Workshop C2

Al Bustan Rotana Hotel, Bahri B & Stallion

CITA Corporate Member Presentations
Inspection Procedures, Methods and
Data Systems

Chaired by Juha Tukiainen

Member of CITA Bureau Permanent
Workshop C2

Presentation 1

**Tandem Test Line**

Hakim El Jebli

Ryme, Spain
Tandem test line

4.6 Kw.

3.5 Tn.

Ø 202 mm. Ø 166 mm.

2.250 - 3.200 mm.

820 - 2.150 mm.
Brake Tester & Suspension Bench

- The Tandem test line is composed by two pairs of benches: 2 for the brake test and 2 for the suspension test.
Automatic Adjustment

- The Tandem has an automatic adjustment to the specific distance between the axles of each vehicle.
Pneumatic Retention System

- It has a pneumatic retention system of the vehicle that gives greater stability and safety for the braking test.
The Tandem test line has a Data Base that includes the axle distances of the European, American and Asiatic vehicles.
Operation: Vehicle Selection

Once chosen the vehicle to be tested, the Tandem adapts the axle distance automatically and allows to do a quick inspection of the vehicle.
Operation: Side Slip Teste

The first test is the Side Slip Tester to register the deviation of the steering axle.
Operation: Brake Teste

Initially a lifting pneumatic beam retains the vehicle. When the proper placement of the vehicle is detected the lifting beam descends, leaving the axles perfectly positioned on the tandem of brake testers. At this moment a retention roller rests on the rear tires, giving the test a greater stability and therefore more safety. Then the motors of the brake tester start. The four wheels are tested simultaneously. The ovality and brake values of the entire vehicle are then completed and registered.
Operation: Suspension Test

The pneumatic lifting system will position the vehicle on level with the floor in order to make easier the exit from the brake tester rollers. Then the vehicle moves to the tandem suspension tester. Again, both axles are simultaneously tested.
Operation: End of the Tests

Once finished the tests, the vehicles is removed from the Tandem test line and the operator can continue the remaining tests of the inspection such us emission, headlight, visual inspection, etc..
Advantages of the Tandem

- Reduction of the time of the vehicle inspection around 50%.
- Increase the productivity of the inspection in more than 100%.
- As the Tandem tests both axles at the same time, the vehicle movements are reduced and the operator can focus on inspecting the vehicle instead of moving the vehicle.
- Free Rollers are not required for the 4x4 vehicles due to the simultaneous test of both axles. In the inspection of the 4x4 vehicles the reduced time is even higher than 50%.
- While testing both axles at the same time the test and its values are more approximate to the real performance of the vehicle.
Software: Brake Teste

SAQUE EL VEHÍCULO

Fuerza Izquierda

2.61 kN

Fuerza Derecha

2.54 kN

Fuerza Izquierda

1.84 kN

Fuerza Derecha

1.58 kN

DESEQUILIBRIO

3 %

DESEQUILIBRIO

14 %

Rendimiento

Diferencia

4WD

1 Repetir  3 Fijar Valores
Software: Suspension test
It adjusts automatically to the specific distance between the axles of the vehicle.
Thank you for your attention!

www.ryme.com
SOFTWARE FOR DATA COLLECTION AND ANALYSIS FOR PTI-TESTS WITH VeRTest

Stefan Velkoski

Robert Bosch GmbH, Germany
Software for Data collection and analysis of PTI-Tests with VeRTTest

Stefan Velkoski – Robert Bosch GmbH

2015 CITA Conference, 14-16th April 2015, Dubai, UAE
VeRTest – Users and Sponsors

- VeRTest = Vehicle Roadworthiness Test
- Users:
  - Vehicle Test Organizations
  - Authorized companies which are working for Ministry of Transport
  - Authorized personnel (such as. Employee of the Ministry of Transport and Communications, etc.)
  - Organizations and institutions that may require some statistical data (ex. Emission of CO2, etc.), such as Ecology organization, Ministry etc.
- Successfully Implemented in:
  - Macedonia (on governmental level)
  - Serbia (AMSS in test period)
System description - VeRTest

VeRTest is a sole integrated IT system in the area of:

- Vehicle Data
- Registered Vehicles
- Technical Inspected Vehicles
- Results from measuring with testing equipment
- Owners and Users of Vehicles
- Traffic Licenses, international driving licenses and many other documents depending on the local law
- Collection of fees for Registration
- Reports and Statistics
Why VeRTTest?

