Submitted by the experts from Japan

Informal document **GRSP-61-04**
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UN Regulation (UNR) for Hydrogen-Fuelled Vehicles of Categories L1, L2, L3, L4 and L5

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Overview

- Background
- Outline of the UNR
- Hydrogen container
- Direction of hydrogen discharge upon TPRD activation
- Protection of the container in the vehicle
- Strength of the attachment of the container
- Timeline

Background

- Not possible to obtain mutually-recognized international type approvals for hydrogen-fuelled motorcycles due to the absence of international regulations

  ⇒ Japan to propose a new international regulation based on UNR134 and Japanese regulations

regulation		Four wheelers	Motorcycles
International	Hydrogen safety	GTR13 and UNR134	Not yet
	Electric safety	UNR100 (and EVS GTR)	UNR136
Japanese	Hydrogen safety	Adopted GTR13 and UNR134	・Vehicle part: established in February, 2016
			・Hydrogen storage system part: Under construction
	Electric safety	Adopted UNR100	Adopted UNR136

Outline of the UNR

- Scope
  - Two- and three-wheelers (L1, L2, L3, L4 & L5) with the compressed gaseous hydrogen system
- Regulation number to differ from UNR134.
- To be based on UNR134 and contain the following items including the requirements unique to motorcycles:

PART 1: Hydrogen storage system
- Type of container*1
- Maximum water capacity*1
- Performance requirements

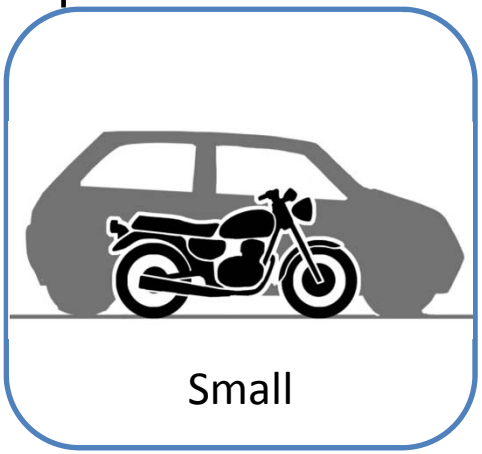
PART 2: Specific components
- Performance requirements

*1 Newly added items with requirements unique to motorcycles

PART 3: Vehicle fuel system
- Fuelling receptacle
- Over-pressure protection
- Hydrogen discharge systems (Direction*1)
- Purge
- Protection against flammable conditions
- Fuel system leakage
- Tell-tale signal warning
- Installation of the hydrogen container on-board a vehicle*1

Outline of the UNR

- Issues related to the requirements unique to motorcycles:
  - Small vehicle and small container(s)
  - Turnover
  - Sitting astride, etc.
- Appropriate requirements below for motorcycles to be established in place of the post-crash safety requirements for four-wheelers.
  - Acceleration test for the strength of the attachment of the container
  - The requirements regarding abrasion-avoidance and vehicle body performance


Small


Turnover


Sitting astride

Hydrogen container

- Maximum capacity: ≤ 23L (paragraph 5)
  - Specified, with the size of small garage for motorcycle taken into account, so that the internal hydrogen concentration will be ≤ 1%

    (Small garage size: 2.2m × 0.9m × 1.8m = 3.56 m^3)

- Hydrogen container: Metal liner (Paragraph 2.4)
  - Fully-wrapped metallic liner container
  - Specified in view of the hydrogen fuelling technology so that the temperature inside the container can be kept at ≤ 85°C at the time of fuelling (this is not achievable with plastic liner containers).

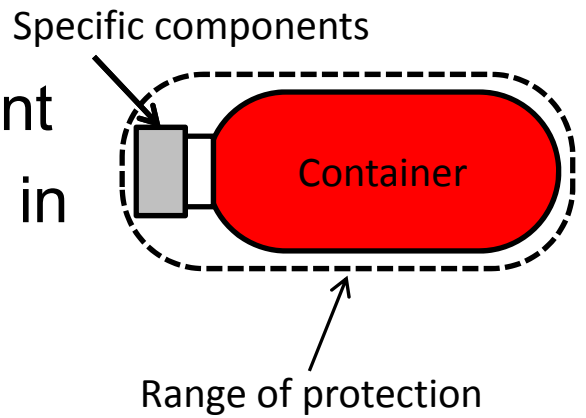
Direction of hydrogen discharge upon TPRD activation

- Specified so that people around can identify the direction of hydrogen discharge upon activation of the thermally-activated pressure relief device (TPRD) even when the motorcycle is overturned.
  - The direction of hydrogen discharge upon activation of TPRD shall be “vertically downward from the bottom of the vehicle body”. (Paragraph 7.1.3.1.)

