



Forward Motion/Moving-Off Information Signal and/or Motion Inhibit Systems Regulation (MOIS)

Consensus Document for Potential Regulatory
Approaches – Version 1

VRU-Proxi-11-03

September 2019

Regulation Scope



Regulation Scope (Q1)

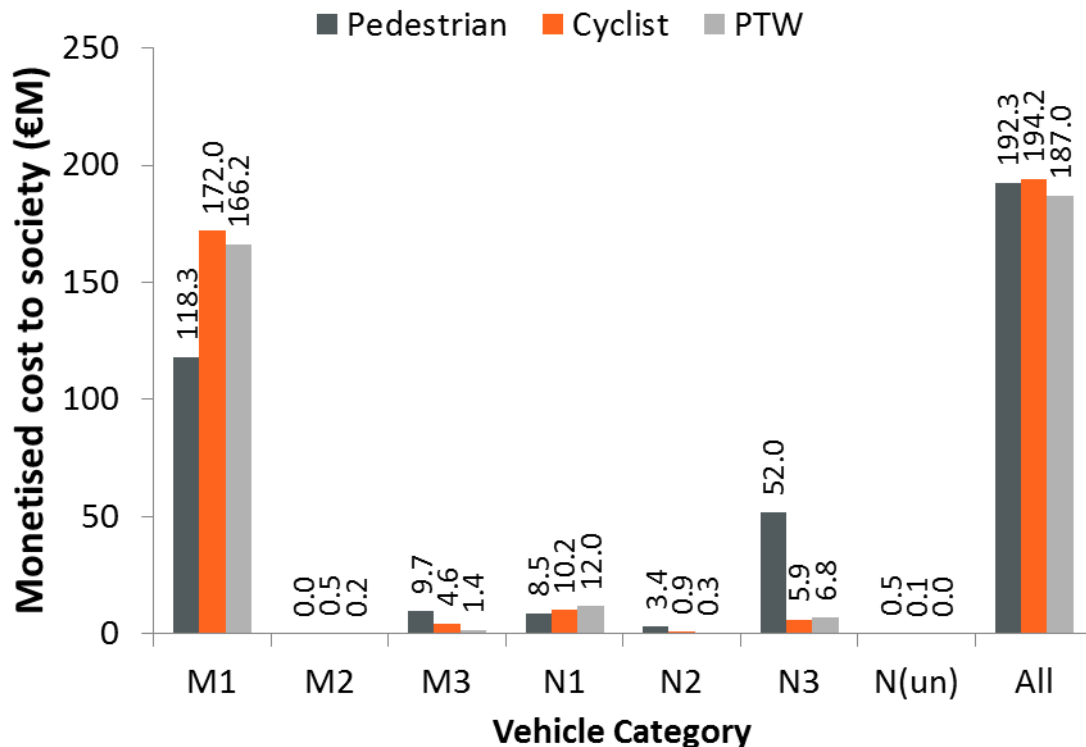
What vehicle categories shall be in scope?

- VRU-Proxi Question:
 - **Q1: What shall the scope of the regulation be regarding vehicle categories?**
- Summary of Options:
 - M2/M3/N2/N3 only – linked to GSR requirements
 - All vehicle categories – i.e. including M1/N1 category vehicles too
- Summary of VRU-Proxi-10 Discussion:
 - Proposed that to prepare for GRSG-118 (April 2020), M2/M3/N2/N3 vehicle categories only
 - Summary of relevant TPs from VRU-Proxi-09-03 (pg. 62) and CFs from VRU-Proxi-10-05 (pgs. 3-7)
- VRU-Proxi Member Feedback:
 - **J:** Some amount of accidents are constantly occurred for M1 and N1 in Japan. Therefore, **we would like to include M1 and N1 categories**
 - **DE:** M1/N1 vehicles will very **likely not have the problem of not seeing VRUs** in front of the vehicle prior to moving off. These accident situations also are clearly targeted by AEB for M1/N1. German position is that these systems should be **developed for M2/N2 and above.**
 - **CLEPA:** CLEPA supports the VRU-Proxi-10 Outcomes to **exclude M1/N1**. All the following CLEPA considerations are based on the assumption that M1/N1 are excluded
- VRU-Proxi Decision:
 - [To be completed]

Regulation Scope (Q1): Evidence #1

VRU Casualty Share for MOIS casualties (EU28)

- MOIS Target Population
- Collisions between M1 vehicles and VRUs have highest societal costs
 - M3/N1/N3 also have significant societal cost
- VRU casualty share:
 - Pedestrians greater share for M2/M3/N2/N3 (particularly for N3)
 - Pedestrians/cyclists relatively equivalent share for M1/N1



Regulation Scope (Q2)

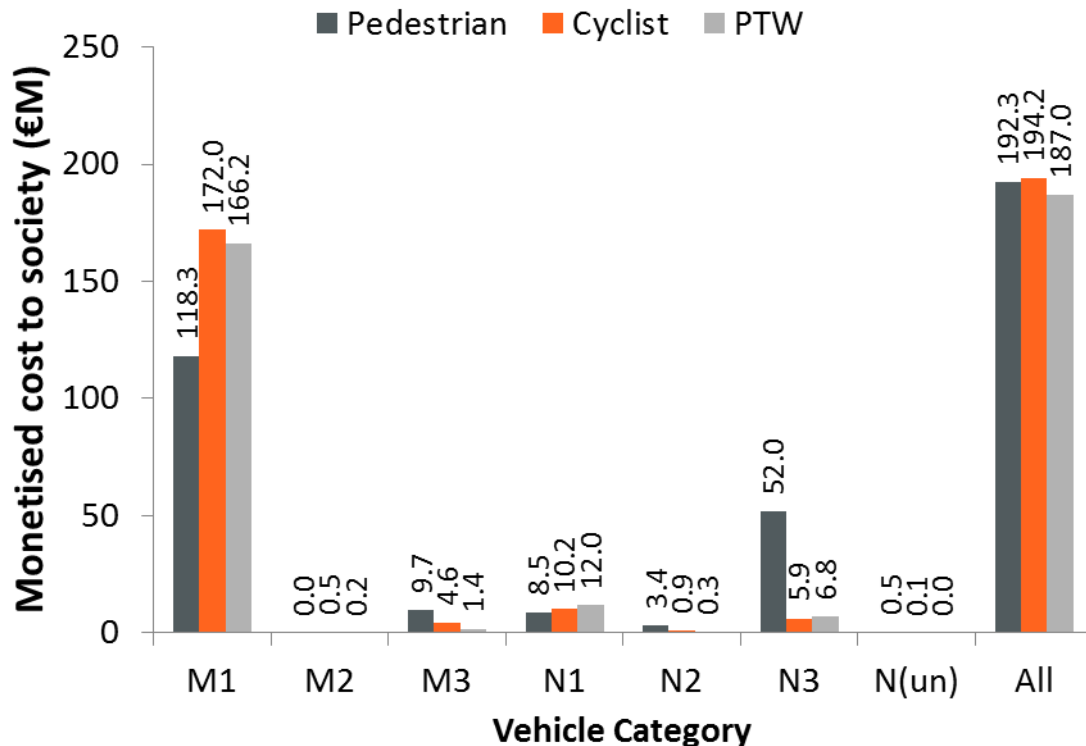
What VRUs shall be in scope?

