

# REVIEW OF VEHICLE EMERGENCY RESPONSE GUIDANCE

R. Swaim, HowItBroke.com, 20221116

## OBSERVATIONS:

1. Vehicle manufacturers are not required to provide emergency response guides, beyond general requirements of the New Car Assessment Program (NCAP) program sub-parts (49 CFR Part 575.301, Part 575.302, Part 575.401, USC 1232, etc.)

- 1A. NTSB Safety Recommendation H-20-30 stated:

To the National Highway Traffic Safety Administration:

When determining a vehicle's US New Car Assessment Program score, factor in the availability of a manufacturer's emergency response guide and its adherence to International Organization for Standardization standard 17840 and SAE International recommended practice J2990. (H-20-30)

The Safety Board classified the NHTSA response unsatisfactory because NHTSA has chosen not to agree.

- 1A. Emergency response information continues to be very difficult to find, especially during an incident response when time is critical.
  - 1B. Tesla and Ford are examples that providing easily accessible links to emergency information is possible.
2. The NFPA provides a common location for collecting emergency response information. FEMA and other organizations refer to the NFPA web page, as do many but not all search engine links for manufacturer emergency guidance.
  - 2A. While an excellent resource, the privately funded web page is outdated due to the volume of, and continual change in, new vehicles. Many new vehicles are not included in the NFPA list.  
EXAMPLE: The most recent BMW links are from 2018.
3. Basic approaches regarding how to show emergency response information vary widely between manufacturers, and even large changes in approach exist within a manufacturer between years.  
EXAMPLE 1: The 2021 Ford Mach-E ERG is a variation that divides the typical single page ISO-17840 illustration across topics on 34 pages.  
EXAMPLE 2: The 2022 Ford F150 Lightning has a single page ISO-17840 illustration at the beginning of a similarly comprehensive 20 page guide.  
EXAMPLE 3: The 2022 Honda CR-V has a single page ISO-17840 illustration on page 42 of 44.  
EXAMPLE 4: Unique from other manufacturers and previous GM models, the Lyriq guide states that the 12V cables should not be cut unless needed for extrication.
4. Some manufacturers claim to be 17840 compliant, when they are quite unique.  
EXAMPLE: While the Nissan Leaf was originally introduced in 2010, emergency information for the 2022 continues to spread illustrations across a larger document, similar to the 2021 Ford Mach-E previously mentioned.

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5. Some European manufacturers have a 1-2 page rescue sheet with a separate large document for instructions, warnings, and cautions.
  - 5A. More than the rescue sheets, the separate documents can be very difficult to search for and find quickly. Broken hyperlinks are common. Searching through separate documents of up to 161 pages can be cumbersome and time consuming.
  - 5B. Emergency response information is typically not found on the more accessible manufacturer web pages.

EXAMPLE: BMW i4 emergency response information is on the BMW Aftersales Online System
  - 5B2. Once found, the separate documents may include info for ALL models and be vague, making them all but unusable in a crisis.

EXAMPLE 1: Mercedes is 161 pages

EXAMPLE 2: VW States: "Due to the large number of different battery types with their different accumulator technology, this guide cannot address the specific chemical components, and due to continuous improvement in hazards and possible behavior of all these batteries."
  - 5B3. The search function on manufacturer websites generally do not provide links to queries such as "Emergency response information"
6. Some manufacturers provide a QR code or other link to emergency response information.

EXAMPLE 1: Mercedes provides a QR code in the fuel filler or charging port door.

EXAMPLE 2: Iveco provides a QR code and telephone numbers on the most recent emergency response sheets.
7. Non-standardized use of descriptions, pictograms, and icons results in conflicts of key information.

EXAMPLE: PPE call-outs vary from none, to generically stating "*Wear appropriate protective equipment!*," to "*...use appropriate PPE,*" to "*SCBA required,*" to only posting an Injury Risk icon, to posting the Injury Risk icon plus a definition.

NOTE: Even the Injury Risk definition has variations.

EXAMPLE: VW ID.4 states "*Hazards to the human health*" while Cadillac Lyriq states "*Potential for eye, nose, and throat irritation with prolonged exposure.*" Neither call for SCBA
8. Ford and Hyundai/Kia call for removal of jewelry and other worn metal items. Most manufacturers have no instructions regarding potential personal short circuit hazards.
9. TOOLS AND EQUIPMENT

Some manufacturer emergency information is quite comprehensive and others are conspicuously blank.

  - 9A. The ISO 17840 standard does not require listing tools on emergency response sheets and most manufacturers do not or are minimal. A minority provide tool information separately,

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such as the separate and comprehensive 161 page document by Mercedes which even includes tape.

