Korea Opinion on UN R127 Amendment Proposal (GRSP-2020-09e)

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Introduction

- UN R127 amendment proposal has been submitted by EC for 67th GRSP meeting (GRSP-2020-09e)
- The amendment proposal is mainly about the extension of head test area and may influence GTR No.9 amendment in the future
- Republic of Korea would like to share an opinion on the amendment contents with simulation research results regarding the head test area extension
Background

- KNCAP needs to consider the current traffic accident status and safety demand (Pedestrians → Vulnerable Road Users)
- Approach: extension of headform test area → Study(from 2018)

Fatality Trend in Korea

- Fatalities (overall): 24% decreased (2010 → 2017)
- Fatalities from cyclists: 10.8% decreased (2010 → 2017)
- Ratio of cyclist fatalities: 5.4% → 6.3% increased (2010 → 2017)

Accident analysis:
- mostly side impact cases (81.7%)
- mostly passenger vehicles (93%)
- many cases in junction area (60%)

*Kyeonggi province, n=500, 2014~2018

(KoROAD, Traffic Accident Statistics Report)
# Car-to-Cyclist Crash Simulation

## Simulation scenarios

<table>
<thead>
<tr>
<th>Vehicle</th>
<th>Rider</th>
<th>Impact Condition</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small-sized Sedan</td>
<td>50% M</td>
<td>Center &amp; Perpendicular&lt;br&gt;(vehicle speed: 40km/h, bicycle speed: 15km/h)</td>
<td></td>
</tr>
<tr>
<td>Mid-sized Sedan</td>
<td></td>
<td>Outmost &amp; Perpendicular&lt;br&gt;(vehicle speed: 40km/h, bicycle speed: 15km/h)</td>
<td>Pedal position: UP</td>
</tr>
<tr>
<td>SUV</td>
<td>95% M</td>
<td>Oblique(15 degrees)&lt;br&gt;(vehicle speed: 25km/h, bicycle speed: 15km/h)</td>
<td></td>
</tr>
</tbody>
</table>
Car-to-Cyclist Crash Simulation

- **KATRI simulation (2018)**
  - rider: Madymo 50%M, 95%M
  - vehicle: open source models
  - head impact position
    - sedan → WAD 2104~2427
    - SUV → WAD 1641~1784

- **Manufacturers simulation (2019)**
  - rider: Hybrid-3 50%M, 95%M
  - vehicle: real car models in the market
  - head impact position
    - sedan → WAD 2020~2550
    - SUV → WAD 1753~2250
Case - vehicle height and head impact position

- SUV 1 (BLE height: 1068 mm) by KATRI
  - vehicle: open source model
  - head impact location: WAD 1641~1784

- SUV 2 (BLE height: 1073 mm) by OEM
  - vehicle: real car model in the market
  - head impact location: WAD 1753~1910
Correlation – vehicle height and head impact position

- BLE height change
  825 mm
  +25 mm increase
  1125 mm

- Head impact position (in WAD)

* H-point height (cyclist): 1035 (±10) mm

Observed result
- In case the BLE height is higher than the H-point height of the cyclist, the head impact point location (WAD) seems unchanged and below WAD 2100
Opinion

- Rear extension boundary (WAD 2500) in UN R127 amendment proposal (GRSP-2020-09e) is an appropriate level.

- However, based on the simulation result, head impact positions of cyclists beyond WAD 2100 are unlikely to occur in case of vehicles with high front design like large SUVs.

- Republic of Korea would like to propose WAD 2100 (current limit) as the rear extension boundary in case that the vehicle has a higher BLE height than [1035 mm].
  - proposal: GRSP-2020-9e + additional provision for exception
  - other parameters and standards are considerable instead of BLE height (@CTR) and the square value.