ACPE IWG #09

Test Procedure proposal

Background : Traffic Accidents Analysis

- **ACPE traffic accidents rate** (Ujwhjsyflj%tk&FHUJ%fhhnijsyx%ns%mj%szr gjw%tk&fhhnijsyx'%g~%qthfyts.
  - **Rate is higher at parking lot**

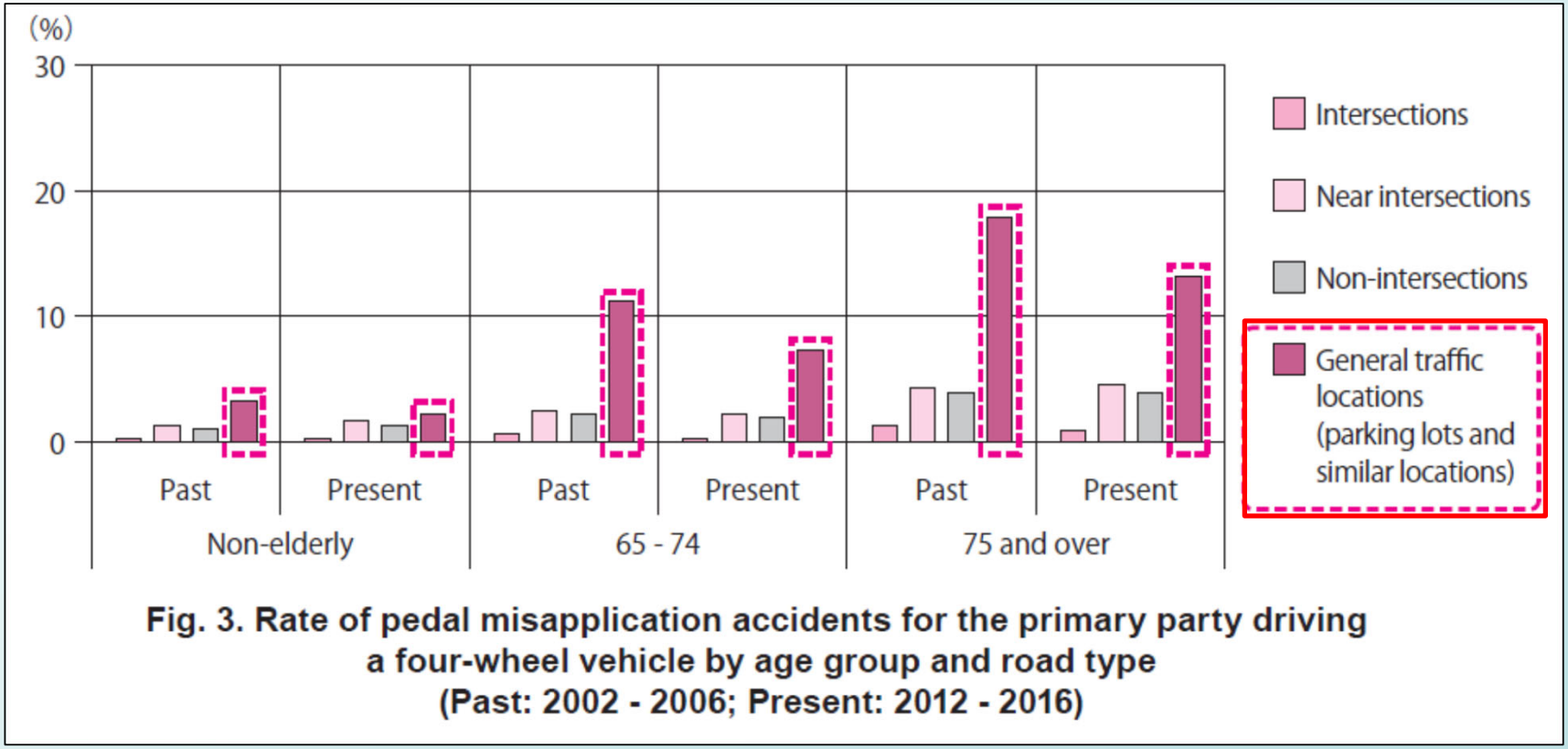

Fig. 3. Rate of pedal misapplication accidents for the primary party driving a four-wheel vehicle by age group and road type (Past: 2002 - 2006; Present: 2012 - 2016)