- VRU-Proxi Question:
 - **Q2: What shall the scope of the regulation be regarding VRUs?**
- Summary of Options:
 - Adult pedestrians, child pedestrians and/or cyclists
- Summary of VRU-Proxi-10 Discussion:
 - Draft AEB regulation requires a 6yo pedestrian dummy (& will require a cyclist dummy), draft BSIS regulation requires a cyclist dummy, TfL standards use adult and child dummies
 - Very low proportion of child (<15yo) casualties (from VRU-Proxi-09-03 (pg. 85)), more elderly
 - Cyclists important for M1/N1 vehicles, pedestrians significantly more important for other categories
- VRU-Proxi Member Feedback:
 - **J:** Detection target shall be pedestrian **mainly adults include children**. Because children are easy to be in the blind spot
 - **DE:** From a technology perspective, child pedestrians are a worst case with regard to identification and detection, as well as a worst case for the vehicle driver to see them. Cyclists, on the other hand, are much easier to detect for typical sensor systems. German position is: **child pedestrians should be detected**.
 - **CLEPA:** CLEPA considers necessary to only use **standardised collision targets** (i.e. ISO 19206) [**adult pedestrian** targets only – cyclist in draft]
- VRU-Proxi Decision:
 - [To be completed]

Regulation Scope (Q2): Evidence #1

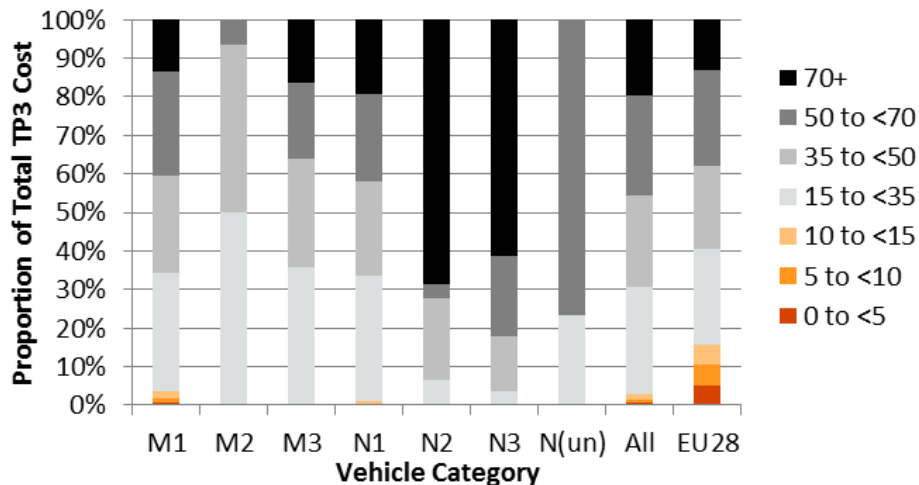
VRU Casualty Share for MOIS casualties (EU28)

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- VRU casualty share:
 - Pedestrians greater share for M2/M3/N2/N3 (particularly for N3)
 - Pedestrians/cyclists relatively equivalent share for M1/N1



Regulation Scope (Q2): Evidence #2

Casualty Age as a Proportion of Total Annual Societal Costs of VRU Casualties



- Key Points:
 - Relatively smaller incidence of child (<15yo) casualties vs. proportion of EU28 population
 - Much higher risk of elderly (≥ 70 yo) casualties for N2/N3 vehicles vs. proportion of EU28 population

System Functionality



System Functionality (Q3)

What system functionality/ies shall be regulated?

- VRU-Proxi Question:
 - **Q3: What shall the scope of the regulation be regarding the functionality of the systems that it is trying to regulate?**
- Summary of Options:
 - Moving off proximity information signal, moving off collision warning signal
 - Moving off motion inhibit (i.e. no take-off)
 - Moving off AEB, low-speed AEB
- Summary of VRU-Proxi-10 Discussion:
 - GRVA shall be consulted regarding potential conflicts with AEB (M1/N1) regulation
 - Moving-off/low-speed AEB considered out of scope, motion inhibit needs further consideration
- VRU-Proxi Member Feedback:
 - See overleaf
- VRU-Proxi Decision:
 - [To be completed]

System Functionality (Q3)

What system functionality/ies shall be regulated?

- VRU-Proxi Question:
 - **Q3: What shall the scope of the regulation be regarding the functionality of the systems that it is trying to regulate?**
- VRU-Proxi Member Feedback:
 - **J:** If discussion about this system will be done in VRU-Proxi IWG, it shall be **warning aspects only**. If it will include vehicle control aspects such as low-speed AEB, discussion should be done in GRVA. We are not sure about **relationship between direct visions**. Does this system warn even if VRU can be seen or blind spot only? And also, not sure about **frequency of warning in the actual scene** (worry about annoyance for driver) and **technical feasibility** (no system exist).
 - **DE:** Currently, AEB systems for N2/M2 and above are targeting the high speed regime. There is a German proposal to modify Reg 131 in a way to require AEBs to be working at all speeds, however there is still a large debate on this between Industry and CPs. It would benefit these discussions if **AEB functionality for the lower speeds** is also requested from another group (-> the necessary sensors for low-speed pedestrian detection could be also the sensors required for a good-performing full speed range AEB function, targeted at cars).
 - **CLEPA:** Brake application (AEB) should be excluded from the scope as **braking shall remain in the responsibility of the GRVA informal group** dedicated to emergency braking. Considering the criticality of time constraints and the need to develop a robust regulation, capable to properly address scenarios in real life and the corresponding system behaviors, **CLEPA proposes a stepwise introduction, as follows: Step 1 - Information/Warning, Step 2 - Motion inhibit**. In any case requirements should reflect systems that are already on the market and fully consider their real-world implications (e.g. misuse cases, technical capabilities, others)
 - **OICA:** **TTC based warning should be avoided at low speed**, as failure rate for such systems increases while speed is reduced

Vehicle Manoeuvres



Vehicle Manoeuvres (Q4)

What motion is the vehicle undertaking?

- VRU-Proxi Question:
 - **Q4: What shall the scope of the regulation be regarding the motion of the vehicle during the collisions that the regulation is attempting to prevent?**
- Summary of Options:
 - Stationary vehicle, about to move off from rest by moving straight ahead
 - Vehicle moving slowly straight ahead
 - Stationary vehicle, about to move off from rest by turning to nearside/offside
 - Vehicle moving slowly by turning to nearside/offside
- Summary of VRU-Proxi-10 Discussion:
 - Proposed that to prepare for GRSG-118 (April 2020), straight ahead (stationary/slow movement) only
 - Future may look at turning manoeuvres
- VRU-Proxi Member Feedback:
 - See overleaf
- VRU-Proxi Decision:

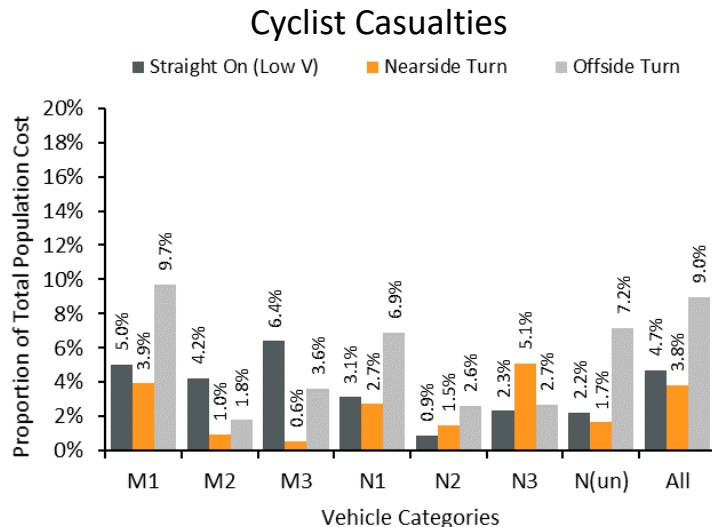
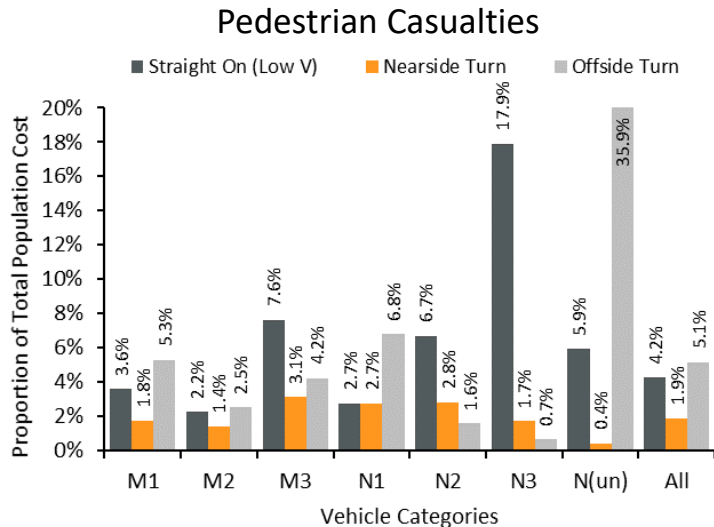
Vehicle Manoeuvres (Q4)

What motion is the vehicle undertaking?

