JASIC Opinions on ETRTO/LINK's proposed revision to the vehicle method

JAPAN AUTOMOBILE STANDARDS INTERNATIONALIZATION CENTER

Opinions on ETRTO’s proposal(TA-36-3)

Mixed fitment tyres abrasion test method

- Issue:
  - Current method description requests to fit 4 identical candidate tyres on the candidate vehicle
  - Abrasion rate index of candidate is calculated based of the mass loss of the 4 candidate and reference tyres
  - Some tyres (e.g. *375/20R21 103*) cannot be fitted on 4 positions, but only on drive axle
- Proposal
  - The tyres which can be fitted only on one axle will be tested on this axle only, and
  - Abrasion rate index will be calculated with one axle tyres only, comparing to reference tyres on the same axle
  - Load distribution for the candidate and reference tyres shall be similar.
- Impact : scope extension
- Proof of concept
  - Tests comparing candidate on 3 different vehicles tyres on drive axle have been compared to test using usual method ➔ coherent results.
- Implementation date: informal document for 202509 GRBP
- Implementation in the annex 3 (see 19.16.4)
  - In 1.11.13.1 and 1.11.13.4, indicate in case mixed fitment, N=2, not 4.
  - In 1.6 after 1.6.12, add a paragraph indicating:
    - The load to reach on the candidate tyres axle, should be 50% for rear axle tyres, ETRTO fine tuning requested pressure and reference tyre loading/pressure
    - The load distribution coherence between candidate vehicle and reference vehicle.
  - Correct the scope accordingly

- This proposal can't be adopted because discussion based on measured data is necessary.
- Size that cannot be tested by vehicle method can be tested by drum method.
- The basis for determining the size that can only be fitted on the drive axle is unclear.

Front Axel tuning (camber)

Front Axle tuning (camber)

- Issue:
  - During Market Assessment plan and Multicircuit plan, it appeared that the camber limits fixed in the 1.6.2.1 may often be difficult to respect, with 72 vehicles being at the front camber limit, or slightly over.
- Proposal
  - In paragraph 1.6.2.1, modify the limit -1.2 degrees to -1.3 degrees
- Impact : test feasibility improved.
- Proof of concept
  - See statistics
- Implementation date: informal document for 202509 GRBP
  - In paragraph 1.6.2.1 and similar, modify the limit -1.2 degrees to -1.3 degrees

- This proposal can’t be adopted because it would reduce test accuracy.
- Discussion based on measured data is necessary.

Rear Axle tuning

- Issue:
  - Looks current specifications are difficult to apply and force to go to “exceptional case”.
- Proposal
  - To be defined
- Impact : test feasibility improved.
- Proof of concept
  - See statistics
- Implementation date: informal document for 202602 GRBP
- Note : checked MA data, possible issue for RWD and AWD to confirm.

- Unable to judge due to unclear details.

TOE definition

- Issue in 1.6.2.1
  - The definition is missing/improper. Wheel toe values are a function of the wheel alignment and of the vehicle alignment on the alignment rig. Total axle toe is only a function of the wheel alignment, which is the value of interest.
  - With the current text, toe left = 0.03 & toe right = 0.13 would be outside of the allowed range.
  - With the new text, toe = (0.03 + 0.13)/2 = 0.08 would be within the tolerance
- Proposal : add in definition:
  - "Toe IN/OUT angle per wheel" on the front (rear) axle is the average of the measured toe angle of the right front (rear) wheel and the measured toe angle of the left front (rear) wheel". In other words, it is total axle toe angle divided by 2.
  - Keep the limit as defined in current text
- Impact : test feasibility improved.
- Implementation date: informal document for 202509 GRBP
- Question: where is toe in/out positive/negative described? do we need to describe/define somewhere? ➔ check with UNECE group, and test centers. (open is negative) ➔ refer to https://www.iso.org/obp/ui/en/#iso:std:iso:8855:ed-2:v1:en where definition are. If cannot refer to ISO in R173, copy the ISO definition in the text.

- Toe angle of each wheel becomes larger, which may cause uneven wear.
- To determine whether or not to adopt this proposal, it is necessary to analyze the toe angle and abrasion rate of each wheel.

