Submitted by the experts of OICA

Informal document **GRRF-84-33**
84th GRRF, 19–22 September 2017
Agenda item 7(i)

TPMS and Tyre Inflation Pressure Field Study 2016/2017

OICA presentation to GRRF-84, Geneva

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Purpose

Evaluate the effectiveness of TPMS in general and especially iTPMS and dTPMS by comparing the actual tyre inflation pressures with the individual recommended pressures.

Approach

Collect data from vehicles in the field using the same methods in different countries of the EU including

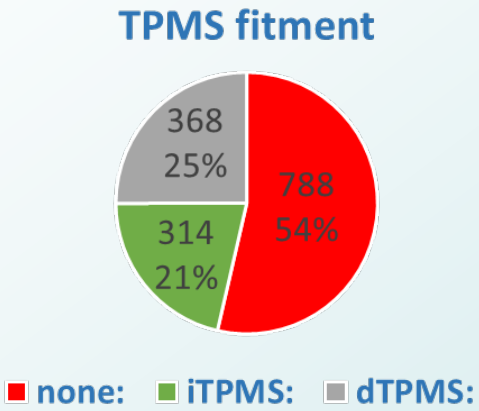
- TPMS fitment and status
- Tyre dimension
- Load state
- Inflation pressure and sidewall temperature
- Ambient temperature

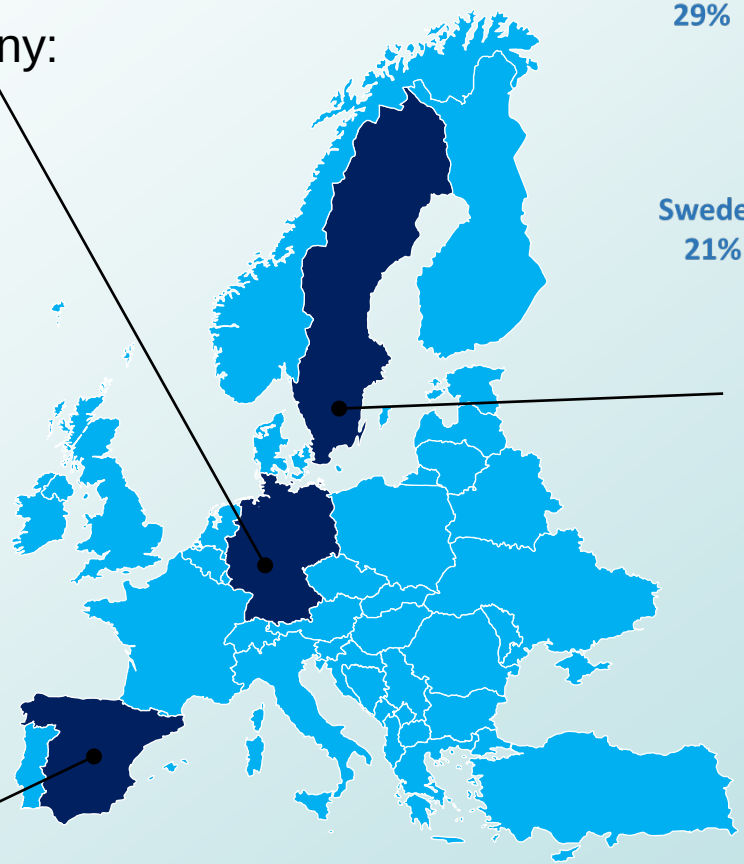
Determine the recommended cold inflation pressure. Normalize the measured pressures to the ambient temperature using the tyre sidewall temperatures and determine the under/over-inflation status relative to the pressure recommendations.

Locations & Sample Sizes

Hanau, Germany:

738 vehicles





Linköping, Sweden:

311 vehicles

Total:

1470 vehicles

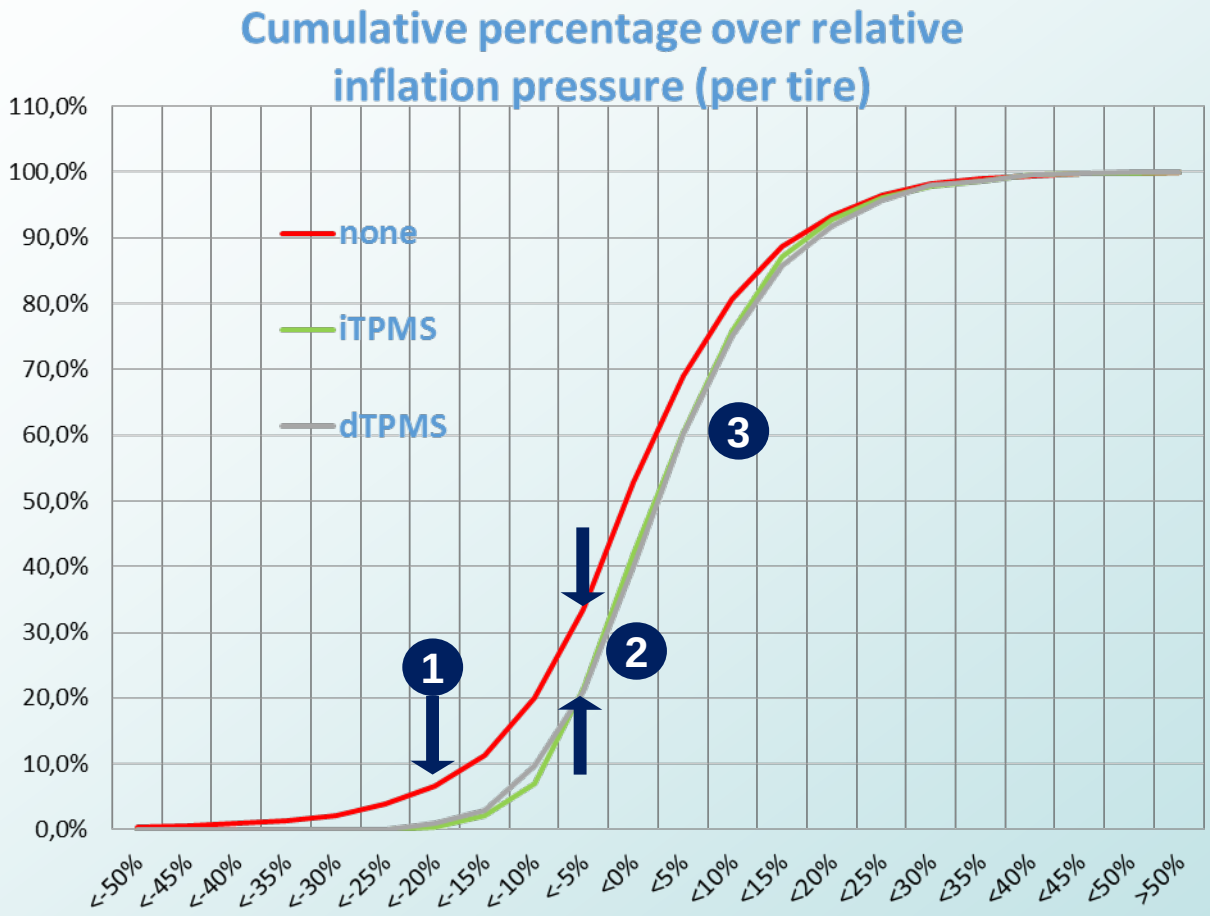
Madrid, Spain:

421 vehicles

Certification

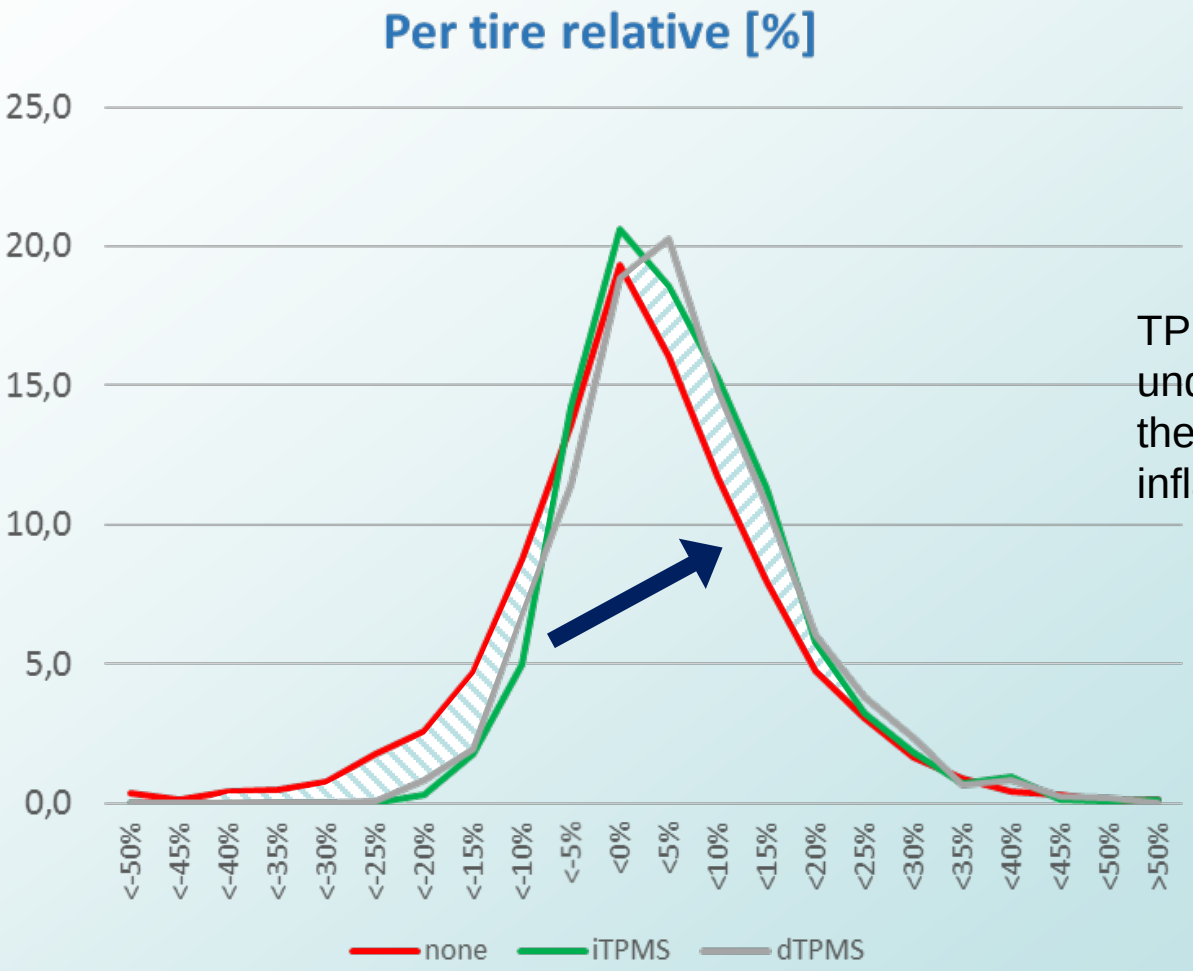
Parts of the Sweden and Germany data and all of the Spain data was collected under the supervision or by staff of the certification organizations TÜV Nord, DEKRA and TÜV Süd. Reports are available on demand.