- VRU-Proxi Question:
 - **Q4: What shall the scope of the regulation be regarding the motion of the vehicle during the collisions that the regulation is attempting to prevent?**
- VRU-Proxi Member Feedback:
 - **J:** To be considered **not only forward direction but also right or left turn from standstill** to moving-off or low-speed. It should be discussed with accidentology.
 - **DE:** German national accident statistics does not allow to identify the situations (statistics provided to VRU PROXI already in November 2017)
 - **CLEPA:** CLEPA agrees with the proposed **“moving straight ahead collision only” (from stand-still or slow motion)** and stresses that turning scenarios would require a much broader field of vision and sensor performances.

VRU Manoeuvres (Q4): Evidence #1

Vehicle Manoeuvre when Front End Impacted as a Proportion of Annual Costs of Total Population



Key Points:

- Moving-off/slowing/stopping (straight on – low V) manoeuvre important for front end impacts
 - Across the board, but particularly for M3/N2/N3 vehicles that impact pedestrians with front end
- Offside turn manoeuvre important for front end impacts
 - Across the board, but particularly for M1/M3/N1 vehicles that impact pedestrians and cyclists with front end

Vehicle Manoeuvres (Q5)

What speed is the vehicle travelling at?

- VRU-Proxi Question:
 - **Q5: What shall the scope of the regulation be regarding the maximum speed of the vehicle that the system shall be operational for?**
- Summary of Options:
 - 0 kph to 10/20/30 kph
- Summary of VRU-Proxi-10 Discussion:
 - GRVA needs to be consulted regarding the interface with AEB(M1/N1) regulation
 - Requires collision warnings at speeds >20kph, which may act as pragmatic boundary
- VRU-Proxi Member Feedback:
 - **J:** Regarding moving-off, **it is enough to detect within 0~20 km/h**. If available, speed data in parking can help to decide speed. Over 20 km/h can cover by lower speed range and it seems normal driving not VRU-Proxi focus.
 - **DE:** German national accident statistics does not allow to identify the situations (statistics provided to VRU PROXI already in November 2017)
 - **CLEPA:** CLEPA considers **10kph maximum speed** do represent well the “slow moving” conditions.
- VRU-Proxi Decision:
 - [To be completed]

VRU Manoeuvres



VRU Manoeuvres (Q6)

What motion is the VRU undertaking?

- VRU-Proxi Question:
 - **Q6: What shall the scope of the regulation be regarding the motion of the VRU during the collisions that the regulation is attempting to prevent?**
- Summary of Options:
 - Crossing from nearside/offside
 - Stationary in road facing towards/away
 - Moving in road longitudinally towards/away to vehicle manoeuvre
 - Obstructed
- Summary of VRU-Proxi-10 Discussion:
 - Collision where VRUs located in road ahead likely to be lower than crossing – however data unknown
 - Further evidence required for decision
- VRU-Proxi Member Feedback:
 - See overleaf
- VRU-Proxi Decision:

VRU Manoeuvres (Q6)

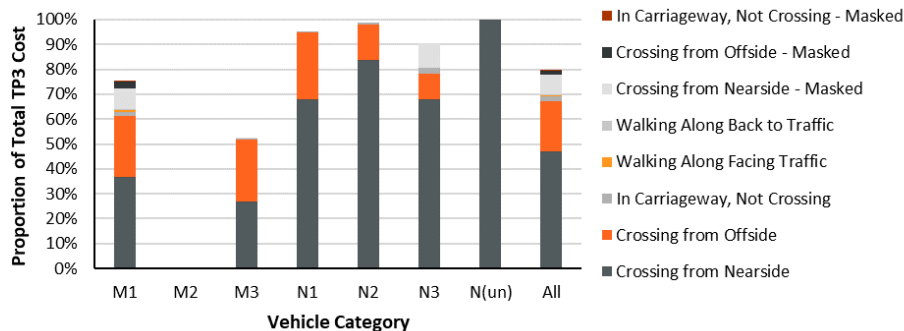
What motion is the VRU undertaking?

- VRU-Proxi Question:
 - **Q6: What shall the scope of the regulation be regarding the motion of the VRU during the collisions that the regulation is attempting to prevent?**
- VRU-Proxi Member Feedback:
 - **J:** It should be **detect not only crossing but also detect stationary scenario** around vehicle.
 - **DE:** German national accident statistics does not allow to identify the situations (statistics provided to VRU PROXI already in November 2017). However, a **crossing scenario is exactly what is currently in the AEBS M1-N1 regulation, which would allow a copy-paste of most aspects.**
 - **CLEPA:** CLEPA recommends a pragmatic **approach based on robust accidentology** evidences and justifications

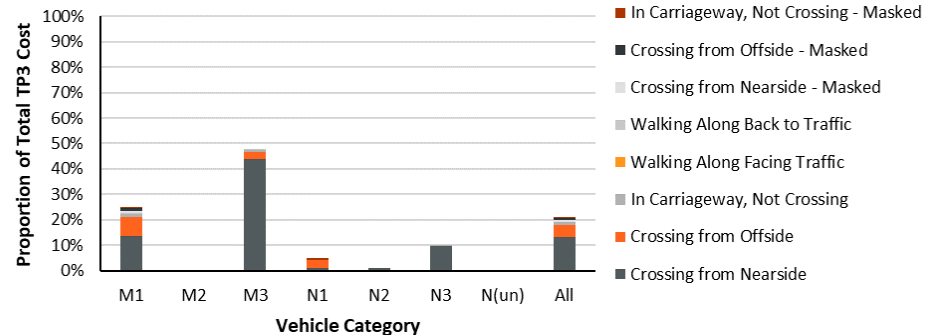
VRU Manoeuvres (Q6): Evidence #1

Pedestrian Manoeuvre as a Proportion of Total Annual Societal Costs of Target Population

Vehicle Moving-Off Manoeuvres



Vehicle Slowing/Stopping Manoeuvres



Key Points:

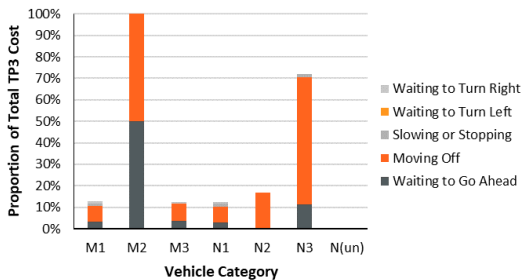
- Crossing from nearside/offside are leading pedestrian manoeuvres for all categories
- Crossing from nearside while masked (obstructed) important for M1/N3 categories
 - Representative of a pedestrian crossing from behind a vehicle from the nearside of the carriageway
- Not very many collisions when stood in pathway of vehicle