Minimal average temperature test for Normal/Y tyres

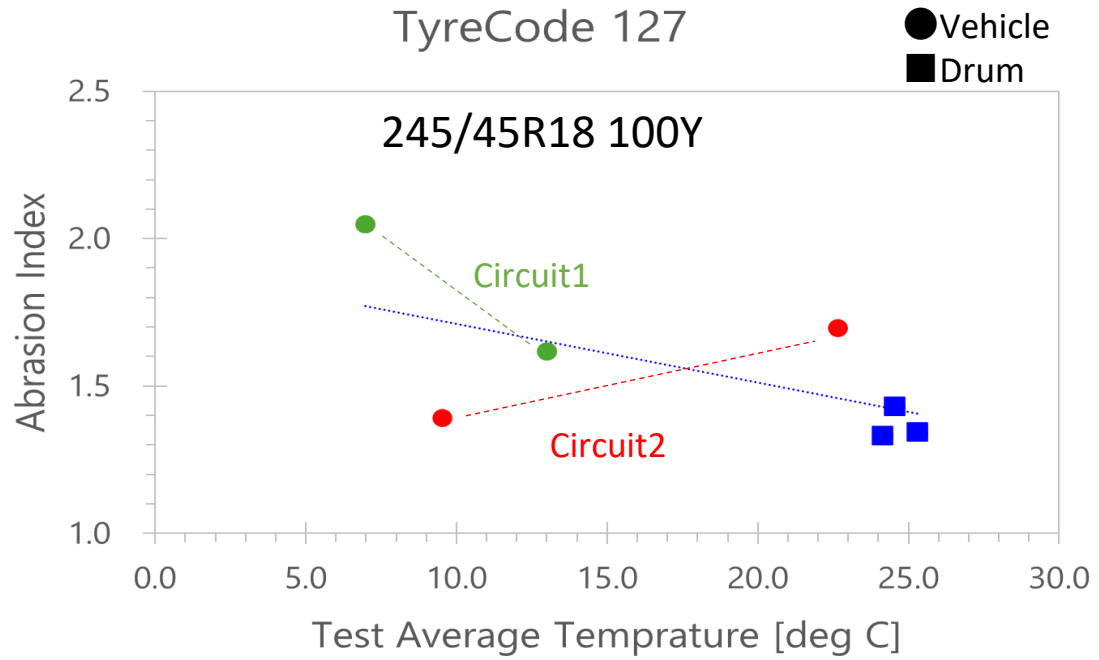
Minimal average temperature test for Normal/Y tyres

- Issue:
  - The average test temperature currently allowed should be above 7°C for Normal tyres
  - During the correlation test, 2 tyres with speed index Y has shown a high abrasion rate index at temperature around 7°C, and a much lower abrasion rate index at any higher test temperatures
- Proposal
  - Normal tyres to be tested with an average temperature above 10°C and Y speed index tyres above 12°C (instead of 7°C)
- Impact : decrease uncertainties. For Validation test, decrease the Sigma by **0.04**
- Proof of concept
  - Recalculation the sigma obtained in validation plan after removing 2/45 tests at T < 7°C
- Implementation date: informal document for 202509 GRBP
- Implementation in the annex 3, paragraph 1.7.1:

(a) The average temperature during the test shall be within the following range: from 10 °C to 35 °C; However, for tyres with speed index Y, the minimal average temperature during the test shall be 12 °C

(b) The minimum and maximum temperature during the test shall be within the following range: from 5 °C to 40 °C for at least 90 per cent of test distance; However for tyres with speed index Y, the minimal temperature for at least 90 per cent of test distance during the test shall over 7 °C

- The reason for changing the temperature of only Y speed index tyres is unclear.
- The changes in the index and temperature differ for each circuit, and the difference in the index is not solely due to the influence of temperature. Therefore, this proposal will not improve accuracy.
- The specified temperature range may be too wide. It is necessary to judge based on individual data, including not only the average but also the maximum and minimum specifications for the 90% of test distance.



Maximal average temperature test for 3PMSF tyres

- Issue:
  - The average test temperature currently allowed is up to 20°C for 3PMSF tyres
  - 3PMSF tyres are primarily designed for winter conditions, not for high temperature
- Proposal
  - Limit the maximal average test temperature to 17°C For 3PMSF tyres.
- Impact : decrease uncertainties, specially when performing COP and/or Market Surveillance
- Implementation date: informal document for 202509 GRBP
- Implementation in the annex 3, 1.7.1

(a) The average temperature during the test shall be within the following range: from -3 °C to 17 °C;

(b) The minimum and maximum temperature during the test shall be within the following range: from -7 °C to 22 °C for at least 90 per cent of test distance;

- The intention of this proposal is unclear.
- The specified temperature range may be too wide. It is necessary to judge based on individual data, including not only the average but also the maximum and minimum specifications for the 90% of test distance.

