


Discussion Paper regarding
“Speed Trace Violations / Drive Trace Index”
(OIL#29/30/41)

Prepared by WLTP Technical Secretary
10th WLTP IWG Meeting
14th ~ 16th APR 2015

1. What has changed ?

	cycle profile	tolerance	drive trace index
R83/EU	trapezoid	$\pm 2\text{km/h}$ within $\pm 1\text{sec}$	NO
JPN	Micro-transient	$\pm 2\text{km/h}$ within $\pm 1\text{sec}$	under the study for its adoption
US		$\pm 2\text{mph}$ within $\pm 1\text{sec}$	being carried out (no criteria is defined)
			
WLTP	Micro-transient	to be decided	YES (criteria : to be decided)

2. Drive Trace Indexes

(1) Previous Study (possible index)

Indexes	brief description	Possible application	(Ref) EPA requires
ER	is defined as the percent difference between the total driven and target cycle energy		
DR	is defined as the percent difference between the total driven and scheduled distance		
EER	is defined as the percentage difference between the distance per unit cycle energy for the driven and target traces		✓
ASCR	is defined as the percentage difference between the ASC for the driven and target traces	✓	✓
IWR	is defined as the percentage difference between the inertial work for the driven and target traces	(under the study)	✓
RMSSE	provides the driver's performance in meeting the schedule speed trace throughout the test cycle in terms of the Root Mean Squared Speed Error	✓	

(2) Proposed Tentative Criteria

Indexes	Whole cycle		Each phase
	4phases	3 phases	
ASCR	3%		NA
RMSSE	0.8		NA
IWR	under the study		NA

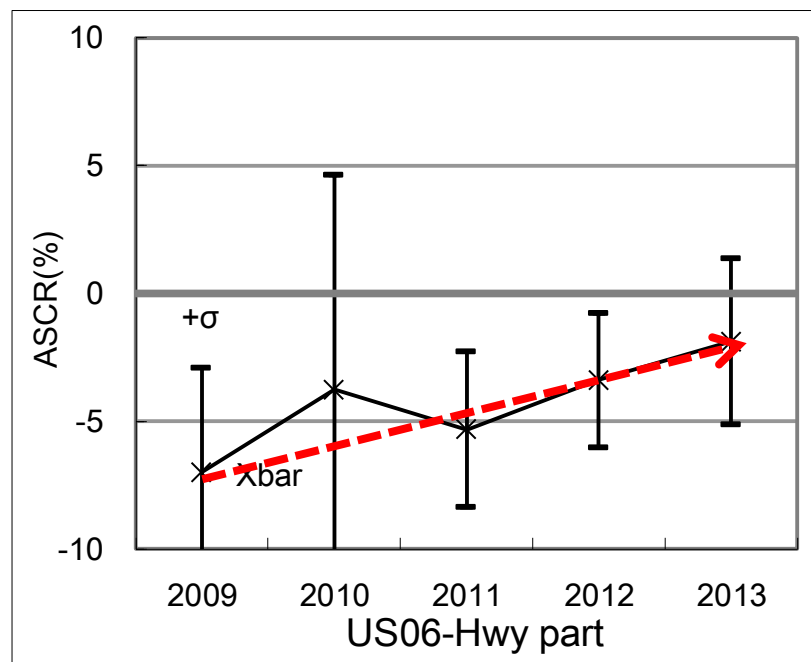
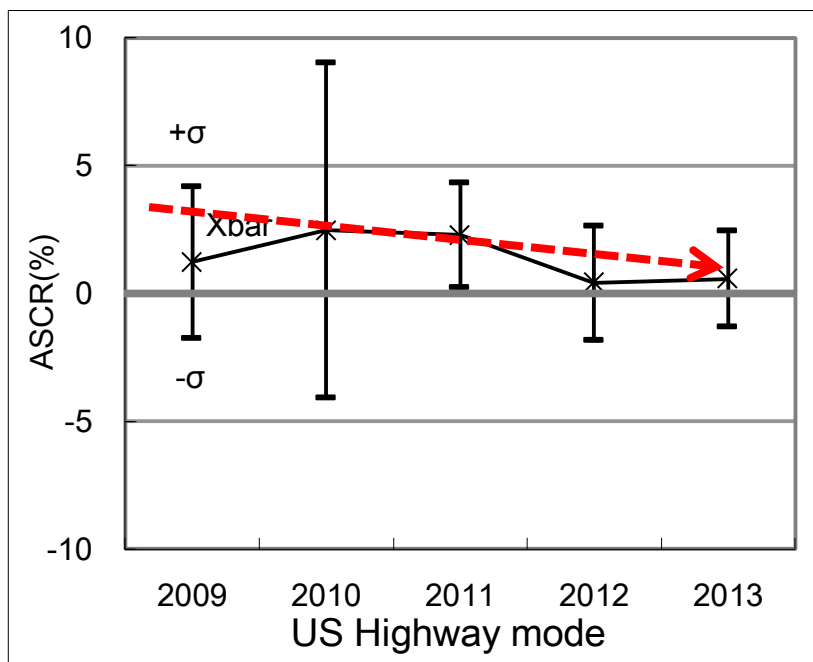
note)

