OICA comments to GRRF-83-13 / TPMS Field Study

UNECE GRRF-83, 23-27 January 2017
Reflections on T&E report
Overview on tests used for the T&E report

Analysis of tests conducted, based on information available:

20 tests per vehicle

- 4 tests claimed to be according to the UN R64/R141 => all tests passed
- 8 tests performed with 1.4 bar followed by a reset:
  - calibration at 1.4bar is an intended misuse case
  => intended misuse cannot be prevented
- 8 tests were conducted in a way, neither relevant for the customers nor real world driving.
Background to regulation

Puncture

• Focus on normal punctures, not blowouts.
• Process that takes in the order of 10 – 30 minutes up to some days.

Diffusion

• Slow process that takes months

Regulation test procedures were designed to address real world pressure loss scenarios with testability in mind
• For an iTPMS it is easier to handle daily customer usage than the test procedures.
Artificial diffusion test

• Diffusion is a slow pressure loss that takes months:
  – Considered in the design of indirect TPMS and in the regulatory test procedure.

• T&E Tests performed:
  – 20 minutes of driving at \textit{constant speed}
  – Then reduce pressure with a \textit{20\% step} (all 4 tyres)
  – Afterwards drive at another \textit{constant speed}

Artificial scenario likely not happen in real life:
• Diffusion is slow process, not a step.
• It is impossible to drive constantly at one speed (e.g. 140 – 150 km/h as in one of the test cases) for several months.
Conclusion

• The T&E publication includes statements that are not correct and misleading

OICA welcomes any fact based discussion on how to improve road safety.

For this purpose OICA is conducting a TPMS field study.
Status of TPMS technology

TPMS Field Study 2016/17
Reasons for TPMS Field Study

- No scientific based study available covering TPMS assessment and its effectiveness in Europe
- Concerns circulating about TPMS effectiveness
- Receive certainty on field status
Scope of the Investigation

• Collect data which enables an analysis of the effectiveness of TPMS in general and iTPMS and dTPMS in comparison including:
  – Current tyre inflation pressure
  – Tyre sidewall and ambient temperature
  – Tyre dimension
  – Vehicle load state
  – Applicable tire pressure recommendation according to manufacturer
  – TPMS fitment & technology
Methodology

• Approach passenger car drivers randomly at filling stations or shopping centers and ask for permission to participate in the study.
• Check load state and tyre dimension(s) and determine the recommended tyre pressure(s).
• Check TPMS fitment (lamp check, visual inspection, users manual, ...).
• Measure tyre pressures.
• Measure tyre sidewall temperatures with IR thermometers and the ambient temperature.
• Compensate the measured pressures with the difference between ambient and sidewall temperature.
Study Size and Certification

- \( n=426 \) (as of Jan 18, 2017)
- Locations: Linköping (S) and Hanau (D)
- TÜV Nord involved since Jan 2017 in process certification and data collection
- Raw data is available
Preliminary Results

- The mandatory fitment of TPMS is effective
  Both dTPMS and iTPMS increase the average inflation pressure by ~3,5% points compared to vehicles w/o TPMS.
- TPMS fitment (independent of technology) reduces the number of severely underinflated tires by ~50%
  this is perfectly in line with the 2012 NHTSA study.
- No cases found for TPMS equipped vehicles with severe underinflation but no warning
- Some cases found with drivers ignoring TPMS warning
TPMS reset misuse prevention
TPMS Reset Misuse Scenarios

Important function for both, direct & indirect TPMS in order to reflect different load cases, tyres, etc.

Unintended misuse:
- Blocked switch/button due to load, etc.
- Reset at undiscovered puncture
- Wrong pressure value adjustment

Intended misuse:
- Driver wants to get rid of warning
TPMS Reset Misuse Scenarios

• All reset misuse scenarios are already addressed by implemented reset logic/functions and relevant information

• OICA is willing to elaborate on draft amendments regarding more detailed reset function requirements