Missing acceleration data

- Current text in 1.11.8
  - (c) If more than 1500 km GNSS acceleration data are missing for the candidate tyre, the test for this candidate tyre is invalid;
  - (d) If more than 1500 km GNSS acceleration data are missing for the reference tyre, the whole test is invalid;
- Issue
  - ~ 20% of acceleration data missing may lead to test condition far away from specifications and to higher uncertainties for test result
  - Abusing test result possible
- Proposal: reduce to 500 km (allowing max 1 shift of missing data)
  - (c) If more than 600 km GNSS acceleration data are missing for the candidate tyre, the test for this candidate tyre is invalid;
  - (d) If more than 600 km GNSS acceleration data are missing for the reference tyre, the whole test is invalid;
- Impact : decrease uncertainties
- Implementation date: informal document for 202509 GRBP

- This proposal strictly limits the range of GPS data loss from 1,500 km to 600 km.
- Since this proposal is stricter than current specification, there will be no problem with its adoption.

Delta candidate/reference vehicles only to consider

Delta candidate/reference vehicles only to consider

- Current text:

1.6.13.3.1. Standard deviation

(a) Longitudinal acceleration: 0.45 m/s2 ± 10 per cent;

(b) Lateral acceleration: 0.93 m/s2 ± 10 per cent.

Longitudinal and lateral accelerations standard deviations during the test shall not deviate by more than 5 per cent from one vehicle to another vehicle of the same convoy.

- Issue
  - The difference between candidate does not matter, only difference between candidate and reference matters
  - Current constraint may discard a test where several candidates tyres are properly tested/measured.
- Proposal: only difference between candidate and reference matters

Longitudinal and lateral accelerations standard deviations for a candidate vehicle during the test shall not deviate by more than 5 per cent from the reference vehicle of the same convoy.

- Impact : test efficiency/cost, discards only the candidate vehicle out of specs, not the others.
- Implementation date: informal document for 202509 GRBP

- This proposal concerns the rules for acceleration differences within a convoy, comparing only the Ref and Candidate rather than comparing Candidates with each other.
- There are no issues with adopting this proposal.

Accelerations STD deviation calculation from GNSS data

- Current text in appendix 1:
  - Calculation proposed from Race Logic Vbox output, which are processed by Race Logic calculation
- Issue
  - Other GNSS may have different or no data treatment, which could bring different final acceleration results
- Proposal:
  - propose calculation from raw GPS data
  - Request same GPS brand and model between candidate and reference vehicle
- Impact:
  - Any GPS brand/model can be used
  - Results will be identical or at least very similar between different brand GPS.
- Implementation date: Proposed calculation method will be shown in informal document to TFTA and 202509 GRBP, and proposal will be submitted for ~~implemented in regulation in~~ 202602 GRBP

- This proposal is about calculation process.
- If more stable results can be obtained, We agree with this proposal.

Improvements to develop for 2026

- Acceleration correction:
  - Difference of acceleration between candidate and reference tyres could allow to correct abrasion rate index, reducing uncertainties
  - Tests to be run end of 2025, to confirm correction method and efficiency
- Load distribution variation between candidate and reference vehicle:
  - Currently large difference possible between candidate and reference vehicle.
  - Tightening the difference could decrease the uncertainties
  - Concept and impact to develop
- Rear axle tuning for AWD/RWD vehicles:
  - Under discussion

- Items to consider for reducing variation
  Acceleration
  Load
  Drive system

Opinions on LINK’s proposal(TA-36-9)

Circuit length

Circuit length

3

Alignment of shift length and total abrasion testing length

Proposal to reduce circuit minimum length from 300 km to 250 km.

1. **Efficiency and Time Management**
   Feasible distance per day:
   2 circuits a day, ca. 2 × 250 km = 500 km
   Integer # of circuits for total test with 16 test days = 16 × 500 km = 8000 km (total abrasion test length)

2. **Adaption to electrical vehicle fleet:**
   250 km per circuit is better aligned with current EV range and consistent recharging schedule.

3. **Optimized testing cycles:** Easier managing and scheduling of test shifts

4. **Consistent results (each shift has the same length)**

LINK

- JASIC agree with shortening the minimum distance of circuit.