- 9B. Burning vehicles have ignited adjacent vehicles, which may be prevented by pulling one out of line, yet none of the emergency response guidance cites having chain available.
- 9C. A minority of guidance information cites the need to cool the battery, typically located on the bottom of the vehicle. Some guidance notes that vehicles should be lifted at specific jack points, typically in the tow section. The separate Mercedes emergency document shows how to lift the side of a vehicle to access the bottom for cooling the battery.
- 9D. The need for blocking wheels to prevent movement is cited in about half of the emergency guidance and should be in all.
- 9E. Manufacturers with an integrated ERG and sheet tend to provide a result, such as "always double cut negative cable" frequently with a tool description such as "hydraulic cutter." This is not standardized and a separate document may provide the result. Emergency response sheets typically just show the "FF Cut" icon. (Tesla has both on sheet)
- 9F. The lack of standardization for high voltage emergency disconnects requires tools in some vehicles and not others. The HV disconnects frequently can not be found without the aid of emergency response information.

### EXAMPLES:

#### 1. CUT LOOPS REQUIRING CABLE CUTTERS:

- 1A. In the front "frunk" compartment are cut loops in Tesla vehicles, Chevrolet Bolt, and others.
- 1B. The Chevrolet Volt hybrid has a firefighter loop in a trunk side panel.
- 1C. Some Mercedes sedans have a cut loop inside a removable panel in the left end of the instrument panel, concealed with fuses.

#### 2. TOGGLES:

- 2A. Chevrolet Tahoe hybrid requires removal of a panel in the right rear door, then pulling a toggle.
- 2B. The Toyota Highlander hybrid is similar but inside the left rear door.
- 2C. The Toyota Prius hybrid requires removal of an unmarked panel in the trunk to access a similar toggle.

#### 3. ROTATING DEVICES:

Ford Focus and Escapes required rear seat removal to access a rotating orange knob.

#### 4. FLAGGED FUSES:

Early SmartCar EVs were an example of an orange tape marker on removable fuse under the left instrument panel to disable the HV circuit. The location is not marked on the emergency response sheet.

#### 5. UNMARKED HV DISCONNECTS:

Ford and Polestar have no firefighter cut-loops marked with the helmet emblem. Instead, each has inconspicuous sliding plastic "maintenance disconnects" under a plastic front cowl panel.

- 6. Most but not all bus and truck HV disconnects are well marked both in documentation and on the vehicles.

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9G. Access to secondary disconnects may be required when an accident prevents access to the initial or forward locations. Secondary HV disconnects are even more difficult to find without the aid of emergency response information.

EXAMPLE 1: Some Model S Teslas require cutting a rear door frame with a circular saw to a specified depth.

EXAMPLE 2: The Rivian pickup truck calls for cutting the roof column to the right side of the rear window with a hydraulic cutter.

EXAMPLE 3: The VW ID.4 secondary cut loop access requires removal of a tail light.

EXAMPLE 4: The Polestar has a second removable “maintenance” fuse plug in the right rear floor panel. The Chevrolet Volt has a second removable “maintenance” fuse plug to remove which is concealed within the center arm rest. The Chevrolet Bolt has a second removable “maintenance” fuse plug beneath the rear seat.

10. Most manufacturers state nothing about placing vehicles in water for fire fighting. Tesla instructs to never intentionally submerge a vehicle, Others (ex: Honda, Kia, Hyundai) provide instructions on how to submerge either for extinguishing &/or de-energizing. All manufacturers provide guidance on recovery of vehicles from water if submerged.

11. The majority of emergency information explicitly states not to puncture the battery case or cut HV (orange) components. This is contrary to the intent of the penetrating tools, such as Rosenbauer, MURER, and Cobra Cold Cut.

11A. A minority cite the reason being risk of electrocution. Because arc flash events are explosive and have occurred when HV batteries have been damaged, emergency response sheets and guides should add this reason to not damage the battery case.<sup>1</sup>

12. None mention the use of whole vehicle bags or blankets.

13. Secondary fires have occurred on tow vehicles and operators have been injured. The potential for this is not included in emergency guidance information.

### SUGGESTED RECOMMENDATIONS:

1. Manufacturers should be asked for commitments to use ISO 17840 as the recognized format for emergency response information. This may be most effective through UNECE Global Technical Regulation (GTR) Number 20.
2. The ISO 17840 guidance committee should use the results of this review to better standardize the format of emergency response information.
3. A Government web page should be established to host emergency response information, similar to finding recall information through NHTSA SAFERCAR.GOV.

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<sup>1</sup> Example: Fort Lauderdale, FL, May 8, 2018, NTSB HWY18FH013

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Unless or until the Government provides such a collective web page, an industry webpage should be established and funded.

4. Emergency response information for each make and model should be self-contained and not need to be found in a separate collection of data amongst other vehicles.
5. Emergency response guidance should include suggested basic tool and equipment to have available. This includes blocks to prevent movement of a vehicle and the need to lift to cool a battery if located on the bottom.
6. All emergency information should state the reasons to not damage the HV battery, including the threats of electrocution and arc flash.
7. All vehicle manufacturer websites should make emergency response information accessible from the search function.
8. A QR Code or other link to emergency response information should be on each vehicle in a standardized location, such as corner of a window or fuel/charge port door.
9. Possibly co-located with the emergency QR code, vehicle fuel type should be in a standardized location on each vehicle, such as corner of a window or in the fuel/charge port door.
10. Tow instructions should warn of the possibility of secondary fires on tow vehicles and add guidance should an event occur.