VRU Manoeuvres (Q6): Evidence #2

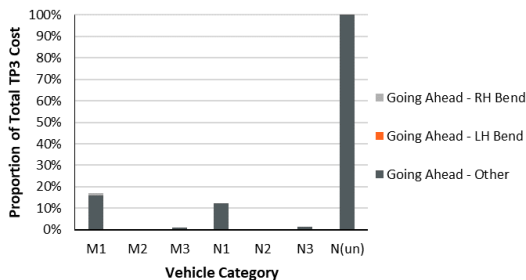
Cyclist Manoeuvre as a Proportion of Total Annual Societal Costs of Target Population

Vehicle Moving-Off
 Stopping Manoeuvres

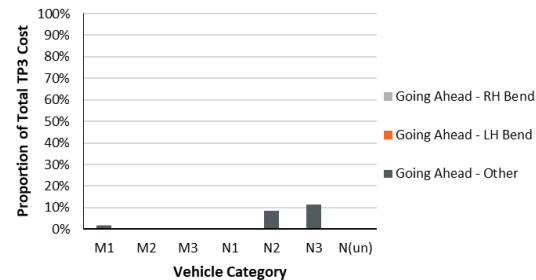
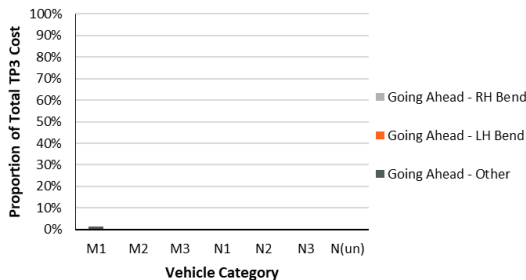
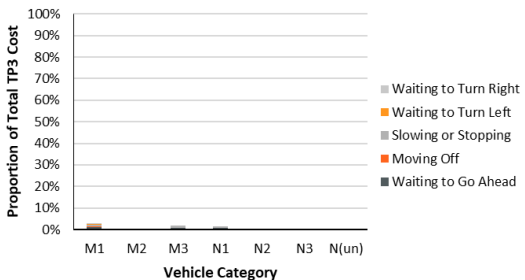
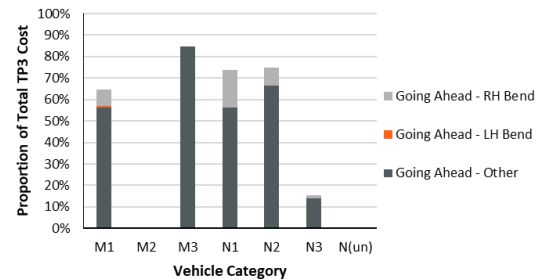
Cyclist Not Crossing



Cyclist Crossing from Nearside



Cyclist Crossing from Offside



Key Points:

- Cyclist crossing from offside is leading cyclist manoeuvre for M1/M3/N1/N2 categories
- Cyclist not crossing is leading cyclist manoeuvre for N3 category vehicles

VRU Manoeuvres (Q7a)

How far away should the VRU be from the front of the vehicle?

- VRU-Proxi Question:
 - **Q7: What shall the scope of the regulation be regarding the forward position of the VRU during the collisions that the regulation is attempting to prevent?**
- Summary of Options:
 - Close-proximity to vehicle and/or further away from vehicle front end
- Summary of VRU-Proxi-10 Discussion:
 - Should both “stationary vehicle, about to move off from rest by moving straight ahead” and “vehicle moving slowly straight ahead” vehicle movement scenarios be adopted then both positions tested
- VRU-Proxi Member Feedback:
 - **DE:** German national accident statistics does not allow to identify the situations (statistics provided to VRU PROXI already in November 2017)
 - **CLEPA:** **CLEPA supports close proximity**, for further away see next point. This needs to be further discussed on the basis of **direct vision considerations** related to the vehicle forward visibility.
- VRU-Proxi Decision:
 - [To be completed]

VRU Manoeuvres (Q7b)

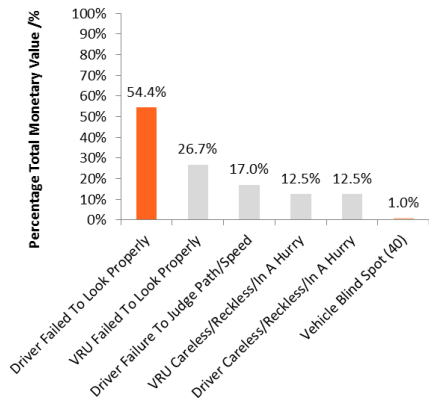
Should direct vision be taken into account?

- VRU-Proxi Question:
 - **Q7: What shall the scope of the regulation be regarding vehicles with “good” direct vision?**
- Summary of Options:
 - Vehicles with “good” direct vision (i.e. M1/M2/M3/N1) be included/excluded
- Summary of VRU-Proxi-10 Discussion:
 - [Not discussed at VRU-Proxi-10]
- VRU-Proxi Member Feedback:
 - [No IWG member feedback directly sought yet]
 - J: We are not sure about relationship between direct visions. Does this system warn even if VRU can be seen or blind spot only?
 - DE: M1/N1 vehicles will very likely not have the problem of not seeing VRUs in front of the vehicle prior to moving off. These accident situations also are clearly targeted by AEB for M1/N1.
 - CLEPA: This needs to be further discussed on the basis of direct vision considerations related to the vehicle forward visibility.
 - OICA: OICA considers that such systems should not be required in the case where the driver has a good direct vision.
- VRU-Proxi Decision:
 - [To be completed]

