Information of Korea Cases on Vehicle Indoor Air Quality (VIAQ)

KATRI, The Republic of KOREA
(Ministry of Land, Infrastructure and Transport)
1. Background
2. Case Study in Korea
3. The effects of VIAQ Regulation
4. Conclusion
Increasing concerns about **Vehicle Indoor Air Quality (VIAQ)**

- Various chemical materials to harmful to human body are emitted from vehicle interior materials

Researching & Managing vehicle indoor air quality by many countries

- Netherlands, France, Sweden, Germany, Japan, USA, China, Korea
- ISO Standard (12219-1:2012), China (GB/T 27630-2011), Korea (Notification No. 2007-539)

**Need to unified regulation on vehicle indoor air quality (VAIQ)**

to protect driver’s health and safe driving
Case Study in Korea

- Sick House Syndrome & Sick Car Syndrome: became a social issue
  - New car driver feel a headache, eye irritation, sneeze and so on
  - The main cause is the chemical materials that emitted from vehicle interiors

<Media: KBS news “Hazardous substances in new car interiors”>
Interview: I feel slight headache and dizzy…
Surveyed 800 people who purchased a new car

- Feeling the physical symptoms under driving: 51.5%,
- Headache 31.5%, Eyes irritation 31%, Sneeze 15.8%, Fatigue 11.1%...
 Specification and method for the determination of VIAQ

Test measurement method

<table>
<thead>
<tr>
<th>Time</th>
<th>Temp stabilize</th>
<th>Ventilation 30min</th>
<th>Close door Sealing 2hr</th>
<th>sampling 15min</th>
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<tbody>
<tr>
<td>Cabin Temp</td>
<td>25℃</td>
<td>25℃</td>
<td>25℃</td>
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</table>

- Temperature: 25 °C (The average temperature in summer in Korea)

- The hottest month, the average temperature in August 30 years (1971–2000) : 24.9 °C

- Door close time: 2hour (Recommended by the long running time)

- 2006 New car driver survey results: about 2.2 hour

- In summer parking, the 94.6% of driver is driving after the ventilation: Not considered High temperature mode and driving mode

- Using a air conditioning fan or window slightly open (10 ~ 15 cm) when driving open while driving, Within 2–3 minutes more than 90% of the initial concentration decrease
• Verification test whether automobile manufactures comply with guideline

Case Study in Korea

- Car Preparation
- Room Temperature Stabilizing Sampling
- Sample Analysis

- Temp. Stabilizing
- Sampling
- GC/MS
- HPLC
- Content Analysis

- 14 days
- 28 days
- 2 hours
### The Effects of VIAQ Regulation

#### Verification Test results of VIAQ by year

<table>
<thead>
<tr>
<th>YEAR</th>
<th>ITEM</th>
<th>Formaldehyde</th>
<th>Toluene</th>
<th>Ethylbenzene</th>
<th>Styrene</th>
<th>benzene</th>
<th>Xylene</th>
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<td>2006</td>
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<td>98</td>
<td>518</td>
<td>222</td>
<td>64</td>
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<td>22</td>
<td>51</td>
<td>49</td>
<td>12</td>
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<tr>
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<td>Max</td>
<td>955</td>
<td>2384</td>
<td>632</td>
<td>185</td>
<td>385</td>
<td>2164</td>
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<td>Min</td>
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This graph shows a comparison to 2006 (Not Apply) and 2011~2013 (VIAQ).

- After the VIAQ regulation, vehicle indoor air quality levels improved.
- VIAQ management regulation that this effect is confirmed.
Conclusion

- To protect driver and passenger’s health and safe driving, Korea was conducted VIAQ regulation since 2011.
- After the VIAQ regulation, Vehicle indoor air quality levels improved that this effect is confirmed.
- Need to unified regulation on vehicle indoor air quality (VAIQ) to protect driver’s health and safe driving.
Thank you very much ! !