- W.O.T. operation : use target trace during WOT operation
- Gear Shift operation :no treatment is necessary

For more details, please refer the following documents

- ✓ WLTP-DTP-07-05e, SEP 2011
- ✓ WLTP-DTP-LabProcICE-189, FEB 2013
- ✓ WLTP-DTP-LabProcICE-222, APR 2013
- ✓ PSA_WLTC Cycle violation status and proposals, JUL 2013
- ✓ WLTP-06-16e, MAR 2014

(reference) How does “drive trace index” affect on driving technique ?



Indexes encourage drivers to follow the prescribed cycle as much as possible and this motivation improve the indexes as time being.

2. Drive Trace Tolerance

(1) Previous Discussion

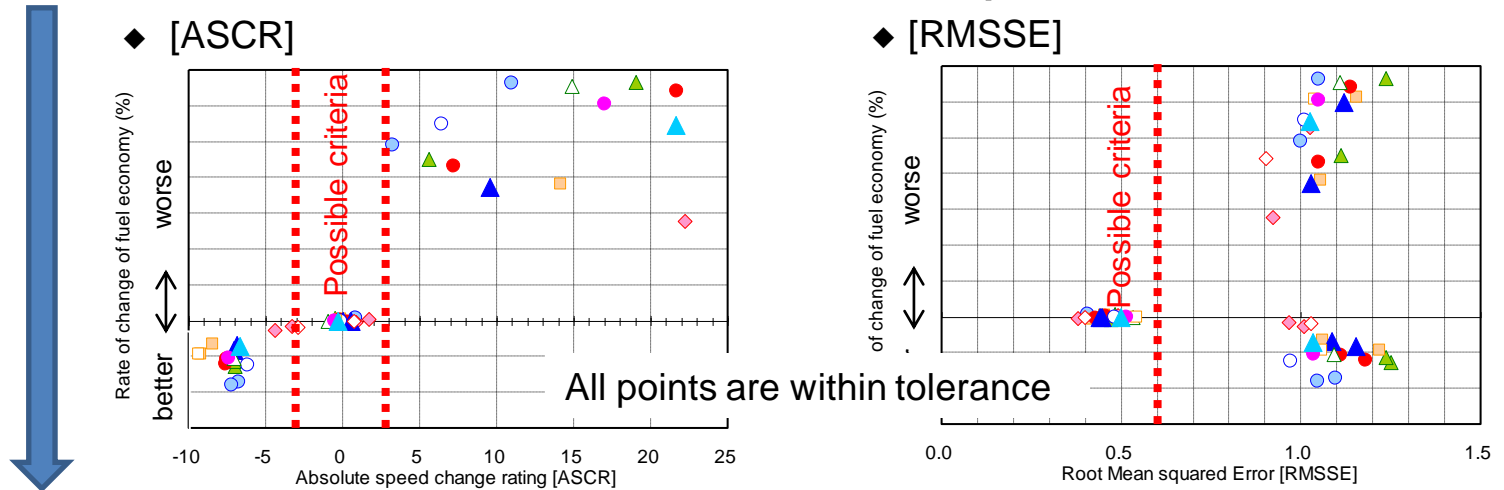
1. The vehicle shall be operated in an appropriate manner to accurately follow the vehicle speed. The vehicle shall be operated smoothly, following representative shift speeds and procedures.
2. Deviations outside the prescribed tolerances shall be accepted provided that the tolerances are never exceeded for more than [X] s on any one occasion.
3. In total no more than [10] deviations per test are allowed.
4. Gear change : ± 1 extra sec. for each gear change event
5. Time criteria in #2:
 - ✓ India proposal: 1% of whole WLTC time (18 sec.)
 - ✓ Japan proposal: Within 0.5 sec. on any violation and less than 3.0 sec/cumulative all violations for 4 phases test and 2.5sec for others
 - ✓ PSA : 2sec 10times