Ref ; info124_e.pdf (itarda.or.jp)

Background : Traffic Accidents Analysis

- Actions to take in the event of ACPE accident (Parking lots)
  - Starting up, Moving straight are higher
  - Reversing and turning are lower

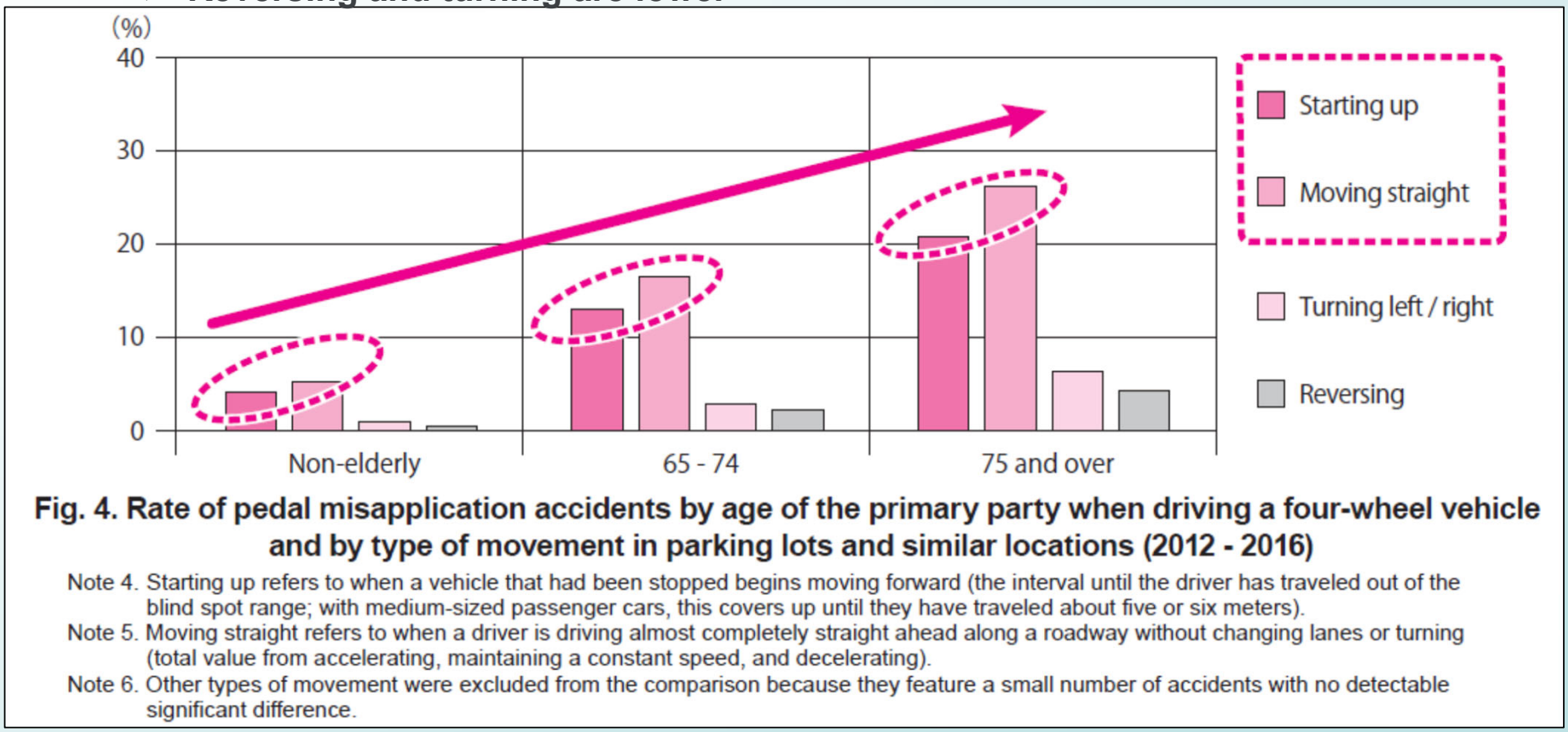

Fig. 4. Rate of pedal misapplication accidents by age of the primary party when driving a four-wheel vehicle and by type of movement in parking lots and similar locations (2012 - 2016)

Note 4. Starting up refers to when a vehicle that had been stopped begins moving forward (the interval until the driver has traveled out of the blind spot range; with medium-sized passenger cars, this covers up until they have traveled about five or six meters).
Note 5. Moving straight refers to when a driver is driving almost completely straight ahead along a roadway without changing lanes or turning (total value from accelerating, maintaining a constant speed, and decelerating).
Note 6. Other types of movement were excluded from the comparison because they feature a small number of accidents with no detectable significant difference.

