Federal Ministry
of Transport and
Digital Infrastructure

bast

Lane Change Test for ACSF

Lane change test

Aimes:
1. Safe lane change while using ACSF
    i. Lane change capability
    ii. Abortion of lane change
2. ACSF on and activated but real steering capability is suppressed
3. Check of willingness of the ACSF for an induced lane change manoeuvre
4. Check of willingness of the ACSF for abort a lane change manoeuvre if second lane is suddenly occupied by another vehicle

Rationale:
ACSF initiated lane change manoeuvre may affect other road users approaching from behind in the second lane
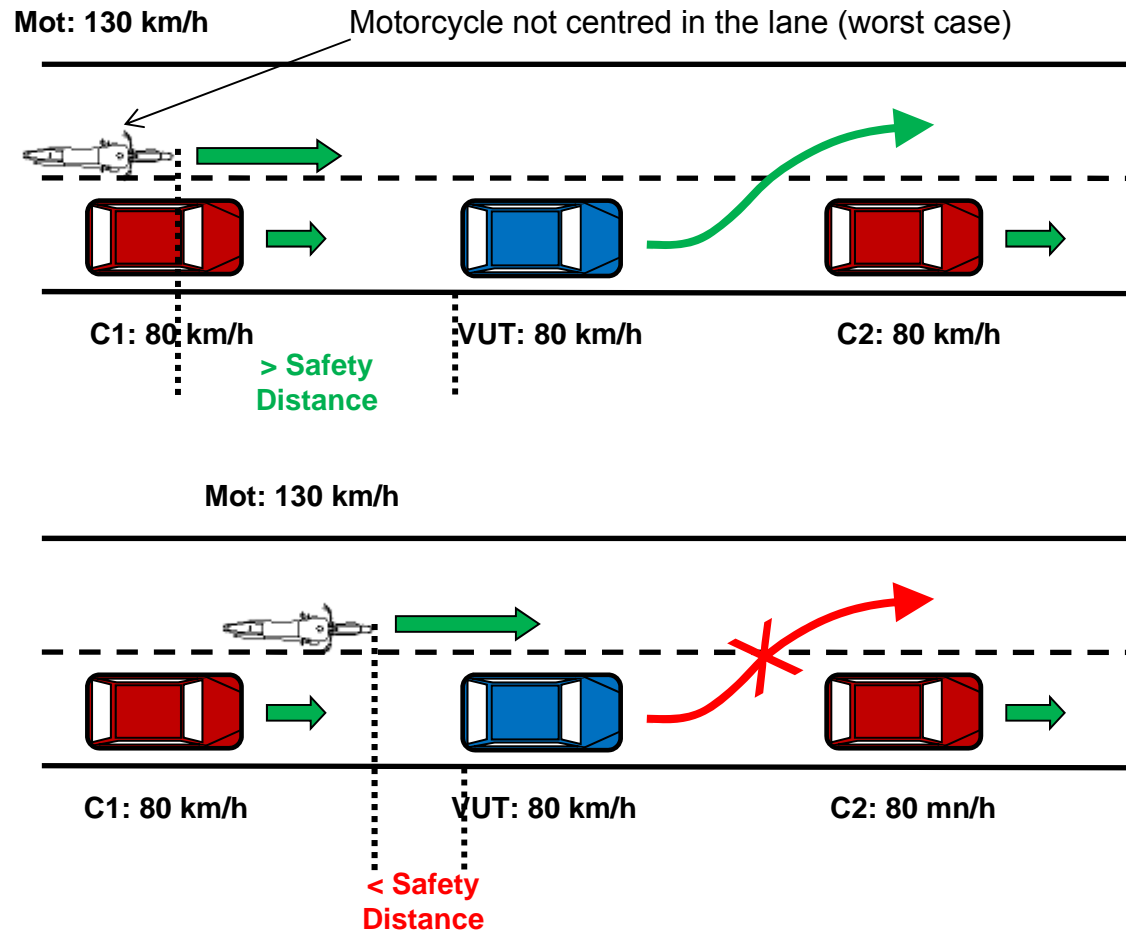
Solution:
Test for safe distance to the rear (without endanger other traffic) where the speed and position of the other object should be classified

Lane change test

- Adjust $v_{VUT\ set}$ to 100 km/h in order to induce willingness to overtake

- Safety Distance (VUT – Mot) is [78 m]

- Distances between vehicles on the right lane are 40 m each

- C1, C2 and Mot centered in their lane

C1: Following Car [or Truck]
C2: Leading Car
VUT: ACSF Car (Vehicle Under Test)
Mot: Motorcycle (L3)

Mot: 130 km/h   Motorcycle not centred in the lane (worst case)

C1: 80 km/h   **VUT: 80 km/h**   **C2: 80 km/h**

> Safety Distance

Mot: 130 km/h

C1: 80 km/h   **VUT: 80 km/h**   **C2: 80 mn/h**

< Safety Distance

Lane change test

ACSF is on and activated but real steering capability is suppressed

- ego vehicle (VUT) drives constantly (at least 4 s) between two other vehicles in the same lane, all at 80 km/h, the other vehicles are centered in the lane.
- time gap to two other vehicles 1.8 s (= 40 m = min. recommended safety distance)
- set $v_{VUT\ set}$ to 100 km/h in order to induce willingness to overtake
- third vehicle (real L3-Motorcycle) approaches on the overtaking lane with 130 km/h.
- distance of third vehicle to vehicle under test: above and below safety distance ($\approx$ 170 m; see presentation ‚Safety Distances‘))
- for safety reasons during testing, the initiated lane change (real steering) of the VUT will be always suppressed during the test (by soft- or hardware) and the willingness of the ACSF to change the lane or not will be checked in the vehicle software (supported by the manufacturer).

Test is passed: **- Willingness to overtake (steering command for the lane change) if the third vehicle is above the Safety Distance when steering command is induced**
- Abortion of willingness to overtake (command to stay in the current lane) and lane keeping continues if the third vehicle is below the Safety Distance