- Centralized unified and secure database
- Harmonizing the local legislation with the European and global legislation.
- Increasing the frequency of technical inspections and mandatory items to review
- Error free procedures and data exchange
- Complete customizable system for statistics and data analyzing
- Scheduling and organizing the complete process of technical inspection
- Marketing promotions
Working Flow without errors

Error control on each entered value providing error free data

Error notification on each field on mouse hover over the red image
Key business benefits of VeRTTest

- reduced errors in the output documents
- increased control over the operations
- a step towards to a paperless archive of incoming documents and outcomes of every preformed process
- control over the collecting of registration fees provided by the state and local government
- cheaper operating costs
- increased productivity
- Facilitated procedures
- Aggregate statistics
- Friendlier interface with easy manipulation of the system
Data Storage and Data Selection

Simple drag-and-drop report customization
User Interaction

- The software provides a simple and user-oriented environment.

- It can easily be adjusted towards the needs of the operator (adaptation of fields for input, color screen, choice of language for communication, etc.).

- Possibility of collecting detailed information on the owners (users) of vehicles for promoting the user – operator relationship ex. mobile phone numbers, e-mail addresses etc.
Report printing and data export

Customization of all reports by customer requirements

Print of any custom designed report (print what you see) with export option in 9 predefined types
Software for Data collection and analysis of PTI-Tests with VeRTest

Stefan Velkoski – Robert Bosch GmbH

2015 CITA Conference, 14-16th April 2015, Dubai, UAE
IMPROVEMENT OF THE RELIABILITY AND THE CONSISTENCY OF THE PTI

Jan van der Does

Executive Project/Product Manager, Van Leeuwen Test Systems B.V., The Netherlands
Improvement of the reliability and the consistency of the PTI
Improvement of the PTI

Applicable to large test stations .....
small and 1-lane test stations ......
Improvement of the PTI and mobile test stations.
Improvement of the PTI

Information on overhead monitor

- type of test
- driver instructions
- real-time measuring values
- tests to perform
- licence number
- axle nr.
Improvement of the PTI

Bribery sensitive situation

Prevent by strict regulation and smart inspection system
Improvement of the PTI

- Prevent contact between customer and vehicle examiner

- Alternatively assign vehicle examiner to random lane.

- System requires random compulsory re-inspections to be carried out by the manager.
## Improvement of the PTI

Controlled access to parts of IT system

### Permissions

**Add permission**

<table>
<thead>
<tr>
<th>Permission name</th>
<th>Station overview</th>
<th>End of day summary</th>
<th>Inspector reporting</th>
<th>Statistics and graphics</th>
<th>Information equipment/calibration</th>
<th>Add equipment event</th>
<th>User access</th>
<th>Vehicle info</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>Manager</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>X</td>
<td>X</td>
<td>V</td>
</tr>
<tr>
<td>Station Manager</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>X</td>
<td>X</td>
<td>V</td>
</tr>
<tr>
<td>Maintenance</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>V</td>
<td>V</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Improvement of the PTI

Tracking system links the tests to the correct vehicle (axle)

T = tracking
F = front axle
R = rear axle
I = in
O = out
Improvement of the PTI

Licence number check
Improvement of the PTI

Stage 1
Improvement of the PTI

Inspector identification with RFID tag
Improvement of the PTI

Inspector id stored with each test

<table>
<thead>
<tr>
<th>Test Result</th>
<th>Start Time</th>
<th>End Time</th>
<th>Lane</th>
<th>Performed by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passed</td>
<td>17:41:12</td>
<td>17:42:36</td>
<td>406050</td>
<td></td>
</tr>
</tbody>
</table>

### RollerBrakeTest

<table>
<thead>
<tr>
<th>Axle</th>
<th>Weight</th>
<th>Drag</th>
<th>Brake type</th>
<th>Left force</th>
<th>Right force</th>
<th>Efficiency</th>
<th>Diff - Prog</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>781</td>
<td>22.6%</td>
<td>Service</td>
<td>271</td>
<td>252</td>
<td>67%</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Serv Imbal.</td>
<td>265</td>
<td>242</td>
<td>-</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Parking</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>766</td>
<td>45.8%</td>
<td>Service</td>
<td>214</td>
<td>208</td>
<td>55.1%</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Serv Imbal.</td>
<td>214</td>
<td>208</td>
<td>-</td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Parking</td>
<td>219</td>
<td>198</td>
<td>54.4%</td>
<td>10%</td>
</tr>
</tbody>
</table>
Irregularity alerts

- Attention
- Road tax not paid
- Vehicle reported stolen
- Unpaid traffic fine(s)
Improvement of the PTI

Fixed preselected tests for each compulsory inspection.
Improvement of the PTI

Robotised headlight beam tester with laser scanner to detect incorrect vehicle alignment
Improvement of the PTI