Ref ; info124_e.pdf (itarda.or.jp)

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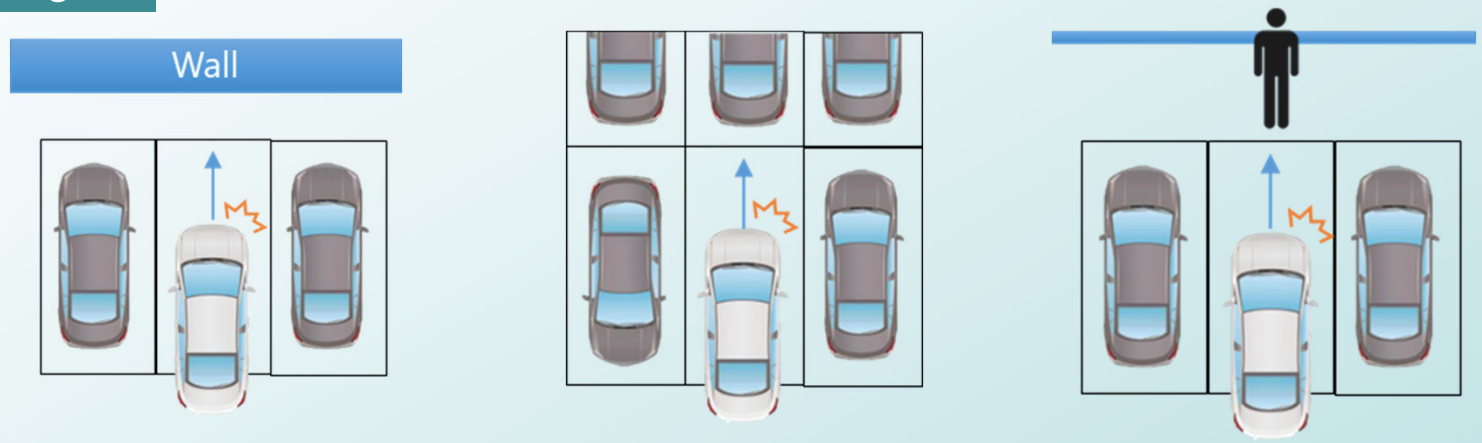
Assuming accidents scenario

- **Assuming pedal error in a parking lot**

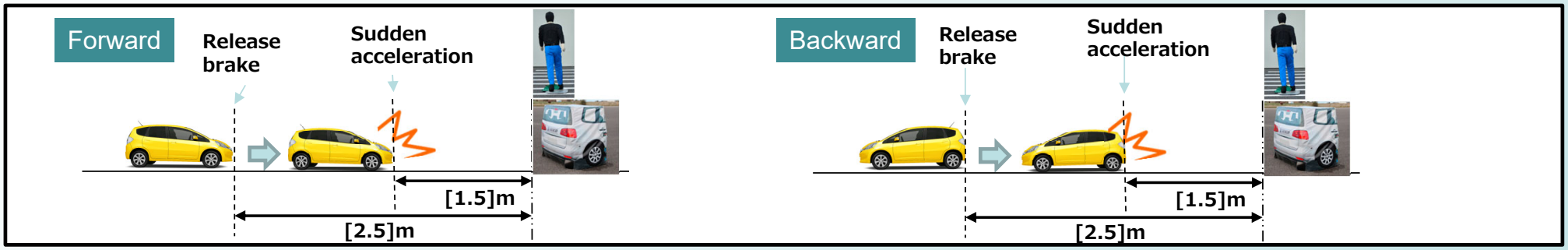
Parking lot



Pedal error may occur when entering and exiting a parking lot (repeated forward and backward movement)

Test procedure proposal

- Simulate situations such as entering and exiting a parking lot
  - ➢ Simulates pedal error during short distance travel



- Release the brake pedal, drive (Creep) a short distance then applying the accelerator pedal input. (distance is [ ] (square bracket)

→ JAMA plan to conduct real vehicle test on end of July. (try to several distance)

- Testability viewpoint
  - Specifying distance makes it easier to adjust the target position. (considering test repeatability and reproducibility)
  - If we specify running time or subject vehicle speed, we have to adjust the target position every time. (There is a large variation in the initial movement of the vehicle.)