* Any other requirements for TPRD are the same as UNR134.

Protection of the container in the vehicle

- To prevent local serious damage to the surface of the container in order to avoid its rupture:
  - (1) Abrasion-avoidance requirement
    - ➢ “The container, etc. shall not come in direct contact with the road surface in the event of turnover, etc.” (Paragraph 7.2.2.1.)
  - (2) Vehicle body performance requirement
    - ➢ “The container, etc. shall not come in direct contact with other parts, etc. (except protective part(s)) in the event of collision or vehicle crush, etc.” (Paragraph 7.2.2.2.)

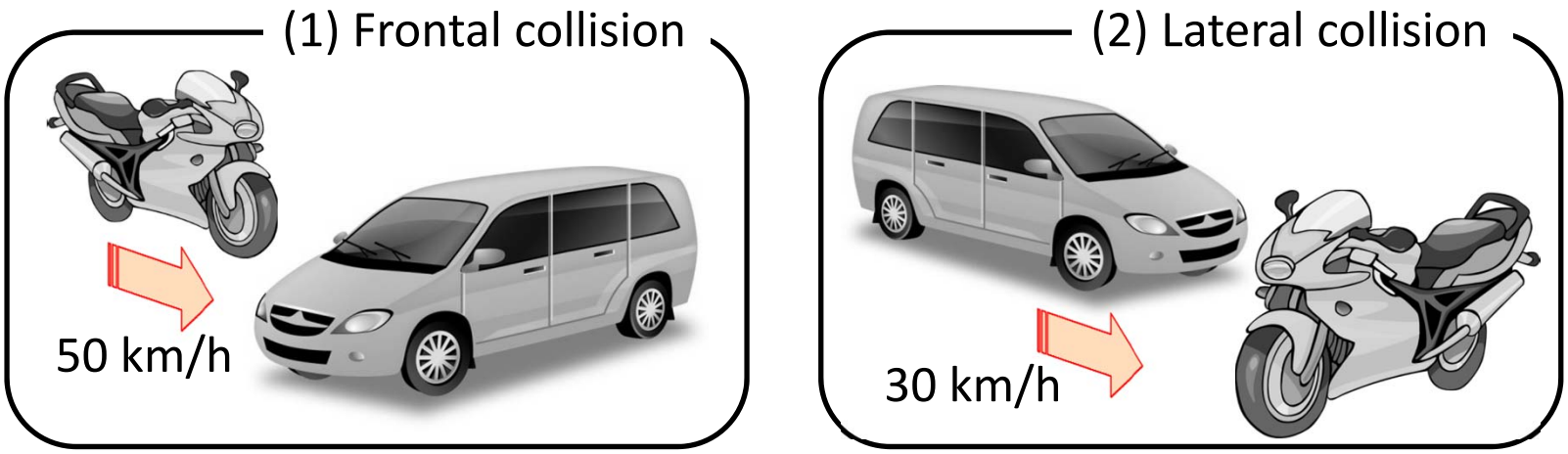


Strength of the attachment of the container

- Necessary to ensure the safety of the container by preventing it from detaching from the vehicle in the event of an accident.
  - The strength of the attachment of the container shall be verified by an acceleration test. (paragraph 7.2)

    (1) Acceleration in the direction of travel: 43.5 G

    (2) Acceleration horizontally perpendicular to the direction of travel: 63 G
  - The container shall remain attached to the vehicle at a minimum of one point after the test.



* Accelerations measured using the speeds determined based on accident data

Timeline

- May 2017
  - Draft UNR as informal document to 61st GRSP. If necessary, a TF meeting shall be held.
- December 2017
  - If there are no objections or substantive changes, Japan will send the Draft UNR as a “working document” to the 62nd GRSP and an agreement will be reached.
- June 2018
  - If there are no objections or substantive changes, WP.29 will vote on the UNR.

Thank you for your attention.