Comprehensive PTI standards
Stage 2
Improvement of the PTI

Side slip tester
Side slip tester
Improvement of the PTI

Side slip tester

short switch bars
Improvement of the PTI

Side slip tester

speed measurement
Improvement of the PTI

Tracking system controlled cover plates
Improvement of the PTI

Misalignment
Improvement of the PTI

Axle position indication

![Axle position indication](image-url)
Wheel position check

allowed wheel position area

weight load cell
Improvement of the PTI

Weight and position change check during suspension test
Improvement of the PTI

Judgment against absolute values, so not only a left/right comparison

<table>
<thead>
<tr>
<th>Suspension</th>
<th>5-VPT-02</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>279 kg</td>
<td>570 kg</td>
</tr>
<tr>
<td>740 N/mm</td>
<td>12 %</td>
</tr>
<tr>
<td>8 % @ 16 Hz</td>
<td>9 %</td>
</tr>
<tr>
<td>103 @ 15 Hz</td>
<td>37 %</td>
</tr>
<tr>
<td></td>
<td>291 kg</td>
</tr>
<tr>
<td></td>
<td>654 N/mm</td>
</tr>
<tr>
<td></td>
<td>17 % @ 16 Hz</td>
</tr>
<tr>
<td></td>
<td>65 @ 15 Hz</td>
</tr>
</tbody>
</table>
Improvement of the PTI

‘Safety’ barriers around brake tester
Improvement of the PTI

Automatic triggering of re-test

In this example: requirement = 50%

Compulsory re-test
Improvement of the PTI

Progressivity check to detect slamming on the brake.
Use of emergency stop detection
Use of emergency stop detection

power cut + software trigger
Improvement of the PTI

Stage 3
Stage 3, diesel smoke test under full load with CDST
Improvement of the PTI Controlled test cycle on CDST

![Graph showing engine power vs. RPM]

- 80%
- 90%
- 100% wheel power
- Rated engine power
- Measured wheel power
- Full throttle part
- Gear changes

Engine Power (kW)

Engine RPM

© VLT
Checks on engine rpm and power

<table>
<thead>
<tr>
<th>RPM (n-1)</th>
<th>Max. RPM (n-1):</th>
<th>Power (kW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4210</td>
<td>61</td>
</tr>
<tr>
<td>2</td>
<td>3790</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3370</td>
<td></td>
</tr>
</tbody>
</table>

Diesel Smoke 70-NX-VB

Wait engine idling time

Max. RPM (n-1): 4570 ✔

Opacity (HSU):

- 1: 15 ✔
- 2: 13 ✔
- 3: 10 ✔
Improvement of the PTI

Speedometer test on CDST

No actual speed indication at speedometer test

Accelerate to 60 km/h on Vehicle Speedo and Push Ok
Improvement of the PTI

Aircon-test: not only temperature, but also air flow measurement
Improvement of the PTI

Stage 4
Improvement of the PTI

Inspector identification with RFID tag
Comparison of test results between inspectors

<table>
<thead>
<tr>
<th>Inspector</th>
<th>Inspections</th>
<th>Passed</th>
<th>Failed</th>
<th>Cancelled</th>
<th>Pending</th>
</tr>
</thead>
<tbody>
<tr>
<td>(65-477)</td>
<td>45</td>
<td>33 (73.3%)</td>
<td>12 (26.7%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>(65-5454)</td>
<td>53</td>
<td>41 (77.4%)</td>
<td>12 (22.6%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>(66520071)</td>
<td>36</td>
<td>30 (83.3%)</td>
<td>8 (21.1%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>(66-1054)</td>
<td>53</td>
<td>43 (81.1%)</td>
<td>10 (18.9%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>(66-2332)</td>
<td>49</td>
<td>40 (81.6%)</td>
<td>9 (18.4%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>(66520547)</td>
<td>53</td>
<td>49 (92.3%)</td>
<td>4 (7.7%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>
Improvement of the PTI

Test lane output
fraud sensitive documents
Improvement of the PTI

Lockable printer cabinet

test certificates

test reports
Improvement of the PTI

End of inspection
<table>
<thead>
<tr>
<th>Lane 1</th>
<th>Lane 2</th>
<th>Lane 3</th>
<th>Lane 4</th>
<th>Lane 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Waiting 02</strong></td>
<td><strong>Waiting 00</strong></td>
<td><strong>Waiting 02</strong></td>
<td><strong>Waiting 01</strong></td>
<td><strong>Waiting 00</strong></td>
</tr>
<tr>
<td><strong>GT-43-KD</strong></td>
<td><strong>HR-32-JY</strong></td>
<td><strong>Universal lane</strong></td>
<td><strong>Universal lane</strong></td>
<td><strong>Motorcycle lane</strong></td>
</tr>
<tr>
<td><strong>Stage 1</strong></td>
<td><strong>Stage 2</strong></td>
<td><strong>Stage 3</strong></td>
<td><strong>Stage 4</strong></td>
<td><strong>Stage 5</strong></td>
</tr>
<tr>
<td>KGS-883 MWE-927</td>
<td>SZ-23-45</td>
<td>HR-PJ-33</td>
<td>BDR-284</td>
<td>FC-35-HS</td>
</tr>
<tr>
<td>HDS-937</td>
<td>ND-93-NS</td>
<td>LKS-824</td>
<td>TS-38-JS</td>
<td>-</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>MZ-VT-64</td>
</tr>
</tbody>
</table>

**VEHICLE STATION OVERVIEW**

Traffic on vehicle test lanes

**Inspection type**

- Car lane
- Universal lane
- Motorcycle lane

**Station overview screen for station manager**
Improvement of the PTI

Station overview screen with real-time test lane overview screen
Thank you for your attention.

