Transmitted by the expert from Japan

Informal document **GRSP-50-12**
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agenda item 19(h))

Proposal for amendments to
R12 (Protection of drivers against the steering mechanism in the event of impact),
R94 (Protection of occupants against frontal collision) and
R95 (Protection of occupants against lateral collision)

(Electric Safety)

Note: The modifications to the original text are marked in bold for new or strikethrough for deleted characters

I. Proposal

Proposal A: R12
Paragraph5.5.1., amend to read:

5.5.1. Protection against electrical shock

After the impact at least one of the four criteria specified in paragraphs 5.5.1.1. to 5.5.1.4.2. shall be met.

If the vehicle has an automatic disconnect function or device(s) that galvanically divide the electrical power train circuit during driving condition, at least one of the following criteria shall apply to the disconnected circuit or to each divided circuit individually after the disconnect function is activated.

However criteria defined in 5.5.1.4. shall not apply if more than a single potential of a part of the high voltage bus is not protected under the conditions of protection IPXXB.

In the case that the test is performed under the condition that part(s) of the high voltage system are not energized, the protection against electrical shock shall be proved by either paragraph 5.5.1.3. or paragraph 5.5.1.4. for the relevant part(s)~~.~~ **, excluding the coupling system for charging the RESS which is galvanically separated from high voltage bus during driving condition.**

Proposal B: R94
Paragraph5.2.8.1., amend to read:

5.2.8.1. Protection against electrical shock

After the impact at least one of the four criteria specified in paragraph 5.2.8.1.1. through paragraph 5.2.8.1.4.2. shall be met.

If the vehicle has an automatic disconnect function, or device(s) that galvanically divide the electric power train circuit during driving condition, at

least one of the following criteria shall apply to the disconnected circuit or to each divided circuit individually after the disconnect function is activated.

However criteria defined in 5.2.8.1.4. shall not apply if more than a single potential of a part of the high voltage bus is not protected under the conditions of protection IPXXB.

In the case that the test is performed under the condition that part(s) of the high voltage system are not energized, the protection against electrical shock shall be proved by either paragraph 5.2.8.1.3. or paragraph 5.2.8.1.4. for the relevant part(s)~~.~~**, excluding the coupling system for charging the RESS which is galvanically separated from high voltage bus during driving condition.**

Proposal C: R95

Paragraph5.3.6.1., amend to read:

5.3.6.1. Protection against electrical shock

After the impact at least one of the four criteria specified in paragraph 5.3.6.1.1. through paragraph 5.3.6.1.4.2. shall be met.

If the vehicle has an automatic disconnect function, or device(s) that galvanically divide the electric power train circuit during driving condition, at least one of the following criteria shall apply to the disconnected circuit or to each divided circuit individually after the disconnect function is activated.

However criteria defined in 5.3.6.1.4. shall not apply if more than a single potential of a part of the high voltage bus is not protected under the conditions of protection IPXXB.

In the case that the test is performed under the condition that part(s) of the high voltage system are not energized, the protection against electrical shock shall be proved by either 5.3.6.1.3. or 5.3.6.1.4. for the relevant part(s)~~.~~ **, excluding the coupling system for charging the RESS which is galvanically separated from high voltage bus during driving condition.**

II. Justification

In the following cases, for example, the test would be performed under the condition that part(s) of the high voltage system are not energized:

1. Cases where the high voltage system installed on the vehicle is not energized when the vehicle is not running or when the internal combustion engine or fuel cell is not being operated, etc.

2. Cases of the coupling system for charging the RESS which is galvanically connected to the power train circuit only during charging and is galvanically separated from it when the vehicle is running.

Regarding the cases in 1, since the relevant part(s) are designed to be energized at high voltage during the vehicle operation but are not energized at high voltage during testing, it is not appropriate to prove the protection against electrical shock by absence of high voltage or low electrical energy. For this reason, we consider it appropriate to prove it by physical protection or isolation resistance.

On the other hand, for the cases in 2, normally the relevant part(s) are not energized at high voltage even during the vehicle operation. Therefore, if the absence of high voltage requirement or the low electrical energy requirement is satisfied after testing, it can be deemed to satisfy the requirement on protection against electrical shock in the same way as the physical protection or isolation resistance provisions are met.

However, the current language can be interpreted incorrectly that, even in the cases in 2, the protection against electrical shock is to be proved only by physical protection or isolation resistance. We propose to make these changes to clarify the requirements to be used to prove the protection against electrical shock.