Pressure Distributions



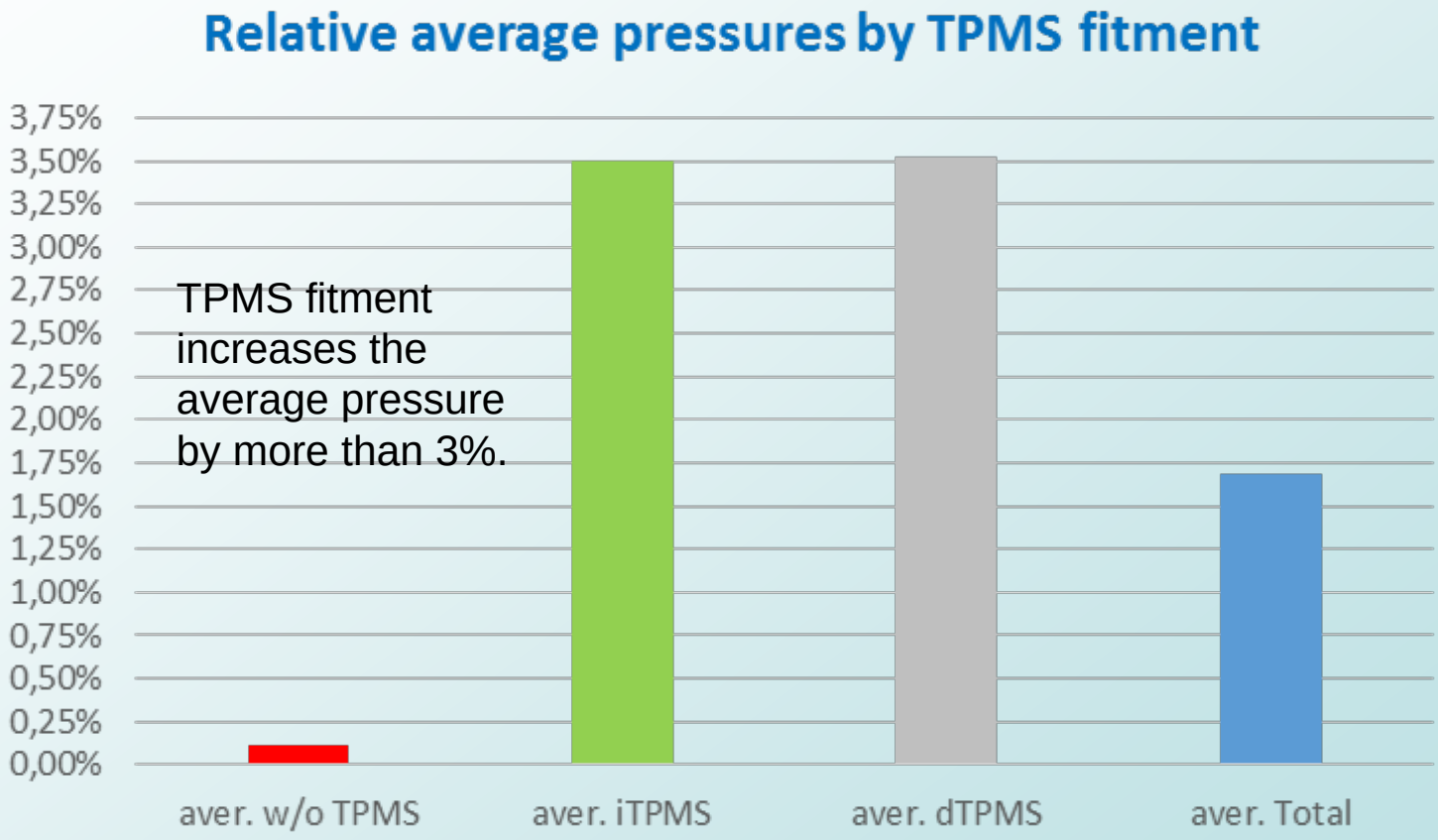
1. TPMS fitment reduces severe under-inflation below -20% by 90%.
2. TPMS fitment reduces under-inflation below -5% by 40%.
3. iTPMS and dTPMS are equally effective.

Pressure Distributions



TPMS fitment “moves” under-inflated tyres to the moderate over-inflation area.