Please feel free to contact us for detailed information.

Van Leeuwen Test Systems B.V.

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CONFIRMING SAFETY OF ELECTRIC AND HYBRID ELECTRIC VEHICLES

Hannes Bloder

AVL DiTEST, Austria
Workshop C2

Presentation 5

DIGITAL PTI (PTI 2.0) – INNOVATIVE APPROACH

Antonio Multari

Technical Expert Emissions at CITA and Vice Chairman of WG Diagnostics & Emissions at ASA and Sales Director Export, MAHA, Germany
Inspection Procedures and Methods

Digital PTI (PTI 2.0) - Innovative Approach

By Antonio Multari, Technical Expert Emissions at CITA and Vice Chairman of WG Diagnostic & Emissions at ASA and Sales Director Export at MAHA
Digital PTI (PTI 2.0) - Innovative Approach

In God we trust;
all others must bring data!
Digital PTI (PTI 2.0) - Innovative Approach

- Nice & Fast
- Online Registration
- Satisfaction
- Transparency
- Efficiency
- Automation
- Optimizing
- Cost Improvement
- m2m communication
- Industry 4.0
- Lifetime costs
- Continues improvement
- Cost Benefit
- 99.5% Availability
- Service
- Prediction

PTI 2.0 - Innovative Approach
1. Vehicle identification (e.g. online registration, license plate reading, RFID,…)
2. Tire depth measurement
3. Body scan
4. OBD
5. Online data evaluation (e.g. tire-rim combination)
6. Visualization via tablet, smartphone, …
7. Paperless documentation
8. Prediction of results
1. Vehicle identification (e.g. online registration, license plate reading, RFID,...)
2. Tire depth measurement
3. Body scan

Digital PTI (PTI 2.0) - Innovative Approach
4. ECSS (OBD PTI Tool)
5. Online data evaluation (e.g. tire-rim combination)
6. Visualization via tablet, smartphone,
Digital PTI (PTI 2.0) - Innovative Approach

7. Paperless documentation
8. Prediction of results

Vehicle Specific Data

- Angaben zur Erstellung einer Fahrleistungsstatistik
  - 8.4.1.1 Zur Erstellung einer Fahrleistungsstatistik für Deutschland übermittelt die Zentrale Stelle die bei den HJ festgestellten und nachfolgend aufgeführten Daten der einzelnen Fahrzeuge halbjährlich dem Kraftfahr-Bundesamt:
    - 8.4.1.1.1 vierstellige KBA-Herstellerleitpläne
    - 8.4.1.1.2 dreistellige KBA-Typenschlüsselnummer
    - 8.4.1.1.3 dreistellige Versionsvariantenschlüsselnummer
    - 8.4.1.1.4 vierstellige Fahrzeugklasse und -aufbauart
    - 8.4.1.1.5 Monat und Jahr der Erstzulassung
    - 8.4.1.1.6 Monat und Jahr der HU
    - 8.4.1.1.7 Stand des Wegzweckzählers bei Kraftfahrzeugen und, soweit vorhanden, bei Anhängern
  - 8.4.1.2 Soweit technische Daten zum vorgeführten Fahrzeug aus den Schlüsselnummern nicht abgerufen werden können, dürfen durch die Zentrale Stelle folgende zusätzliche Angaben übermittelt werden:
    - 8.4.1.2.1 zusätzliche Gesamtwichte (kg)
    - 8.4.1.2.2 Nummerierung (KW)
    - 8.4.1.2.3 Antriebskraft (Nm)
    - 8.4.1.2.4 Höchstgeschwindigkeit (km/h)
    - 8.4.1.2.5 Energie- und Antriebsart
    - 8.4.1.2.6 Emissionsklasse

PTI Report

Data Base for future prediction on PTI
Digital PTI (PTI 2.0) - Innovative Approach

• Resume
Digital PTI (PTI 2.0) - Innovative Approach

Questions Now ???

Thank you !!!

By Antonio Multari, Technical Expert Emissions at CITA and Vice Chairman of WG Diagnostic & Emissions at ASA and Sales Director Export at MAHA