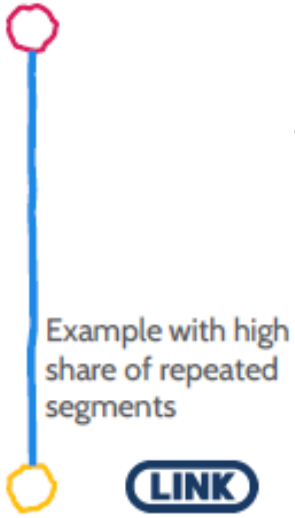
Circuit length, New difinition

Circuit length, New definition

6

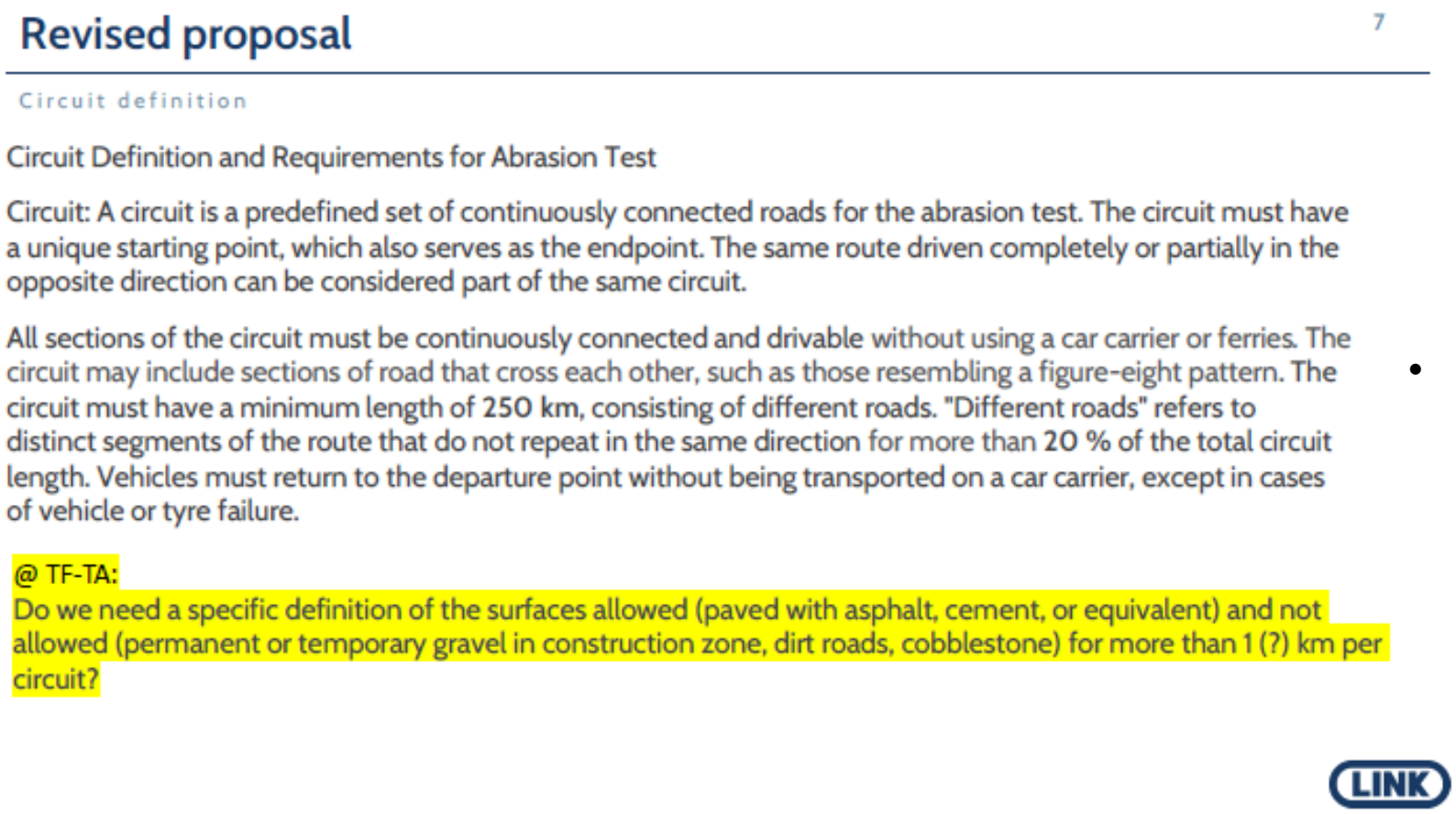
Alignment of shift length and total abrasion testing length

- Remove unnecessary definitions (Loop, etc.).
- Proposal to introduce measure for avoiding repetition of road segments
- Keep existing cycles compliant (DEKRA, IFV, LINK, UTAC,...)