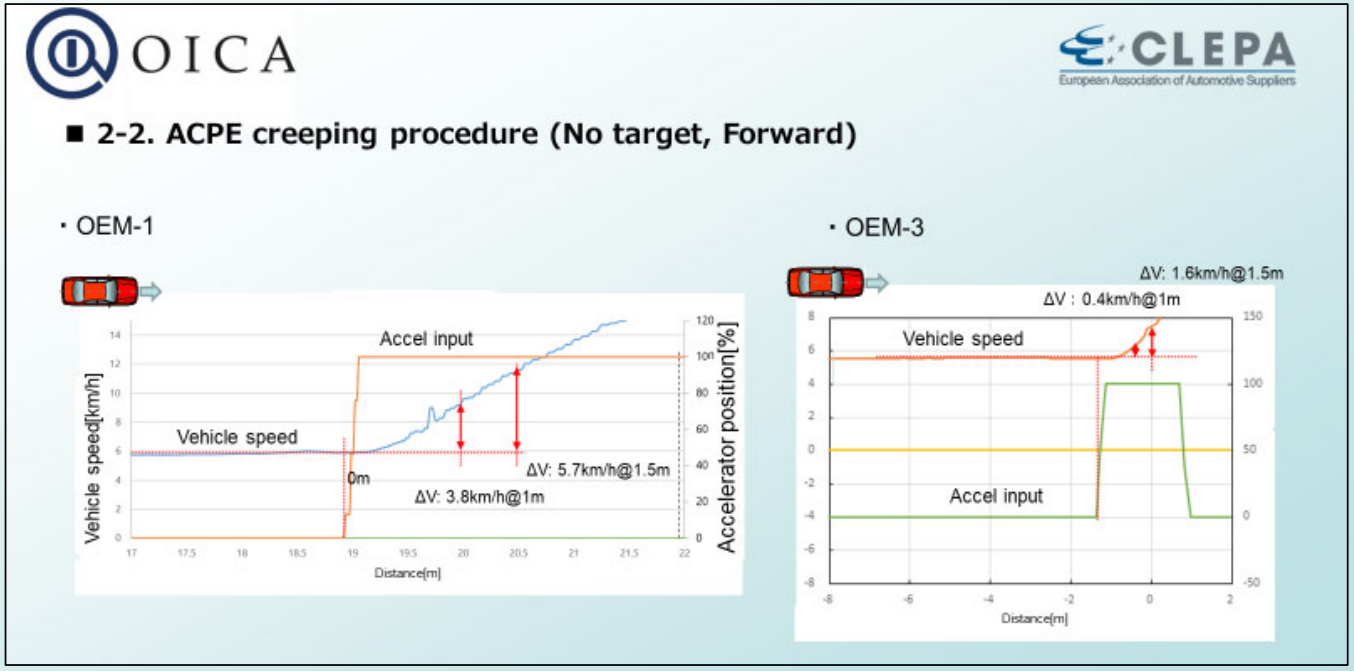
Performance requirement

- Acceleration when the accelerator is pressed while driving tends to be gradual based on the results of actual vehicle tests (ref : ACPE-06-09 document)
- If the distance to the obstacle is short, the initial vehicle speed increase is also small.

→ Would it be possible to measure the distance from the accelerator input to the obstacle in [1.5] m and use the same requirements as for the 00 series?