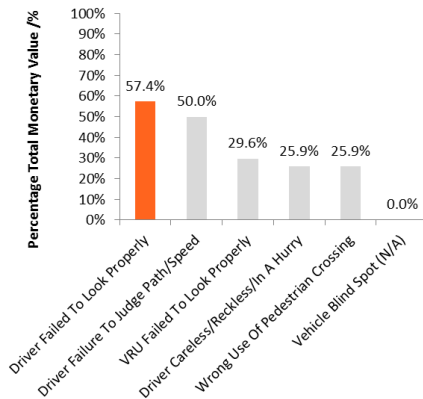
VRU Manoeuvres (Q7b): Evidence #1

Leading Contributory Factors for MOIS casualties

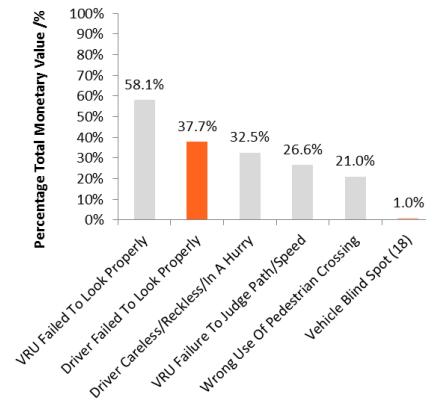
M1



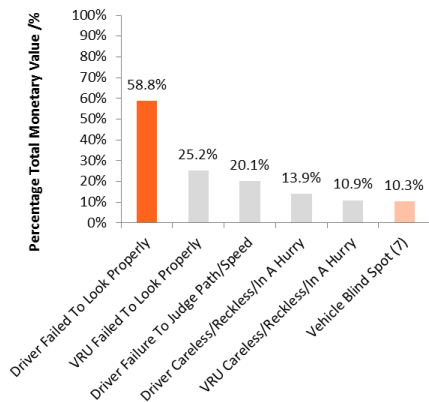
M2



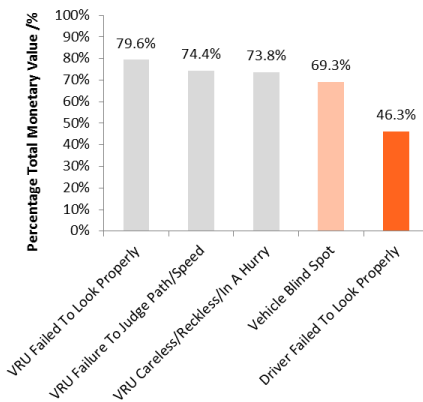
M3



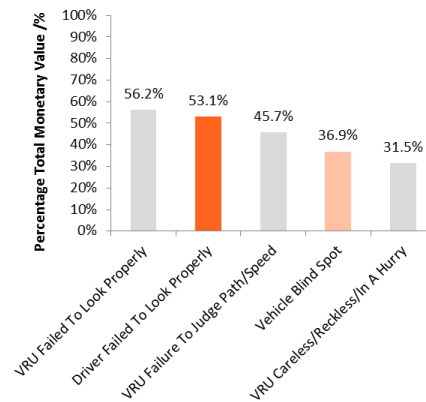
N1



N2



N3



VRU Manoeuvres (Q7b): Evidence #2

Blind Spots During Low Speed/Moving-Off Manoeuvres

- When cause of collision strongly linked to blind spot...
 - VRUs close to front of vehicle
- Very little time between vehicle starting to move and collision occurring
- Collision warning has low effectiveness
- Forward VRU close-proximity information signal
 - May improve outcomes
 - Requires balance of alert effectiveness and intrusiveness of false positives
 - Detection range/direction & HMI will be key
- Moving-off motion inhibit
 - Potential to virtually eliminate collision
 - False positives or pedestrian reaction may cause problems with HMI/driver acceptance, but driver override could be provided

VRU Manoeuvres (Q7b): Evidence #3

Driver Failed to Look Properly During Low Speed/Moving-Off Manoeuvres

- When cause of collision strongly linked driver failing to look properly...
 - VRUs may be further away from front of vehicle *(NB: how far is not quantifiable in S19)*
- Greater time between vehicle starting to move and collision occurring
- Collision warning signal
 - Much more likely to be effective due to greater driver reaction times
- Forward VRU close-proximity information signal
 - Balance of alert effectiveness and intrusiveness of false, and even true, positives may be more challenging (as driver will be able to see VRU when alerted to proximity in most cases)
- Moving-off motion inhibit
 - Inappropriate due to pedestrian behaviour and steered path being a factor as well

VRU Manoeuvres (Q8)

How far away should the VRU be from the front of the vehicle?

- VRU-Proxi Question:
 - **Q8: What is the maximum forward distance away from the front end of the vehicle that the VRU shall be positioned?**
- Summary of Options:
 - 2.5 m, 4 m, 5 m [or based on TTC?]
- Summary of VRU-Proxi-10 Discussion:
 - Current TfL standards use 4 m, calculated based on the reaction times when moving off from rest
- VRU-Proxi Member Feedback:
 - **J:** No preference now. But, actual existence of VRU in the city, not avoidable by environments, need to be investigated.
 - **DE:** German national accident statistics does not allow to identify the situations (statistics provided to VRU PROXI already in November 2017)
 - **CLEPA:** This needs to be further discussed on the basis of [direct vision considerations](#) related to the vehicle forward visibility.
- VRU-Proxi Decision:
 - [To be completed]

VRU Manoeuvres (Q9)

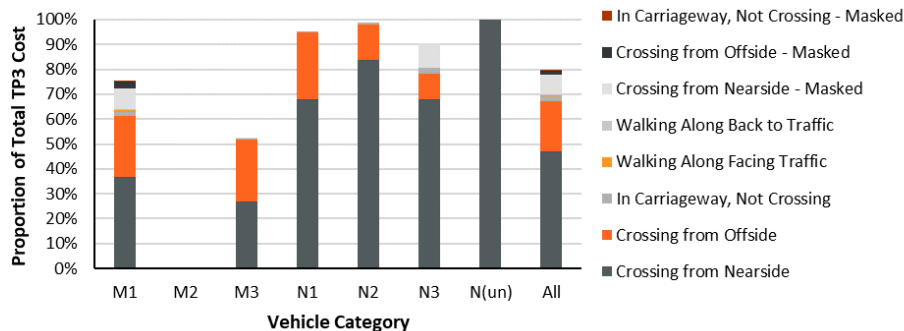
How far away should the VRU be laterally from the vehicle path?

- VRU-Proxi Question:
 - **Q9: What shall the scope of the regulation be regarding the lateral position of the VRU during the collisions that the regulation is attempting to prevent?**
- Summary of Options:
 - VRU dummy laterally displaced and/or starting point in path of vehicle
- Summary of VRU-Proxi-10 Discussion:
 - Should be based on accidentology
- VRU-Proxi Member Feedback:
 - **J:** To be determined based on accidentology.
 - **DE:** German national accident statistics does not allow to identify the situations (statistics provided to VRU PROXI already in November 2017)
 - **CLEPA:** More detailed accidentology data and evaluations are needed to confirm the position parameters
- VRU-Proxi Decision:
 - [To be completed]

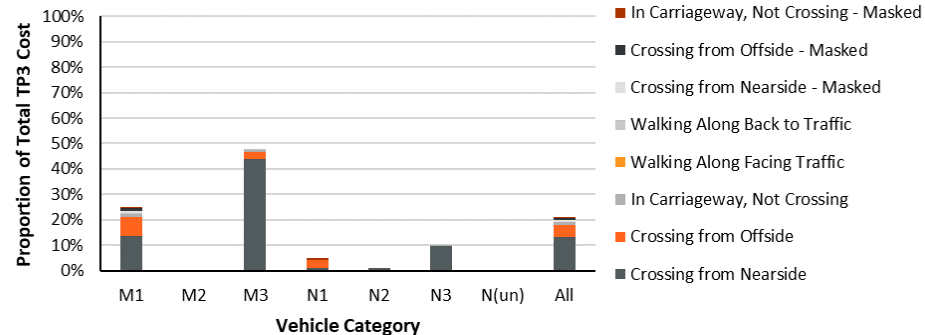
VRU Manoeuvres (Q9): Evidence #1

Pedestrian Manoeuvre as a Proportion of Total Annual Societal Costs of Target Population

Vehicle Moving-Off Manoeuvres



Vehicle Slowing/Stopping Manoeuvres



Key Points:

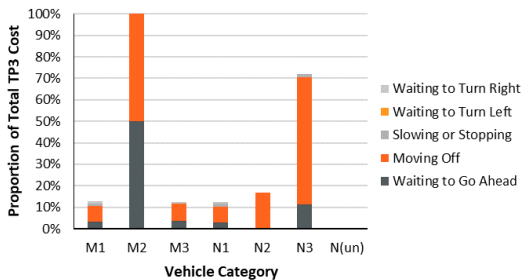
- Crossing from nearside/offside are leading pedestrian manoeuvres for all categories
- Crossing from nearside while masked (obstructed) important for M1/N3 categories
 - Representative of a pedestrian crossing from behind a vehicle from the nearside of the carriageway
- Not very many collisions when stood in pathway of vehicle

VRU Manoeuvres (Q9): Evidence #2

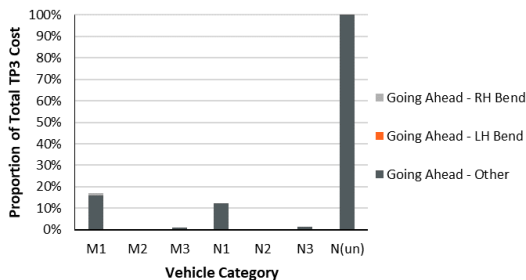
Cyclist Manoeuvre as a Proportion of Total Annual Societal Costs of Target Population