- Regarding the removal of unnecessary definitions, we agree if it does not affect other provisions.
- Regarding the introduction of measure for avoiding repetition of road segments, we agree if sections that are the same but run in different directions are treated as different roads.

Revised proposal



Revised proposal

7

Circuit definition

Circuit Definition and Requirements for Abrasion Test

Circuit: A circuit is a predefined set of continuously connected roads for the abrasion test. The circuit must have a unique starting point, which also serves as the endpoint. The same route driven completely or partially in the opposite direction can be considered part of the same circuit.

All sections of the circuit must be continuously connected and drivable without using a car carrier or ferries. The circuit may include sections of road that cross each other, such as those resembling a figure-eight pattern. The circuit must have a minimum length of **250 km**, consisting of different roads. "Different roads" refers to distinct segments of the route that do not repeat in the same direction for more than **20 %** of the total circuit length. Vehicles must return to the departure point without being transported on a car carrier, except in cases of vehicle or tyre failure.

@ TF-TA:
Do we need a specific definition of the surfaces allowed (paved with asphalt, cement, or equivalent) and not allowed (permanent or temporary gravel in construction zone, dirt roads, cobblestone) for more than 1 (?) km per circuit?

LINK

- Some kind of definition is necessary.

Major traffic disruptions

Major traffic disruptions

9

1.11.9. Deviation from nominal circuit

The circuit is considered valid when the following provisions are met altogether:

(a) The circuit is modified by less than 10 km for the full test or if it is modified by more than 10 km and less than 30 km, for less than 8 shifts;

(b) The total driven distance remains in the 8000 ± 300 km;

(c) The abrasion level of reference tyre at 20 ° C or 10 ° C as applicable is within the ranges specified in paragraph 1.6.16. of this Annex;

(d) The acceleration limits are within the ranges specified in paragraphs 1.6.13.2. and 1.6.13.3. of this Annex.

When all provisions are met the circuit is considered valid and the distance considered for calculation has to be corrected accordingly.

Accidental deviation(s) are acceptable if representing less than 20 per cent of circuit distance or less than 100 km (whichever is lower) under the condition that the reference tyre abrasion level at 20 ° C or 10 ° C as applicable stays in authorized limits and acceleration standard deviations are respected.

In all other cases, the test is considered not valid and the circuit has to be revalidated.

Guidance on handling major disruptions (e.g., long traffic jams, full track closures) would be appreciated.
Is it possible to interrupt the test and continue another day?

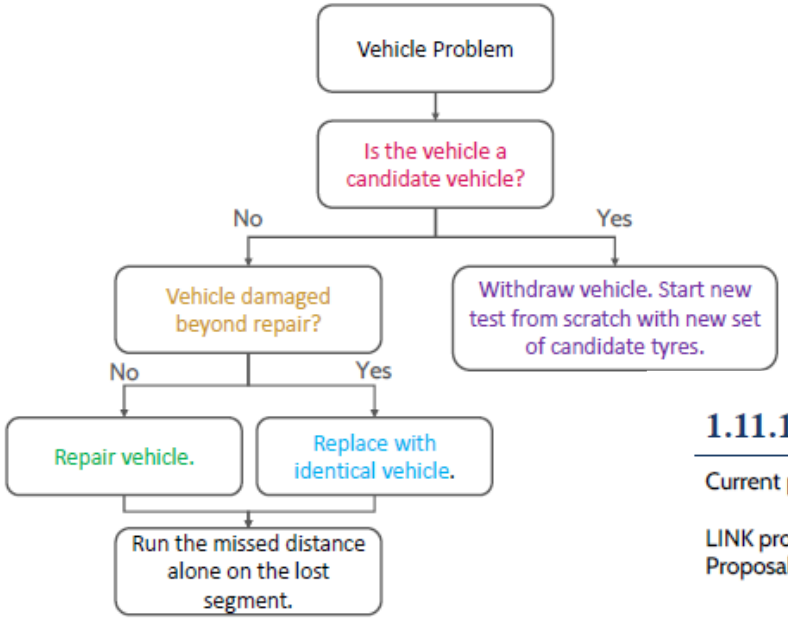
- No objections.

