are urged to use the latest production release of the GIT EDR Tool software appropriately as indicated in the instructions which come with the relevant system when retrieving data from Hyundai or Kia vehicles. The authors believe that this Compendium will further illustrate what is the best way to ensure that retrieved data has been translated using the most current information provided by these manufacturers.

Editors Note:

In Volume 8, Issue 1 of Collision, in "Hyundai and Kia Crash Data, a Preliminary Overview," the authors of this Compendium provided a "first look" at crash data newly available from Event Data Recorder (EDR) systems found in Hyundai and Kia vehicles retrievable using what will be referred to here as the Hyundai-Kia EDR Tool(s). The Compendium in this issue is the first-of-its-kind published in-depth review of several important aspects of EDR data available from Hyundai and Kia vehicles and a follow-up on that early, preliminary review. Some of the crash test data initially evaluated and discussed briefly in that earlier review is also discussed in more depth in "Analysis of Event Data Recorder Delta-V Recording in the IIHS Small Overlap Crash Test" in this issue of Collision.

We are often asked about "peer review" of Collision articles. While that topic has been addressed time and again in Collision, for this Compendium, each of the sub-sections has been written and reviewed by individuals who have actually used the Hyundai and/or Kia EDR Tool and who have reviewed and compared the retrieved data to other sources of crash data or information. The best information we have been able to develop is that less than 50 Hyundai and Kia EDR Tools have been sold commercially within North America which makes it far less likely that, for example, some later published paper would be able to assert that same claim in the context of finding an individual with experience with the system to review the text.

During the preparation and research for this article, the authors reached out to Hyundai Motor America (Hyundai), Kia Motors Corporation (Kia) and Global Information Technology (GIT, the manufacturer of the Hyundai and Kia EDR Tool(s)). Hyundai responded that they were interested in the EDR test set up "status" and were looking for information on what kind of test was performed and how the testing was done as well as data on the differences between the data extracted using EDR tool and the ACU internal data. Despite follow up calls and emails from the authors offering the available information, no further communication has been had between the authors and any of those entities nor did they participate in the preparation of this Compendium.

For readers who might be familiar with the operation and use of the Bosch CDR Tool, many of the Hyundai-Kia EDR Tool concepts discussed in the Compendium may be easily compared to those concepts or applications associated with the CDR Tool….whether "good" or "bad." Bosch is the manufacturer of the longest standing EDR data retrieval tool, no one from Bosch was involved in the research for or preparation of this Compendium. The Bosch CDR Tool has been in existence as the Vetronix then later the Bosch CDR Tool for nearly 14 years at this writing and the experience gained by the authors in the use of that tool over that same period in a variety of settings has been applied during the development of the Compendium. Undeniably, many of the readers of Collision will have personal experience with the use and application of the Bosch CDR Tool and, for that reason, some references have been made to the Bosch tool not so much as a "comparison," but rather to offer a frame of reference.

For a more detailed and comprehensive look at data from these "EDR Tools," the authors will be presenting on this article and potential developments in the meantime at the ***CDR User's Summit in Houston, TX in January, 2014*** and that presentation might be later referenced for updates to this text as necessary.