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(2) Initial Proposal by TS

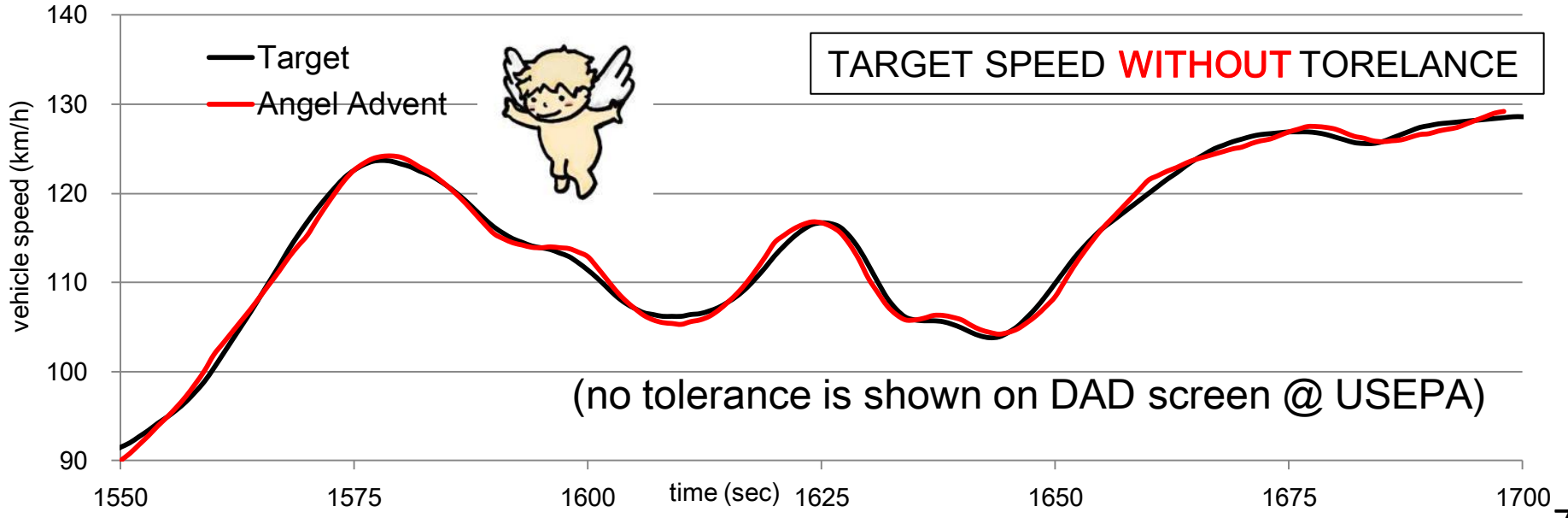
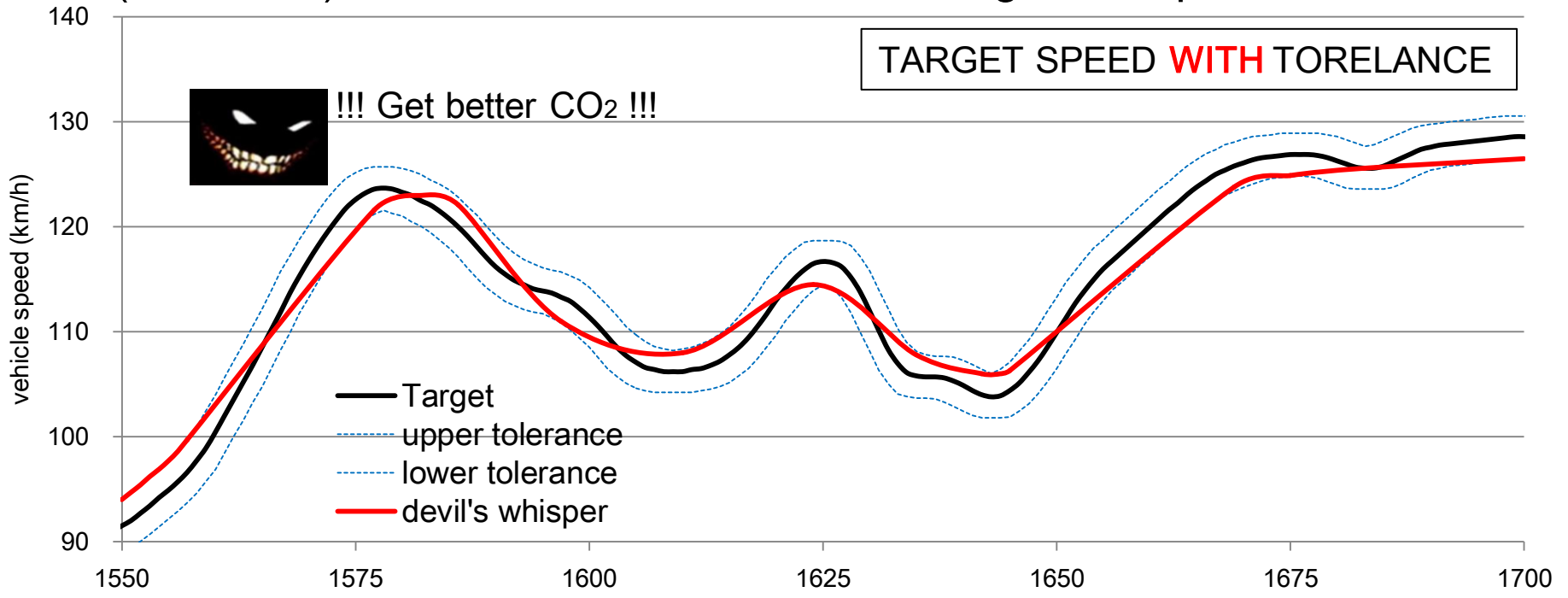
1. “Indexes” can detect smooth/aggressive technique better than “Tolerance” and can be replaced.



NO TOLERANCE
IS NECESSARY

2. “Trace Tolerance” can be one of testing flexibilities (refer P7)

(reference) how does tolerance work ? - negative impact -



3. Next Actions

	5	6	7	8	9	10
IWG meeting		★ 11 th Meeting			12 th Meeting ★ : Finalization	
Drive Indexes	→	Further study on criteria setting including other indexes (EER, IWR) ★ Provide concrete proposals by TS → Feedback and comments from CPs and Web. conference				
Drive Tolerance	→	Feedback and/or Comments with Counter-Proposal ★ status report → 2 nd Proposal by TS (and Web. conference, if necessary)				