Vehicle Moving-Off
 Vehicle Slowing/
 Stopping Manoeuvres
 Manoeuvres

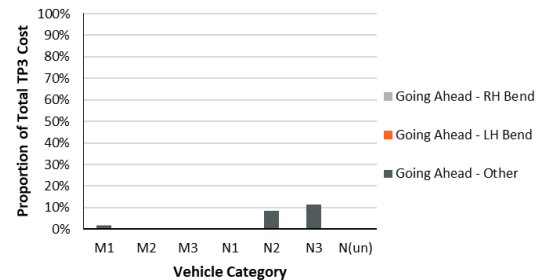
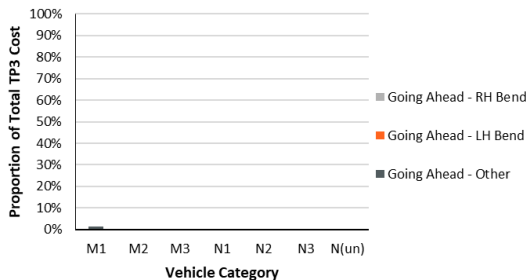
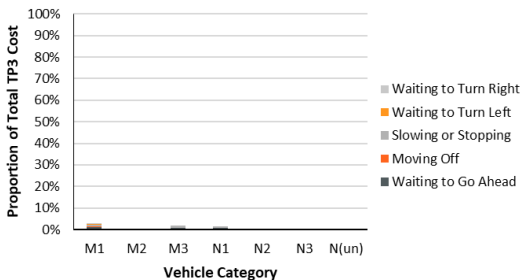
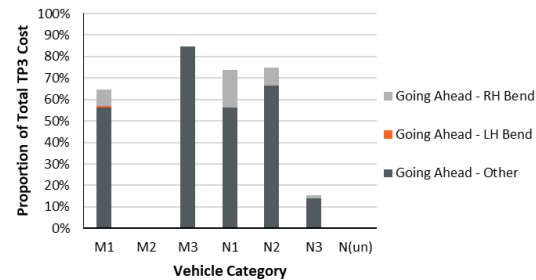
Cyclist Not Crossing



Cyclist Crossing from Nearside



Cyclist Crossing from Offside



Key Points:

- Cyclist crossing from offside is leading cyclist manoeuvre for M1/M3/N1/N2 categories
- Cyclist not crossing is leading cyclist manoeuvre for N3 category vehicles

VRU Manoeuvres (Q10)

How far away should the VRU be laterally from the vehicle path?

- VRU-Proxi Question:
 - **Q10: What is the maximum initial lateral distance away from the nearside/offside edge of the vehicle that the VRU shall be positioned for laterally displaced starting point tests?**
- Summary of Options:
 - 0 m, 1 m, 2.2 m [or based on TTC?]
- Summary of VRU-Proxi-10 Discussion:
 - Current TfL standards use 2.2 m, calculated based on the reaction times when moving off from rest
- VRU-Proxi Member Feedback:
 - **J:** To be determined based on accidentology.
 - **DE:** German national accident statistics does not allow to identify the situations (statistics provided to VRU PROXI already in November 2017)
 - **CLEPA:** More detailed accidentology data and evaluations are needed to confirm the position parameters
- VRU-Proxi Decision:
 - [To be completed]

VRU Manoeuvres (Q11)

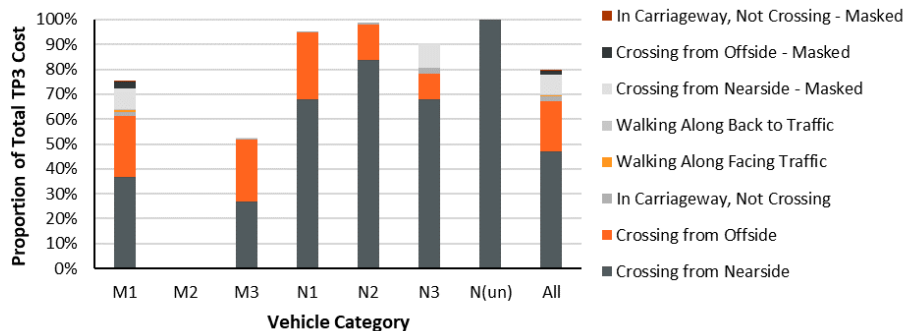
Should VRUs stepping out from behind an obstruction be saved?

- VRU-Proxi Question:
 - **Q11: What shall the scope of the regulation be regarding the testing for VRUs that are obstructed from view?**
- Summary of Options:
 - Obstruction by environmental clutter/vehicle
 - Obstructed pedestrian crossing from nearside/offside
- Summary of VRU-Proxi-10 Discussion:
 - If significant proportion of collisions involving obstruction, inclusion should be considered
- VRU-Proxi Member Feedback:
 - **J:** To be determined based on accidentology.
 - **DE:** German national accident statistics does not allow to identify the situations (statistics provided to VRU PROXI already in November 2017)
 - **CLEPA:** More detailed information on the obstruction parameters are needed to evaluate a feasible scenario, also more detailed accidentology justifications are needed to understand the relevance of obstructed view collisions.
- VRU-Proxi Decision:
 - [To be completed]

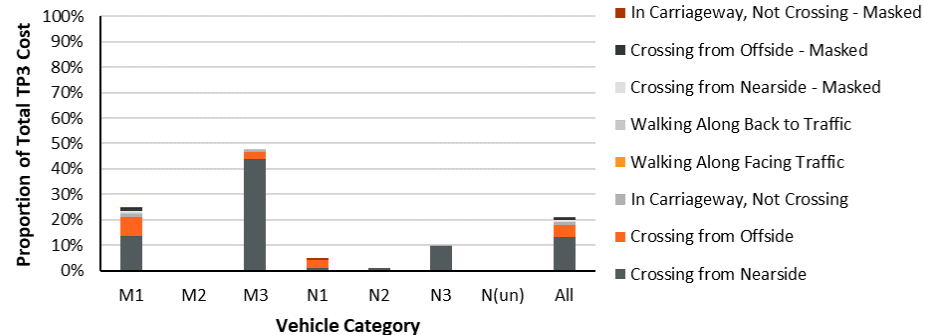
VRU Manoeuvres (Q11): Evidence #1

Pedestrian Manoeuvre as a Proportion of Total Annual Societal Costs of Target Population

Vehicle Moving-Off Manoeuvres



Vehicle Slowing/Stopping Manoeuvres



Key Points:

- Crossing from nearside/offside are leading pedestrian manoeuvres for all categories
- Crossing from nearside while masked (obstructed) important for M1/N3 categories
 - Representative of a pedestrian crossing from behind a vehicle from the nearside of the carriageway
- Not very many collisions when stood in pathway of vehicle

VRU Manoeuvres (Q12)

What speed is the VRU travelling at?

- VRU-Proxi Question:
 - **Q12: What shall the scope of the regulation be regarding the crossing speeds of the VRU that the system shall be operational for when crossing?**
- Summary of Options:
 - 3/5/8 kph pedestrian
 - 5/15 kph cyclist
- Summary of VRU-Proxi-10 Discussion:
 - Range of speeds above adopted by various draft regulations/standards/testing protocols
 - Crossing speeds should be determined based on technical feasibility vs. scenarios vs. safety ambition
- VRU-Proxi Member Feedback:
 - **J:** To be determined based on the facts.
 - **DE:** German national accident statistics does not allow to identify the situations (statistics provided to VRU PROXI already in November 2017)
 - **CLEPA:** More detailed information on the scenario parameters (e.g. distance and position) are needed to evaluate appropriate speed value.
- VRU-Proxi Decision:
 - [To be completed]

False Positive Tests



False Positive Tests (Q13)

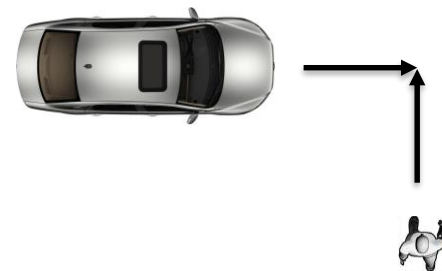
Shall false-positive tests be included in the performance assessment?