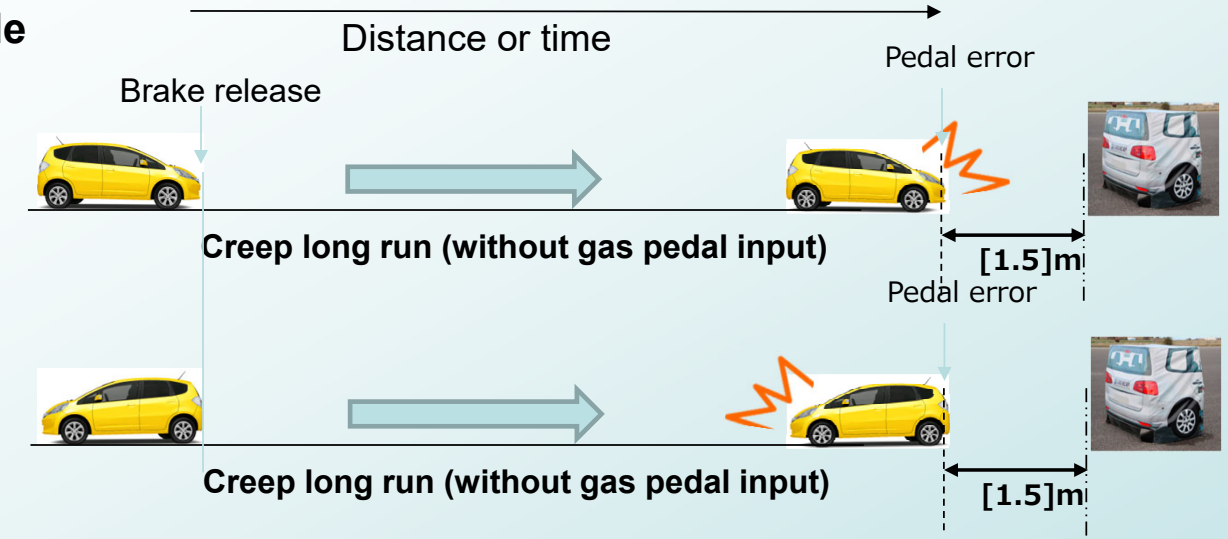
- Test distance, performance, etc. are scheduled for actual testing at the end of July

→ We would like to propose these parameter at the IWG in September



Creeping (Long) Run test procedure concern

Example



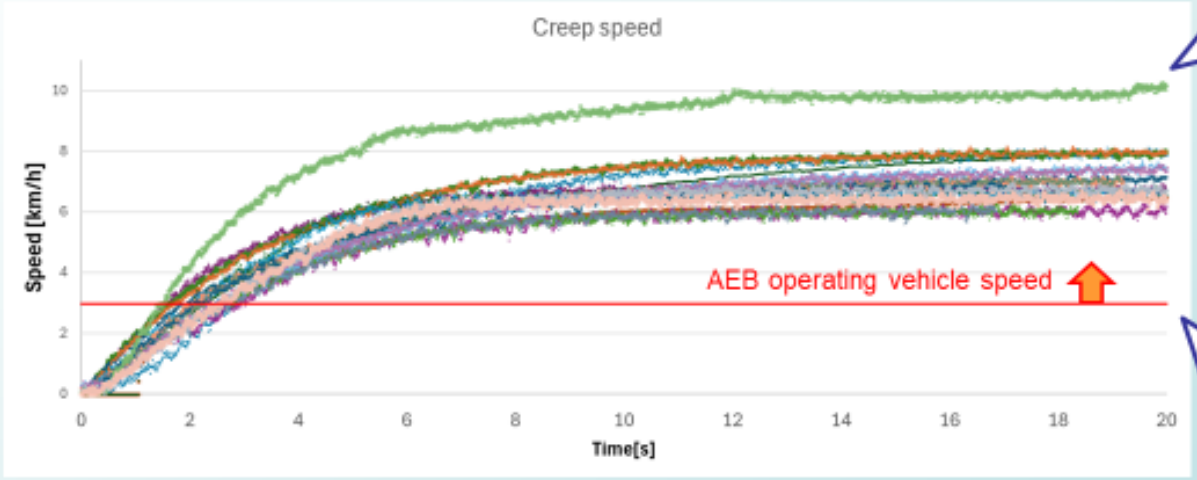
- **It is unlikely that such a scenario is ACPE typical accident scenario.**
  (creeping long run (ex. 5sec or more, or 10m running)
  Although we believe that such accidents are not zero, they are unlikely to be typical.

