Informal document **GRRF-83-16**
83rd GRRF, 23-27 January 2017
Agenda item 7(j)

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/R 141 => 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 *constant speed*
  - Then reduce pressure with a *20% step* (all 4 tyres)
  - Afterwards drive at another *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

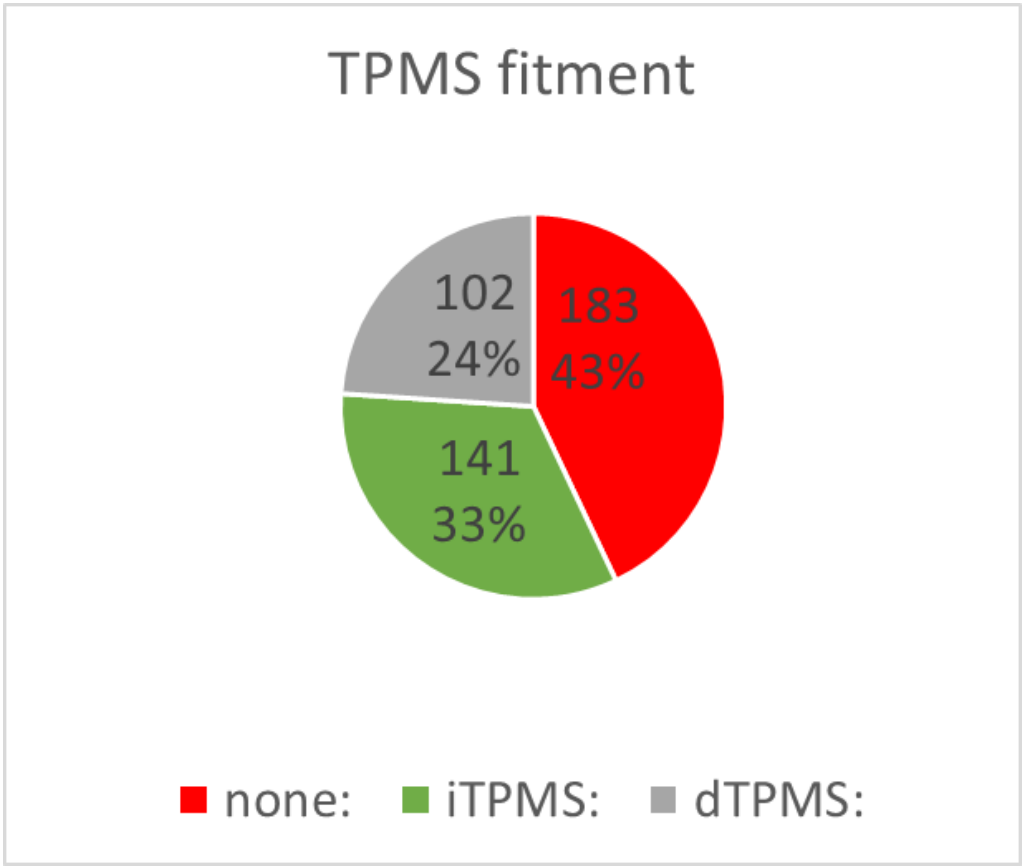
- Collect data which enables an analysis of the effectiveness of TPMS in general and iTPMS and dTPMS in comparison including
  - Current tyre inflation pressure
  - Tyre sidewall and ambient temperature
  - Tyre dimension
  - Vehicle load state
  - Applicable tire pressure recommendation according to 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

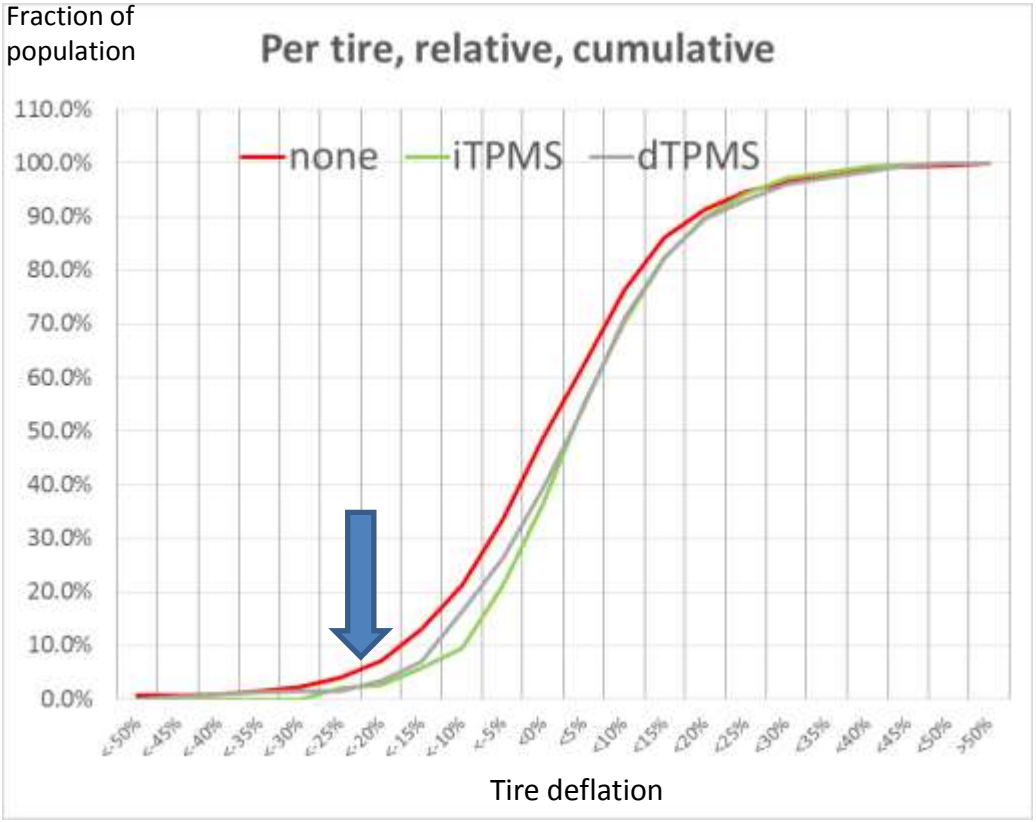
- n=426 (as of Jan 18, 2017)
- Locations: Linköping (S) and Hanau (D)
- TÜV Nord involved since Jan 2017 in process certification and data collection
- Raw data is available



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

TPMS Reset

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

TPMS Reset Cases

Unintended misuse:

- Blocked swich / 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