- VRU-Proxi Question:
 - **Q13: What shall the scope of the regulation be regarding testing for false positives?**
- Summary of Options:
 - No false positive test, false positive test in environmental clutter or false positive test when VRU not in path/due to cross path of vehicle
- Summary of VRU-Proxi-10 Discussion:
 - False positive tests should be included to ensure minimum performance regarding false positives
- VRU-Proxi Member Feedback:
 - **J:** To be included **both scenes**.
 - **DE:** A false positive test would **require a clear definition** as to what is not a relevant situation. This is probably not possible.
 - **CLEPA:** It is **very difficult to establish a robust false positive test** which would certainly result in very burdensome procedures, therefore CLEPA does not support a false positive test.
- VRU-Proxi Decision:
 - [To be completed]

False Positives (Q13): Evidence #1

Draft AEB Regulation for M1/N1 Detection of Pedestrians/Cyclists during Forward Motion

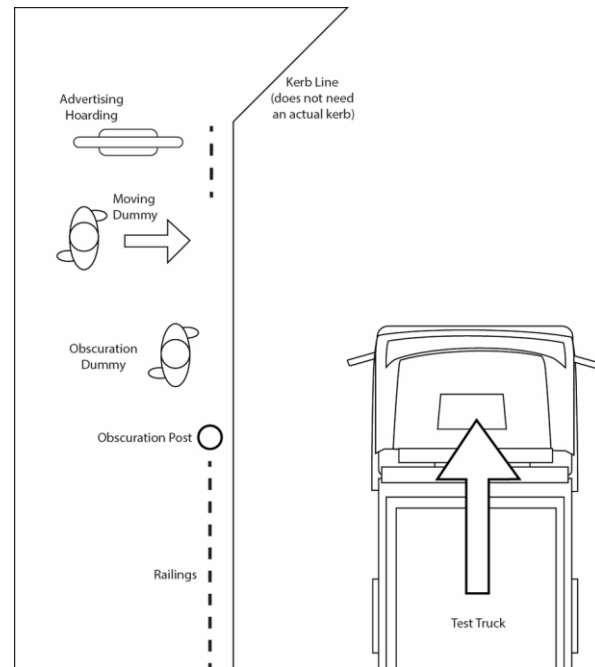
- Scope of regulation
 - Vehicles: M1/N1; VRUs: Pedestrians/[Cyclists]
- Test Scenarios
 - TP test: Forward VUT motion in straight line, at 20-60 kph speeds, with 6yo pedestrian target crossing at 5 kph from nearside with collision point at longitudinal centreline of VUT front end
 - Tested at 3 different specified speeds (+ other speeds at TS discretion)
 - FP test: As above, with pedestrian target stationary, facing VUT direction of travel and 1 m away from VUT nearside
 - Tested at 1 speed at TS discretion



False Positives (Q13): Evidence #2

TfL Blind Spot Warning Standards for M3/N3 Detection of Pedestrians during Forward Motion

- Scope of standards
 - Vehicles: M3/N3; VRUs: Pedestrians
- Test Scenarios
 - Proximity tests: Stationary VUT with pedestrian target crossing at 3-5 kph starting 2.2 m from nearside of VUT
 - Tested at combination of 2-3 VRU-VUT distances (0.3 m, [2.5] m & 4.0 m) and pedestrian targets (6yo and adult)
 - Collision warning/motion inhibit tests: Forward VUT motion in straight line from 0 to 10 kph with pedestrian target stationary in front of VUT between 25-75% width
 - Tested at combination of 2-3 VRU-VUT distances (0.3 m, [2.5] m & 4.0 m) and pedestrian targets (6yo and adult)
 - FP test: As above for proximity test, with pedestrian targets stationary prior to movement



Human-Machine Interface



Human Machine Interface (Q14)

Shall HMI requirements be considered in scope?

- VRU-Proxi Question:
 - **Q14: What shall the scope of the regulation be regarding the requirements for HMI?**
- Summary of Options:
 - No HMI requirements, HMI requirements for proximity information signal only or HMI requirements for proximity information and collision warning signals
- Summary of VRU-Proxi-10 Discussion:
 - Draft BSIS and AEBS(M1/N1) regulations provide precedent for defining proximity information and collision warning signal HMI, could also align with ISO 15006/15008
- VRU-Proxi Member Feedback:
 - J: Only **timing and modality to be described like BSIS.**
- VRU-Proxi Decision:
 - [To be completed]

Human Machine Interface (Q14): Evidence #1

Draft AEB Regulation for M1/N1 Detection of Pedestrians/Cyclists during Forward Motion

- **Functionality**
 - Collision warning signal/~~Emergency braking~~ functions
 - Collision warning signal phase shall be triggered before emergency braking phase
- **Requirements**
 - Specified maximum impact speed requirements, relating to initial vehicle speed
 - Can be used to back-calculate “last point of information” for collision warning signal
 - Collision warning signal HMI requirements
 - Two modes of information signal + other requirements
 - No signal/activation for FP test
- **Proposal for Consideration:**
 - Harmonise with functionality/requirements of draft AEB reg. re: collision warning signal?
 - Scope: M2/M3/N2/N3; Speed range: 5-20 kph; Test scenarios: Appropriate for far located VRUs only/include cyclist tests/stationary target in VUT path/near VRU tests/motion inhibit

Human Machine Interface (Q14): Evidence #2

Draft BSIS Regulation for N3 Detection of Cyclists during Nearside Turns

- Requirements
 - Specified first and last points of information requirements
 - Related to vehicle/VRU speeds and the range of possible turn radii and impact points
 - Specified maximum detection boundaries for all tests
 - Collision warning signal performance requirements not defined
 - HMI requirements
 - Defined for both proximity information and collision warning signals
- **Proposal for Consideration:**
 - Harmonise with functionality/requirements of draft BSIS reg. re: static test 1?

Human Machine Interface (Q14): Evidence #3

TfL Blind Spot Warning Standards for M3/N3 Detection of Pedestrians during Forward Motion

- **Functionality**
 - Proximity information signal/Collision warning signal/Motion inhibit functions
- **Requirements**
 - Proximity information signal
 - Signal shall be available for when the pedestrian traverses at least the VUT forward motion path
 - Collision warning signal
 - Signal shall be available from start of motion to at least 0.75 TTC
 - Motion inhibit – requirement to inhibit motion before impact with pedestrian
 - Extensive HMI requirements on signal, based on ISO 15006/15008
 - No signal/activation for FP test
- **Proposal for Consideration:**
 - Harmonise with functionality/requirements of draft TfL standard esp. motion inhibit?
 - Scope: M2/M3/N2/N3; VRU type?

Human Machine Interface (Q15)

Shall manual overrides be permitted?

- VRU-Proxi Question:
 - **Q15: What shall the scope of the regulation be regarding manual overrides for motion inhibit systems?**
- Summary of Options:
 - Manual override proposed for motion inhibit systems
- Summary of VRU-Proxi-10 Discussion:
 - Manual override necessary for resolution of false positives
- VRU-Proxi Member Feedback:
 - **J: Yes.** It is 58 agreement.
 - **CLEPA:** The driver shall always be able to override any assistance system, therefore **CLEPA supports the manual override.**
- VRU-Proxi Decision:
 - [To be completed]

Regulatory Precedents



Regulatory Precedents (Q16)

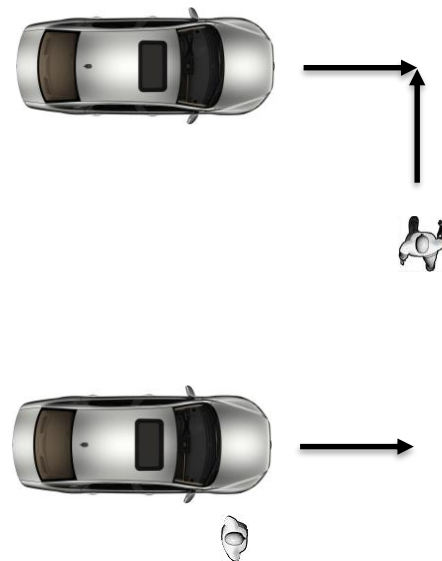
What existing protocols may be used to base MOIS Regulation draft on?

