Relation between PTI regulations and type approval regulations using the example of advanced driver assist systems

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Relation between PTI regulations and Type Approval regulations using the example of Advanced Driver Assistance Systems
Spanner Fairies on board

Source: AutoBild.de
Electronic Spanner Fairies on board

Source: MOST Cooperation
Milestones of the international road policy from the EU point of view

1926 International agreement on road traffic
1968 Agreement on road traffic (Vienna)
1970 70/156/EEC (vehicles and trailers)
1974 74/150/EEC (agriculture or forestry trucks)
1992 92/61/EEC (2- or 3-wheeled vehicles)
1977 77/143/EEC
1996 96/96/EC (consolidation)
2009 2009/40/EU (consolidation)
2003/127/EC (ISO-smartcard)
2007 2007/46/EC (vehicles and trailers) (framework directive)
2009 2009/40/EU (further development)
Milestones of the international road policy from the UN/ECE point of view

1926
International agreement on road traffic

1958
(European) Agreement concerning the adaption of uniform technical prescriptions for vehicles, equipment and parts and the conditions for reciprocal recognition of approvals

1968
International agreement on road traffic

1971
European supplementary agreement

1997
(European) Agreement about the standardised technical conditions for the periodical technical inspection of registered vehicles

1998
(Global) Agreement concerning the establishing of global technical regulations for vehicles, equipment and parts (“Parallel agreement”)
Updating level of Type Approval and inspection regulations

- 70 / 156 / EEC - Type Approval
  - 70 / 320 / EEC
  - 92 / 53 / EEC
  - 92 / 54 / EEC
  - 92 / 55 / EEC
  - 92 / 53 / EEC
  - 94 / 12 / EC
  - 94 / 23 / EC
  - 98 / 91 / EC
- 77 / 143 / EEC - Inspection
  - 77 / 320 / EEC
  - 92 / 54 / EEC
  - 92 / 55 / EEC
  - 94 / 23 / EC
  - 2001 / 9 / EC
  - 2003 / 27 / EC
  - 2001 / 116 / EC
  - 2007 / 46 / EC
  - 2009 / 40 / EU
  - 2010 / 48 / EU
Necessary steps for the successful further development

**Advanced Driver Assistance Systems (ADAS)**

<table>
<thead>
<tr>
<th>Target</th>
<th>Attainment of fast penetration of the vehicle market with safety relevant vehicle functions and systems</th>
<th>Inspection of such systems at PTI – Creation of conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Path</td>
<td>Mandatory assembly of safety relevant vehicle functions and systems and Campaigns about usage and safety potentials of ADAS</td>
<td>Description of the function of ADAS within the homologation regulations for vehicles and components</td>
</tr>
<tr>
<td>Require-ment</td>
<td>Rules within the Type Approval regulations</td>
<td>Provision of additional information about the homologation documents or Provision of inspection specifications by the inspection institutions</td>
</tr>
</tbody>
</table>

Subsequent frequent inspection in the frame of PTI

**Essential to hit the ambitious targets**
Development of vehicle condition during the life time cycle

Safety level
- Vision Zero
- State of the art
- Individual safety level of the vehicle
- PTI requirements

Degradation of vehicle status within the traffic

- Defect rate of passenger cars within the traffic – 4 weeks before PTI (MD/DD)
- At the PTI detected defect rate (MD/DD)

Source: FSD

Years
3 5 7 9

Safety level
26.2% 41.2% 56.6% 61.5% 74.1%

Repair after the inspection

PTI

Type Approval

Predominant to be affected by

Defect rate

Source: FSD

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ADAS installation information on the PTI report (until now not realised draft)

Configuration with safety relevant electronic controlled vehicle systems

The PTI report may inform additional about the equipment level of the individual vehicle regarding ADAS (subsequent use of existing data):

- Which serial and special equipment is **plugged** (and in the frame of the PTI noticed as fully functional)
- Which maximum equipment would be available for this type of vehicle
- Which **safety advantages** provide these systems

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic Bending light</td>
<td>During cornering and depending on the steering angle and speed, the light beam is swivelled and/or an additional headlight is activated.</td>
<td>available</td>
</tr>
<tr>
<td>Active Steering, incl. Servotronic</td>
<td>Steering assist: Depending on the driving situation, the steering angle is automatically changed, without intervention by the driver.</td>
<td>available</td>
</tr>
<tr>
<td>Adaptive Cruise Control</td>
<td>The system maintains the vehicle’s speed, depending on preferred speed and distance to the vehicle in front.</td>
<td>available</td>
</tr>
<tr>
<td>Xenon light, incl. Automatic headlamp levelling</td>
<td>Depending on the load and (optional) pitch angle, the system regulates the headlamp’s vertical aim.</td>
<td>plugged</td>
</tr>
<tr>
<td>Speed limiter with break function</td>
<td>Whilst driving, the system prevents exceeding a defined maximum speed. Relevant, if mandatory.</td>
<td>plugged</td>
</tr>
<tr>
<td>Rain sensor, incl. Automatic light</td>
<td>Automatic light: Depending on the ambient brightness, the system automatically switches on and off the driving light.</td>
<td>plugged</td>
</tr>
<tr>
<td>Emergency Stop Signal (ESS)</td>
<td>Emergency braking signal: In case of light deceleration, hazard warning lights or flashing brake lights are activated and so the following traffic is warned.</td>
<td>plugged</td>
</tr>
<tr>
<td>Electronic stability program (DSC, ABS, CBC, DTC)</td>
<td>The system stabilises the vehicle or the complete vehicle train in critical dynamic driving situations.</td>
<td>plugged</td>
</tr>
<tr>
<td>Passive occupant restraint system</td>
<td>Driver and co-driver head airbags as well as side bags protect passengers in case of frontal or side impact.</td>
<td>plugged</td>
</tr>
</tbody>
</table>
Description of the function of ADAS within the regulations of Type Approval – basic requirement for the PTI

Examples

- braking
- lengthwise, across and yaw dynamic stabilisation of vehicle movements
- to hold on the vehicle
- change of direction
- change of intensity of the illumination of road
- change of signal aspects of the lighting technology facility of the vehicle
- adherence and/or shoring of traffic participants
- covering of the survival space of traffic participants
- avoidance of accidental deployment of safe guards for traffic participants
- change of the springing and damping behaviour
- control of the regulation of the tyre pressure
- change of the air deflector devices
- electrical drive concept for the operation of the vehicle
- improvement and strengthening of the visibility
Effective and efficient examination of the vehicle inspection through

- application of state of the art inspection technology and tools e.g.
  - PTI Adapter in connection with
  - mobile end devices like laptops, tablet pc or smart phones

in connection with the

- provision of selected information about the Type Approval documents

Source: FSD
Provision of additional information for the PTI out of Type Approval documentations

Supporting information for brake tests at PTI should already be fixed during Type Approval and provided during each individual PTI.

Reference value / reference brake force

Source: FSD
Successful risk limitation about frequent development of the PTI regulations

Regulation approach:

Safety risks
- because of aging and wear of vehicles
- growing with increased vehicle age because of increasing bad maintenance and missing repairs
- through false or not executed repairs of accident damages
- higher risk at vehicles with ADAS

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Interaction of PTI regulations and Type Approval regulations

Environment regulations vs. Inspection regulations?!

To conform with the stringent emission standards in the future, complex underbody constructions are necessary.

For the conformance of the Inspection regulations appropriate *inspection openings/claps* are required for the visual inspection of safety relevant parts (particularly braking systems).

Integration into the Type Approval regulations

Source: AutoMotorSport
Thank you for your attention!

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