Vehicle trouble handling

1.11.10 Vehicle trouble handling

12

Vehicle trouble handling
The following provisions apply in case of vehicle damages in the convoy:
(a) If a vehicle used in the convoy is damaged and cannot be used anymore (e.g. major mechanical failure or accident), it shall be replaced by an identical vehicle that shall be identically loaded and tuned. The replacement vehicle, equipped with the same tyres having started the test, shall run the distance lost due to vehicle failure on the lost segment of the circuit alone without the other vehicles of the convoy;
(b) If a vehicle used in the convoy is broken down and can be repaired, the lost distance shall be run without other convoy vehicles on the lost segment of the test circuit;
(c) If the failure occurs on a candidate vehicle and not on the reference vehicle, the convoy may continue the test and the failing vehicle/tyre shall be withdrawn from the convoy. A new set of candidate tyres shall then be used for a new test, starting from scratch.



- JASIC opposes both the current provisions and Link's proposal. We are concerned that testing only repaired vehicles could lead to abuse of the provisions. If a vehicle experiences a problem, the test of the tires installed on that vehicle should be invalidated.

1.11.10 Vehicle trouble handling - Proposal

13

Current proposal asks to withdraw candidate vehicle independently if it is repairable or not. Is this the intend?

LINK proposes to remove differentiation between candidate and reference vehicle. Allow repair of vehicles if possible. Proposal for a clearer wording in the current draft regulation:

1.11.10 Vehicle Trouble Handling
In the event of a vehicle failure during the test, the following provisions shall apply:
If the vehicle can be repaired and returned to service:
(a) The repaired vehicle shall operate alone on the lost segment of the test circuit.
(b) It shall complete the distance lost during the period of unavailability.
(c) No other convoy vehicles shall accompany the repaired vehicle during this recovery run.

If the vehicle cannot be repaired or is otherwise unusable (e.g. due to major mechanical failure or accident) or the repair is not considered a viable option (e.g., cost or time to repair):
(a) The vehicle shall be replaced with an **identical vehicle**, loaded and tuned in the same manner to the same specifications.
(b) The replacement vehicle shall be equipped with the **same** tyres used at the start of the initial test.
(c) The replacement vehicle shall operate alone on the lost segment of the test circuit to complete the distance lost.
(d) No other convoy vehicles shall accompany the replacement vehicle during this recovery run.

Accelerations calculation

Annex 3, Appendix 1: Accelerations calculation

15

The current postprocessing of recorded vehicle acceleration/data data follows a certain logic, laid out in Annex 3.
This section is not yet detailed enough to enable third parties the implementation in their own tools.
There are unclear definitions, and the provided python code is not debugged.

Python code:

```
from scipy import interpolate
import numpy as np
data_inp['distance'] = data_inp['speed']/data_inp['fsample']
data_inp['distance'] = data_inp['distance'].cumsum()

# interpolate function for acc
f_accx = interpolate.interp1d(data_inp['distance'], data_inp['accx'])
f_accy = interpolate.interp1d(data_inp['distance'], data_inp['accy'])

# generate array of distance every 1m
distance_1m = np.array(data_inp['distance'].iloc[0], data_inp['distance'].iloc[-1], 1)

# create an interpolation every 1m for the accelarations - numpy array result
# len of the array same as len of distance_1m
accx_DB = f_accx(distance_1m)
accy_DB = f_accy(distance_1m)

# compute the stadx with ceiling accx_DB and accy_DB
stdax = np.std(accx_DB)
stday = np.std(accy_DB)
```

Example of incorrect numpy range definition in annex 3.

LINK

- No objections.

AET Tool – Way forward

17

One crossing, two roads

Proposed workflow:

1. Improve algorithm description in regulation

and

i) Make the AET an official tool provided by the European Commission (similar to the VECTO tool used for CO_2 emission calculation).

ii) Provide an example dataset (golden dataset with expected results) as an authoritative or traceable source (to be shared by EU Com). This would allow validation of results for third party developed tools or for future AET software updates.

LINK

- We agree with this proposal.
- The AET tool is provided by ETRTO as a black box. It is unsuitable as a test method due to the numerous disclaimers listed.