- **Vehicle speed up by creeping long run → It may occur AEBS intervention before ACPE.**
  Ex. AEBS intervention → Accelerator input → AEBS override → Vehicle accelerate
  Creeping speed exceeds AEBS operating speed

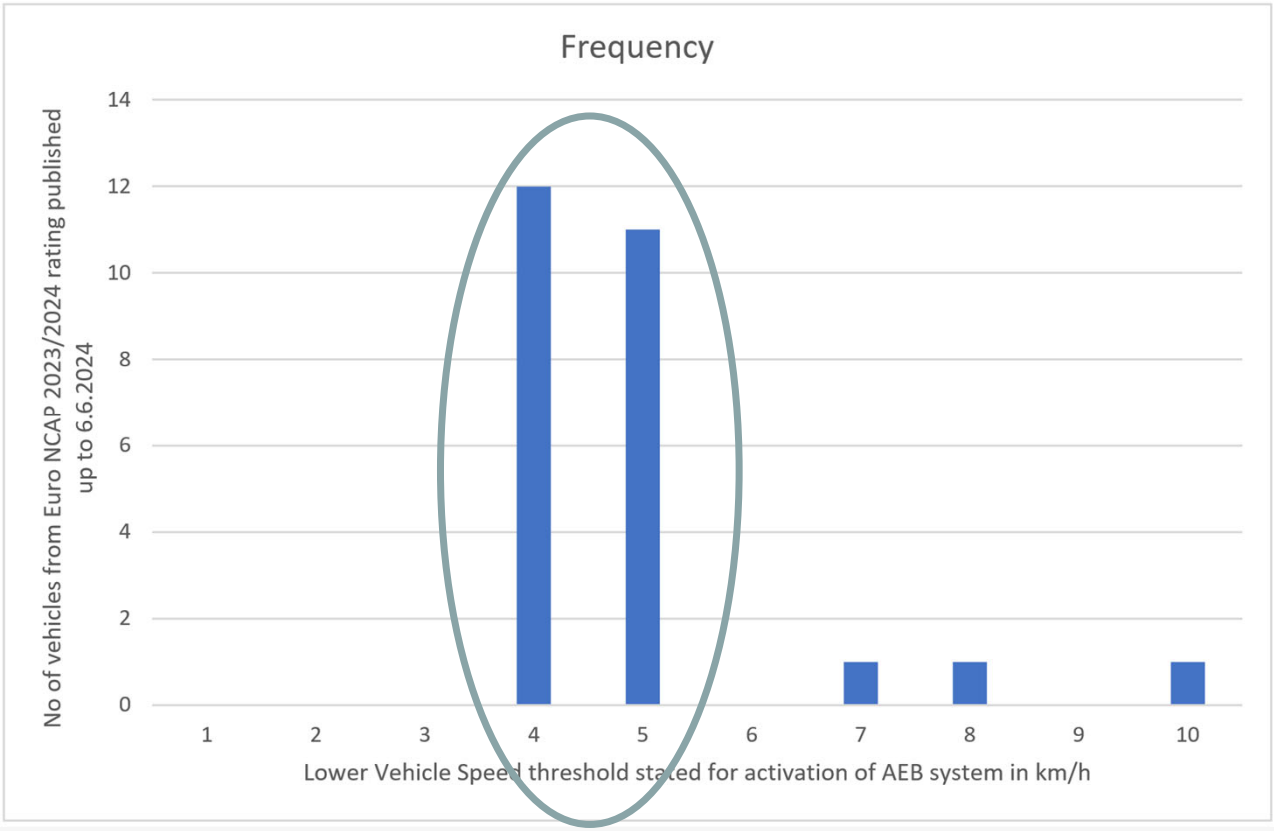
Creeping speed profile (ACPE-06-09 document) (repost)

ACPE-06-XX

■ 1. Creeping speed profile (11 models, 20 data)



AEBS activation lower speed



- **Extract "Euro NCAP" AEBS test result**
  - **Many AEBS can activate at lower speed (from 4~5km/h)**