- VRU-Proxi Question:
 - **Q16: What existing protocols shall be used as a precedent for drafting the MOIS regulation?**
- Summary of Options:
 - Draft AEB Regulation – collision warning function (*not emergency braking*) for similar test scenarios
 - Draft BSIS Regulation – applying BSIS requirements to new test scenarios
 - TfL BSW Standards – apply minimum requirements (*not performance rating*) for similar test scenarios
- Summary of VRU-Proxi-10 Discussion:
 - Basing MOIS regulation on AEB regulation sensible approach, but GRVA needs consulting.
 - Can take appropriate test scenarios/requirements from other options.
- VRU-Proxi Member Feedback:
 - J: To be **communize some part with GRVA regulations [for AEB]**. But regulation range to be limited until warning, not include vehicle control.
 - DE: **Draft AEB regulation** [preferred]
 - CLEPA: AEB regulation is focused on active intervention via braking whilst **MOIS should be focused on warning and signalling**, moreover the **R152 is for M1/N1 that should not be in the scope** of the MOIS Regulation
- VRU-Proxi Decision:
 - [To be completed]

Regulatory Precedents (Q16): Evidence #1

Draft AEB Regulation for M1/N1 Detection of Pedestrians/Cyclists during Forward Motion

- Scope of regulation
 - Vehicles: M1/N1; VRUs: Pedestrians/[Cyclists]
- Test Scenarios
 - TP test: Forward VUT motion in straight line, at 20-60 kph speeds, with 6yo pedestrian target crossing at 5 kph from nearside with collision point at longitudinal centreline of VUT front end
 - Tested at 3 different specified speeds (+ other speeds at TS discretion)
 - FP test: As above, with pedestrian target stationary, facing VUT direction of travel and 1 m away from VUT nearside
 - Tested at 1 speed at TS discretion



Regulatory Precedents (Q16): Evidence #2

Draft AEB Regulation for M1/N1 Detection of Pedestrians/Cyclists during Forward Motion

- **Functionality**
 - Collision warning signal/~~Emergency braking~~ functions
 - Collision warning signal phase shall be triggered before emergency braking phase
- **Requirements**
 - Specified maximum impact speed requirements, relating to initial vehicle speed
 - Can be used to back-calculate “last point of information” for collision warning signal
 - Collision warning signal HMI requirements
 - Two modes of information signal + other requirements
 - No signal/activation for FP test
- **Proposal for Consideration:**
 - Harmonise with functionality/requirements of draft AEB reg. re: collision warning signal?
 - Scope: M2/M3/N2/N3; Speed range: 5-20 kph; Test scenarios: Appropriate for far located VRUs only/include cyclist tests/stationary target in VUT path/near VRU tests/motion inhibit

Regulatory Precedents (Q16): Evidence #3

Draft BSIS Regulation for N3 Detection of Cyclists during Nearside Turns

- Scope of regulation
 - Vehicles: N2>8T/N3 (Optional for M2/M3/N2<8T; VRUs: Cyclists)
- Test Scenarios
 - Dynamic tests: Forward VUT motion in straight line, at 5-30 kph speeds, with cyclist target moving alongside at speeds of 5-20 kph and distances of 0.9-4.25 m from VUT nearside, with timing to ensure both reach predefined collision point in foremost 6 m of VUT nearside
 - Tested at 7 different vehicle/cyclist speed combinations (+ other speed combinations at TS discretion)
 - Static tests: VUT at standstill with cyclist target crossing from nearside (perpendicular) 1.15 m in front of VUT and moving along the nearside (parallel) 2.75 m away from VUT nearside
 - Static scenario of cyclist crossing from nearside may perhaps conflict with MOIS regulation
- Functionality
 - Proximity information signal/Collision warning signal

Regulatory Precedents (Q16): Evidence #4

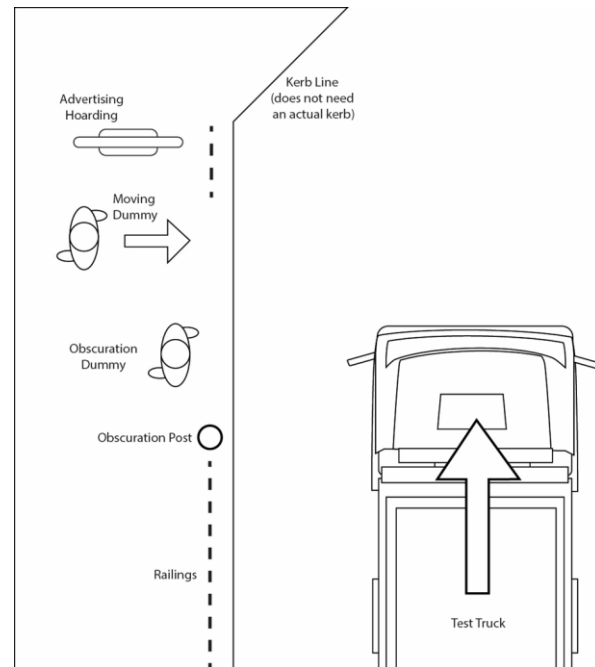
Draft BSIS Regulation for N3 Detection of Cyclists during Nearside Turns

- Requirements
 - Specified first and last points of information requirements
 - Related to vehicle/VRU speeds and the range of possible turn radii and impact points
 - Specified maximum detection boundaries for all tests
 - Collision warning signal performance requirements not defined
 - HMI requirements
 - Defined for both proximity information and collision warning signals
- **Proposal for Consideration:**
 - Harmonise with functionality/requirements of draft BSIS reg. re: static test 1?

Regulatory Precedents (Q16): Evidence #5

TfL Blind Spot Warning Standards for M3/N3 Detection of Pedestrians during Forward Motion

- Scope of standards
 - Vehicles: M3/N3; VRUs: Pedestrians
- Test Scenarios
 - Proximity tests: Stationary VUT with pedestrian target crossing at 3-5 kph starting 2.2 m from nearside of VUT
 - Tested at combination of 2-3 VRU-VUT distances (0.3 m, [2.5] m & 4.0 m) and pedestrian targets (6yo and adult)
 - Collision warning/motion inhibit tests: Forward VUT motion in straight line from 0 to 10 kph with pedestrian target stationary in front of VUT between 25-75% width
 - Tested at combination of 2-3 VRU-VUT distances (0.3 m, [2.5] m & 4.0 m) and pedestrian targets (6yo and adult)
 - FP test: As above for proximity test, with pedestrian targets stationary prior to movement



Regulatory Precedents (Q16): Evidence #6

TfL Blind Spot Warning Standards for M3/N3 Detection of Pedestrians during Forward Motion

- **Functionality**
 - Proximity information signal/Collision warning signal/Motion inhibit functions
- **Requirements**
 - Proximity information signal
 - Signal shall be available for when the pedestrian traverses at least the VUT forward motion path
 - Collision warning signal
 - Signal shall be available from start of motion to at least 0.75 TTC
 - Motion inhibit – requirement to inhibit motion before impact with pedestrian
 - Extensive HMI requirements on signal, based on ISO 15006/15008
 - No signal/activation for FP test
- **Proposal for Consideration:**
 - Harmonise with functionality/requirements of draft TfL standard esp. motion inhibit?
 - Scope: M2/M3/N2/N3; VRU type?



Questions?

Dr Phil Martin
Head of Biomechanics

pmartin@trl.co.uk
+44 [0]1344 770 326

TRL | Crowthorne House | Nine Mile Ride | Wokingham
Berkshire | RG40 3GA | United Kingdom