Average Pressures

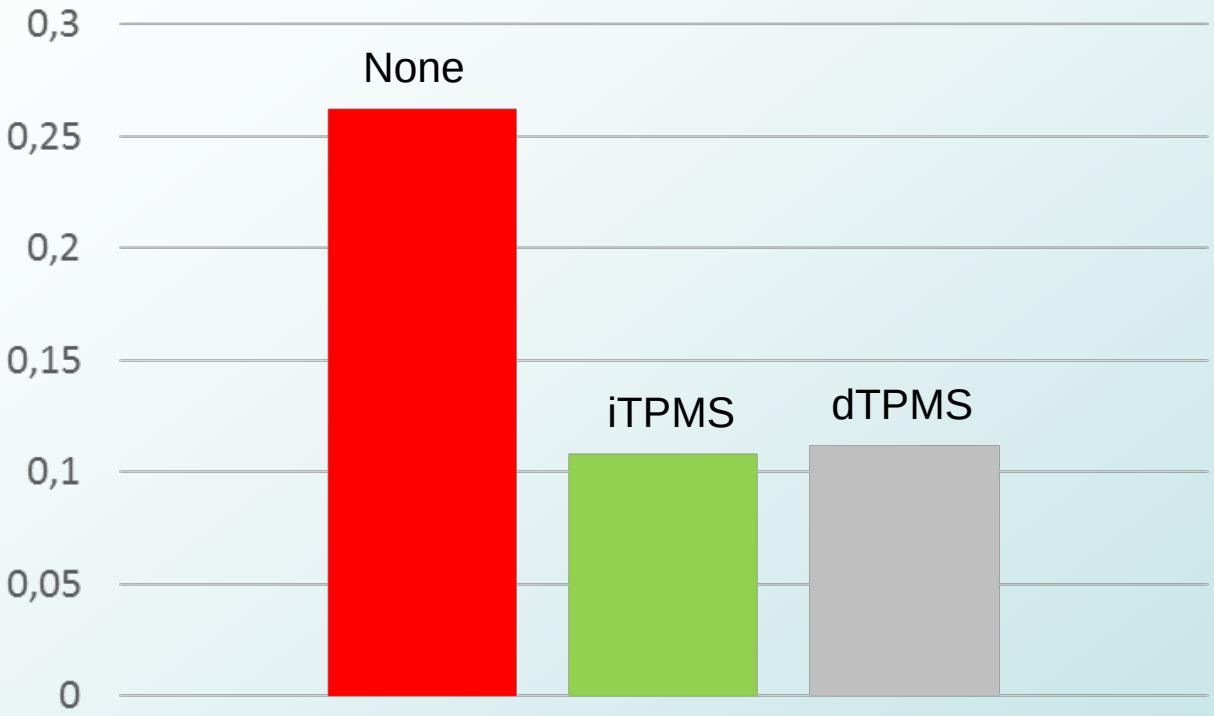


Extreme Under-inflation

No cases could be found where one or more tyres were below 150 kPa on vehicles fitted with TPMS where no warning was already issued.

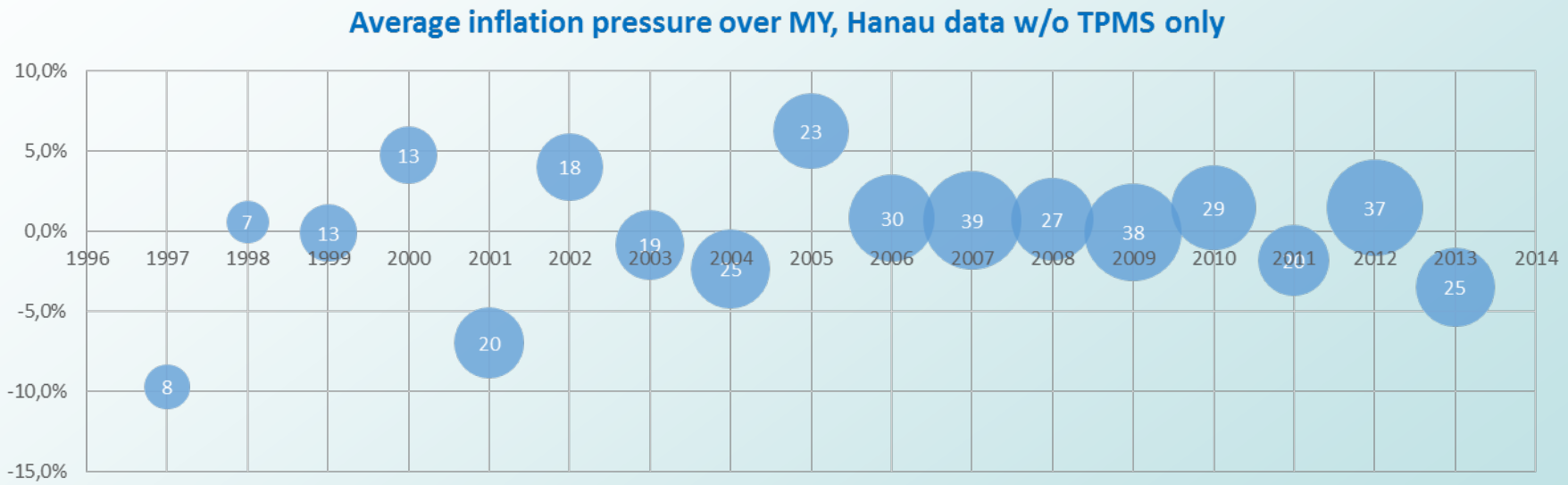
There were 46 tyres below 150 kPa on 33 vehicles without TPMS.

Standard Deviations



Data from TPMS-fitted vehicles has an approx. 60% smaller standard deviation than data from those without.
This means that the inflation pressures on TPMS-fitted vehicles deviate much less from the average pressures.

Vehicle Age vs. Inflation Pressure



Vehicle age and average pressures do not correlate.
Younger vehicles are not better taken care of in terms of tyre pressure maintenance.

Summary of Results

- Fitment of TPMS:
  - Increases the average inflation pressure relative to the recommendation by more than 3%
  - Reduces severe under-inflation by approx. 90% and moderate under-inflation by 40%
  - Reduces the variation of tyre pressures measured by the standard deviation which is reduced by approx. 60%
- iTPMS and dTPMS are equally effective
- In all cases of under-inflation below 150 kPa found on vehicles with working TPMS, a pressure warning had already been issued
- Vehicle age and average pressures do not correlate