***Excerpts from the test results sheets for each vehicle**

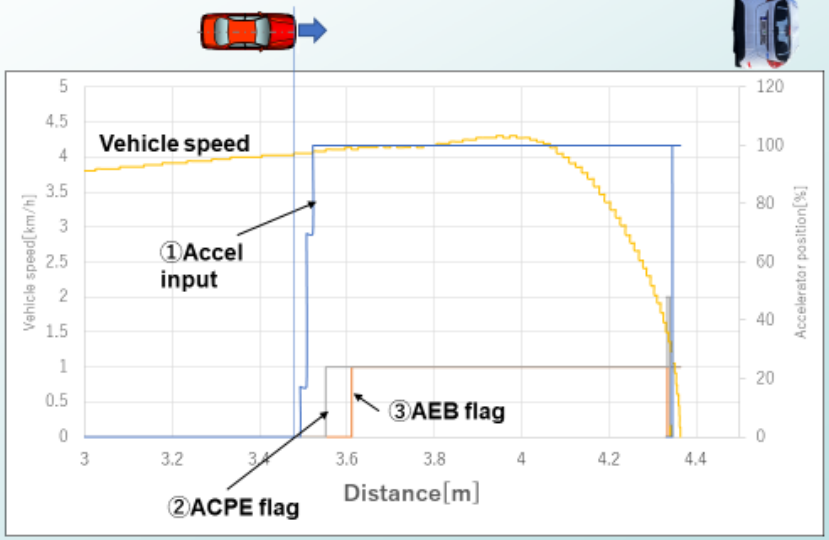
Ref; Euro NCAP | The European New Car Assessment Programme

Test results example : ACPE-06-09 document
(Creeping run test)

ACPE-06-XX

1.Brake pedal release (before 4.5m from the target)
2.Accel pedal input (before 1.0m from the target)

■ 2-1. ACPE creeping procedure (OEM-4 , Forward)



①Accel input → ②ACPE accel suppression → ③AEB operation immediately → Vehicle stop

- **Distance: 1.0m from accel input to obstacle**

➢ **Result: AEB operates immediately after accelerator input**

- **In this vehicle, AEBS was not deactivated by "accelerator operation"**
- **It is possible by design not to activate AEB when it is determined that the driver has the intention.**
- **Also, for vehicles with higher creep speeds, AEB may activate before the accelerator is input**

➢ **There are many different operating concepts, and it is difficult to define them uniformly.**
➢ **This test procedure seemed to be inappropriate as an evaluation method for ACPE.**

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Test procedure proposal

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Test procedure	Target	00 series TP From standstill to accelerate (1.0/1.5m)		01 series TP Moving OFF
	Vehicle (3D or 2D)	X		X
	Pedestrian	N/A		X
	Performance requirement	■ Warning function ■ Speed reduction ・ΔV＜8km/h、 ・Reduction rate more than 30% (w/wo ACPE)		(Tentative) ■ Warning function ■ Speed reduction ・ΔV＜8km/h、 ・Reduction rate more than 30% (w/wo ACPE)

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Summary

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- **Test procedure recommendation ; "Moving Off" scenario based on Traffic accidents analysis.**
  (The vehicle starts moving and the driver immediately operates pedal error.)

- **Creeping run test**
  If the creep travel time is increased, it will overlap with the AEBS operating speed range.
  As the result, a variety of actions may occur.
  - **AEBS operates prior to accel input**
  - **AEBS activation will be cancelled by driver's accel input. etc**

  It seemed to be inappropriate to evaluate ACPE function

➢ **Proposal**
Test Procedure : Moving Off test (short distance run → then accel input)
Test parameter : Would like to propose at September #10 IWG
Based on real vehicle tests (test distance, requirements, etc)

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Thank you

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Appendix ; EURO NCAP Test result sheet

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TEST RESULTS

EURO NCAP

Honda CR-V
With Safety Pack

2024 ★★★★★

Adult Occupant	Child Occupant	Vulnerable Road Users	Safety Assist
85%	86%	80%	79%

SPECIFICATION

Tested Model	Honda CR-V 2.0 Hybrid 'ADVANCE', LHD
Safety pack	Honda Sensing 360
Body Type	- 5 door SUV
Year Of Publication	2024
Kerb Weight	1813kg
VIN From Which Rating Applies	- all CR-Vs with Honda Sensing 360
Class	Small SUV

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AEB Car-to-Car — 7.8 / 9 Pts

System Name	Collision Mitigation Braking System
Type	Autonomous emergency braking and forward collision warning
Operational From	5 km/h
Sensor Used	camera and radar

Assessment details (euroncap.com)