***Working document for the IWG on EDR/DSSAD & SG-EDR. This document serves as a place holder for proposals under consideration as part of the ‘EDR Step 2’ workstream.***

Proposal by the Informal Working Group on EDR/DSSAD amending the 02 Series of Amendments to UN Regulation No. 160 introducing new requirements in line with the ‘Step 2’ workstream (Programme of Work ECE/TRANS/WP.29/2025/1 as revised).

In addition, editorial improvements are included applicable to previous Series of Amendments. In a later stage it will be identified which items will be introduced as a new Series of Amendment and which go into a Supplement to the existing and previous Series of Amendments.

The modifications to the text of the 02 Series of Amendments to UN Regulation No. 160 are marked in bold for new or strikethrough for deleted characters.

 I. Proposal

[Insert new *paragraph 2.x.*:

“**2.x. “*Rollover protection system*” means any protection system that protects occupants during a rollover, which is activated by a vehicle's crash sensing system;**”]

[Insert new *paragraphs 2.xx-zz*:

“**2.xx.** **“*Advanced emergency braking system*” means a system which can automatically detect an imminent forward collision and activate the vehicle braking system to decelerate the vehicle with the purpose of avoiding or mitigating a collision. The system may also be referred to as "Automatic emergency braking system" in other publications or countries.**

**2.yy. “*Trigger activated*” indicates the first trigger that was activated to cause the recording of the event.**

**2.zz. “*Vulnerable road user*” means a person using no vehicle, such as a pedestrian, or using a vehicle without protective occupant compartment, such as a pedal cyclist, micro-vehicle user or motorcyclist.**”]

[*Paragraph 5.3.1.*, amend to read:

“5.3.1. Conditions for triggering recording of data

 An event shall be recorded by the EDR if one of the [**~~following~~ threshold values mentioned under paragraphs 5.3.1.1. to 5.3.1.5**] is met or exceeded[, even if the end of event time of the previous [rollover] event has not been reached].

[**If a vehicle is not fitted with a system referred to in paragraphs 5.3.1.3. to 5.3.1.5., this document requires neither recording of data according to these paragraphs nor fitting of such systems.**]

[**If a locking trigger (i.e. any trigger listed in paragraph 5.3.2.) occurs in short succession after a non-locking trigger (i.e. any trigger not listed in paragraph 5.3.2.) and an overlap of data between both events would result, the non-locking trigger may be excluded.**]

5.3.1.1. Change in longitudinal vehicle velocity more than 8 km/h within a 150 ms or less interval.

5.3.1.2. Change in lateral vehicle velocity more than 8 km/h within a 150 ms or less interval

[*Paragraph 5.3.1.3.*, amend to read:

“5.3.1.3. Activation of Non-reversible occupant restraint system[**, including the rollover protection system**.”]

5.3.1.4. Activation of Vulnerable road user secondary safety system

[~~If a vehicle is not fitted with any Vulnerable Road User (VRU) secondary safety system, this document requires neither recording of data nor fitting of such systems. However, if the vehicle is fitted with such a system, then it is mandatory to record the event data following activation of this system.~~]

[**5.3.1.5. Emergency braking demand by the advanced emergency braking system in response to detecting the possibility of an imminent collision.**”]

[...]

5.3.3. Conditions for establishment of time zero

Time zero is established at the time when any of the following first occurs:

5.3.3.1. For systems with "wake-up" air bag control systems, the time at which the occupant restraint control algorithm is activated; or

5.3.3.2. For continuously running algorithms,

5.3.3.2.1. The first point in the interval where a longitudinal, cumulative delta-V of over 0.8 km/h is reached within a 20 ms time period; or

5.3.3.2.2. For vehicles that record "delta-V, lateral," the first point in the interval where a lateral, cumulative delta-V of over 0.8 km/h is reached within a 5 ms time period; or

5.3.3.3. Deployment of a non-reversible deployable restraint or activation of VRU secondary safety protection system.

[*Paragraph 5.3.3.4.*, amend to read:

“**5.3.3.4. Occurrence of the emergency braking demand trigger of the advanced emergency braking system.**”]

[*Paragraph 5.4.*, amend to read:

"5.4. Crash test performance and survivability

5.4.1. Each vehicle subject to the requirements of national or regional frontal crash test regulations, shall conform with the specifications in paragraph 5.4.3.

5.4.2. Each vehicle subject to the requirements of national or regional side impact crash test regulations shall conform with the specifications of paragraph 5.4.3.

5.4.3. The data elements required by paragraph 5.1, shall be recorded in the format specified by paragraph 5.2, exist at the completion of the crash test and the complete data recorded element shall read "yes" after the test. Elements that are not operating normally in braking, etc.) are not required to meet the accuracy or resolution requirements in these crash tests.
The data shall be retrievable even after an impact of a severity level set by UN Regulations Nos. ~~94, 95 or 137~~ **95 and either 94 or 137**.”]

[*Paragraph 6.1.*, amend to read:

6.1. The accuracy of the measurement of longitudinal and lateral acceleration data element shall be verified using a component test fixture that subjects the EDR/airbag control module acceleration sensors to a sinusoidal acceleration motion in accordance with the following:

“ +/- 2g ”]

*Paragraph x.x*, amend to read:

“x.x. …”

**Annex 4 - Data elements and format**

[*Add “AEB” to column ‘Event(s) recorded for’ for the following data elements:*

* *Speed, vehicle indicated*
* *Engine throttle, % full (or accelerator pedal, % full)*
* *Service brake, on/off*
* *Ignition cycle, crash*
* *Ignition cycle, download*
* *Safety belt status, driver*
* *Complete file recorded*
* *Engine rpm*
* *Anti-lock braking system activity*
* *Stability control*
* *Safety belt status, front passenger*
* *Safety belt status, rear passengers*
* *Tyre Pressure Monitoring System Warning Lamp Status*
* *Longitudinal acceleration (pre – crash)*
* *Lateral acceleration (pre – crash)*
* *Yaw Rate*
* *Advanced Emergency Braking System status*
* *Cruise Control System Status*
* *Adaptive Cruise Control Status (driving automation system level 1)*
* *Safety belt status mid- position front*
* *Lane departure warning system status*
* *Corrective steering function status*
* *Emergency steering function status*
* *Automatically commanded steering function category A status*
* *Automatically commanded steering function category B1 status*
* *Automatically commanded steering function category B2 status*
* *Automatically commanded steering function category C status*
* *Automatically commanded steering function category D status*
* *Automatically commanded steering function category E status*
* *Accident emergency call system status*]

[Replace “seconds” by “sec” and “degrees / second” by “deg/sec” for all data elements concerned.]

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Data element | Condition for requirement | Recording interval/time | Data sample rate | Minimum range | Accuracy | Resolution | Event(s) recorded for |
| Engine throttle, % full ~~(or accelerator pedal, % full)~~ | Mandatory | -5.0 to 0 sec | 2 | 0 to 100% | ±5% | 1% | PlanarRolloverVRU |
| **Accelerator pedal, % full** | **Mandatory** | **-5.0 to 0 sec** | **2** | **0 to 100%** | **±5%** | **1%** | **Planar****Rollover****VRU** |
| Service brake~~, on/off~~ | Mandatory | -5.0 to 0 sec | 2 | ~~On or Off~~**N/A** | ±5% | On**,** ~~or~~ Off | PlanarRolloverVRU |
| Safety belt status, driver  | Mandatory | -1.0 sec | N/A | ~~Fastened, not fastened~~**N/A** | N/A | Fastened, not fastened | Planar |
| Air bag warning lamp7~~,~~ | Mandatory | -1.0 sec | N/A | ~~On or Off~~**N/A** | N/A | On**,** ~~or~~ Off | Planar |
| Complete file recorded | Mandatory | Following other data | N/A | ~~Yes or No~~**N/A** | N/A | Yes**,** ~~or~~ No | Planar |
| Anti-lock braking system activity  | Mandatory | -5.0 to 0 sec | 2 | ~~Faulted, Non-Engaged, Engaged~~**N/A** | N/A | Faulted, Non-Engaged, Engaged | PlanarVRURollover |
| Stability control  | Mandatory | -5.0 to 0 sec | 2 | ~~Faulted, On, Off, Engaged~~ **N/A** | N/A | Faulted, On, Off, Engaged  | PlanarVRURollover |
| Safety belt status, front passenger9 | Mandatory | -1.0 sec | N/A | ~~Fastened, not fastened~~**N/A** | N/A | Fastened, not fastened | PlanarRollover |
| Passenger air bag suppression status, front9 | Mandatory | -1.0 sec | N/A | ~~Suppressed or not suppressed~~**N/A** | N/A | Suppressed**,** ~~or~~ not suppressed | Planar |
| Seat track position switch, foremost, status, driver | Mandatory if fitted and used for deployment decision | -1.0 sec | N/A | ~~Yes or No~~**N/A** | N/A | Yes**,** ~~or~~ No. | PlanarRollover |
| Seat track position switch, foremost, status, front passenger9 | Mandatory if fitted and used for deployment decision | -1.0 sec | N/A | ~~Yes or No~~**N/A** | N/A | Yes**,** ~~or~~ No. | PlanarRollover |
| Occupant size classification, driver  | If recorded | -1.0 sec | N/A | 5th percentile female or larger. | N/A | Yes**,** ~~or~~ No. | PlanarRollover |
| Occupant size classification, front passenger9 | If recorded | -1.0 sec | N/A | 6yr old HIII US ATD or Q6 ATD or smaller | N/A | Yes**,** ~~or~~ No. | PlanarRollover |
| Safety belt status, rear passengers15 | Mandatory | -1.0 sec | N/A | ~~Fastened, not fastened~~**N/A** | N/A | Fastened, not fastened | PlanarRollover |
| Yaw Rate13 | Mandatory | -5 to 0 seconds relative to time zero | 2 | -75 to +75 degrees / second | ± 10% of the full range of the sensor | 0.1 **deg/sec** | PlanarRollover |
| Traction Control Status | Mandatory if not fitted with Stability control  | -5.0 to 0 second relative to time zero | 10 | ~~Faulted, On, Off, Engaged~~ **N/A** | N/A | Faulted, On, Off, Engaged | PlanarRollover |
| Safety belt status mid-position front | Mandatory | -1.0 sec | N/A | ~~Fastened, not fastened~~**N/A** | N/A | Fastened, not fastened | PlanarRollover |
| [**Trigger activated** | **Mandatory** | **Event** | **N/A** | **N/A** | **N/A** | **Change in longitudinal velocity, Change in lateral velocity, Activation of non-reversible occupant restraint system, Activation of vulnerable road user secondary safety system, Advanced emergency braking demand for suspected vulnerable road user, Advanced emergency braking demand for suspected non-vulnerable road user (e.g. M- or N-category motor vehicle)**] | **All 5.3.1. triggers** |
| Engine rpm | Mandatory | -5.0 to 0 sec | 2 | 0 to [~~10,000~~**20,000**] rpm | ±100 rpm  | 100 rpm. | [~~Planar Rollover~~**All 5.3.1. triggers**] |
| … | … | … | … | … | … | … | … |

 II. Justification

1. *SG-EDR-42-08 rev*:

Paragraphs 2.x. and 5.3.1.3.: There had been discussions during type approval on whether a rollover protection system (ROPS) should be considered a Non-reversible occupant restraint system. A new definition is now added for a ROPS, combining the purpose of a ROPS (occupant protection during a rollover) and activation (taken from definition 2.27). To add the activation of a ROPS as a condition for triggering recording of data, it is simply included in 5.3.1.3.

1. *SG-EDR-42-07 (as revised during the SG-EDR-42 session)*:

Paragraph 5.4.: Different views had been addressed during type approval on which collision tests are required to be conducted for evidencing the crash test performance and survivability:

1. a side AND a full width frontal AND an offset front collision, or
2. a side OR a full width frontal OR an offset front collision, or
3. a side AND a frontal collision, being either full width OR offset.

From 5.4.1. and 5.4.2. it follows that c) is the correct interpretation. The proposed amendment aims clarifying this.

1. *SG-EDR-42-06*:

Paragraph 5.3: This proposal aims to achieve that any event based on locking triggers, i.e. those definitively indicating a collision, are always recorded (and subsequently locked) while events triggered shortly before, and therefore relating to the same real-world incidents, may be excluded, i.e. not recorded to non-volatile memory. This shall ensure that the most relevant record relating to a real-world incident (around the actual time of collision) is available and locked and that all data elements relevant for an actual collision are captured.

1. *SG-EDR-42-04*:

Paragraphs 2.xx.-zz, 5.3 and Annex 4. Table 1 (incl. data element Trigger activated): The aim of this proposal is to improve the capture rate of collisions which may be missed by the currently defined triggers, including but not limited to collisions with vulnerable road users, by using advanced emergency braking system interventions as a trigger criterion.

1. *EDR-DSSAD-IWG-27-25 and -26*:

Paragraph 5.3.1: This proposal aims to ensure that events are recorded based on other trigger conditions, even when the rollover algorithm is in operation. In some cases, triggers defined in Paragraphs 5.3.1.1 and 5.3.1.3 are not recorded if they occur before the rollover algorithm concludes. (Refer to document EDR-DSSAD-IWG-26-14.) The proposed modifications resolve the issue of unrecorded triggers, enabling verification of actual crash information.

Annex 4. Table 1, Data elements and format “Engine rpm”: The minimum range of Engine rpm was appropriately defined based on the characteristics of internal combustion engine vehicles. For electric vehicles, the Engine rpm data element is defined in Paragraph 2 to record the Motor rpm (the number of revolutions per minute of the output shaft of the device(s) supplying motive power). As motor output improves in electric vehicles, Motor rpm exceeds 10,000 rpm during high-speed driving. In some vehicle models, it is recorded at the upper limit of the minimum range, 10,000 rpm. Consequently, the minimum range should be expanded to accommodate the Motor rpm range of actual electric vehicles.

1. *EDR-DSSAD-IWG-27-17*:

Paragraph 6.1.: Although somehow derivable from the chart in paragraph 6.1.5., physical equation is missing units and can thus be mis-interpreted.

(This applies to the 02 Series of Amendments only).

1. *EDR-DSSAD-IWG-27-09*:

Annex 4. Table 1: editorial corrections only.

(All other amendments from this document are still under consideration).

1. *EDR-DSSAD-IWG-27-20*:

Annex 4. Table 1: editorial amendments and corrections only.

(All other amendments from this document are still under consideration).

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