VRU-Proxi-11-08
Update to Summary of Collision Landscape Analyses

September 2019
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- Total Populations for EU28
- Collision Characteristics Analysis
  - Blind Spot Information Systems (BSIS)
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Vision
World leader in creating the future of transport and mobility, using evidence-based solutions and innovative thinking

320 engineers, scientists, psychologists, IT experts and statisticians

Mission
Challenge and influence our chosen markets, driving sustained reductions (ultimately to zero) in:
- Fatalities and serious injuries
- Harmful emissions
- Barriers to inclusive mobility
- Unforeseen delays
- Cost inefficiencies

Providing world-leading research, technology and software solutions for surface transport modes and the related markets of automotive, motorsport, insurance and energy

1000 clients in 145 countries
TRL Background...delivering impactful innovation

1950's/70's
The UK Motorway network

1969
The self-driving Citroën DS19

1972
The magic roundabout, Swindon

1980's
Deflectometer

1997
NCAP launched

1997
TRL cycle infrastructure development

2014
Gateway driverless shuttles

2014
London Summer Olympics

2015
Electric double decker bus

2016
HGV Truck Platooning

2017
London Smart Mobility Living Lab

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Total Populations for EU28
Analysis Approach

- All vehicles categorised into Dir. 2007/46/EC categories using STATS19 data
- STATS19 variables used to define total population of casualties
- Total population values scaled to EU28 for each vehicle category and injury severity level
- Further criteria used to define target populations for each safety measure
- Target populations presented as the number of casualties per annum and monetised cost to society per annum
- Monetised cost to society figures used:
  - Fatal - €1.87million, Serious - €243,100, Slight - €18,700
- Approach provided in greater detail in VRU-Proxi-09-03 for reference
## Update to Total Population for EU28

Total annual number of VRU casualties (EU28)

<table>
<thead>
<tr>
<th>Vehicle Category</th>
<th>Pedestrian</th>
<th>Cyclist</th>
<th>PTW</th>
<th>Societal Cost (€M)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Fatal</td>
<td>Serious</td>
<td>Slight</td>
<td>Fatal</td>
</tr>
<tr>
<td>M1</td>
<td>3,600</td>
<td>27,549</td>
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<tr>
<td>M2</td>
<td>11</td>
<td>79</td>
<td>212</td>
<td>2</td>
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<tr>
<td>M3</td>
<td>173</td>
<td>893</td>
<td>2,763</td>
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<tr>
<td>N1</td>
<td>463</td>
<td>1,832</td>
<td>6,102</td>
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<tr>
<td>N2</td>
<td>55</td>
<td>250</td>
<td>687</td>
<td>27</td>
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<tr>
<td>N3</td>
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<tr>
<td>N_{unknown}</td>
<td>2</td>
<td>12</td>
<td>52</td>
<td>0</td>
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<tr>
<td><strong>Total</strong></td>
<td>4,685</td>
<td>31,165</td>
<td>94,321</td>
<td>1,436</td>
</tr>
</tbody>
</table>

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| Vehicle Category | Pedestrian |  |  |  |  |  |  | Societal Cost (€M) |
|------------------|------------|------------|------------|------------|------------|------------|---------------------|
|                  | Fatal      | Serious    | Slight     | Fatal      | Serious    | Slight     | Fatal   | Serious   | Slight   |               |
| N2 ≤7.5T         | 40         | 164        | 399        | 16         | 129        | 491        | 28      | 168       | 488      | 294.1       |
| N2 >7.5T         | 2          | 18         | 39         | 9          | 17         | 53         | 8       | 13        | 34       | 48.4        |
| N2_un_GVW        | 13         | 68         | 249        | 2          | 72         | 319        | 3       | 62        | 184      | 95.8        |
| N3 ≤18T          | 64         | 106        | 163        | 31         | 140        | 273        | 20      | 119       | 214      | 317.1       |
| N3 >18T          | 269        | 352        | 375        | 142        | 316        | 668        | 110     | 353       | 631      | 1,254.2     |
| N3_un_GVW        | 48         | 92         | 209        | 18         | 114        | 375        | 20      | 166       | 340      | 267.8       |
Update to Total Population for EU28

- Total annual societal cost to EU28 of €42.4bn
- Collisions between M1 vehicles and VRUs have highest occurrence and societal costs
- Ranking of societal costs:
  - M1 > N1 > N3 > M3 > N2 > M2
  - N2 ≤ 7.5T greater than N2 > 7.5T
  - N3 > 18T greater than N2 ≤ 18T
- Target populations (TP) derived from total population
Collision Characteristics Analysis
Collision Characteristics Analysis

Definition of Collision Characteristics

- **Key Collision Characteristics**
  - Objectives - to establish which key VRU manoeuvres are most relevant to the vehicle manoeuvre/s associated with each regulation
  - Vehicle manoeuvres
    - Specific to particular regulation intention/s (e.g. reversing for reversing safety reg)
    - Split by manoeuvre where multiple manoeuvres defined in target populations
  - Vehicle impact points
    - Also specific to particular regulation intention/s and split by impact point
  - VRU manoeuvres/impact points
    - Key comparison for analysis
    - Investigated via a combination of VRU manoeuvre and VRU/vehicle impact points
    - E.g. cyclist manoeuvring alongside nearside of vehicle controlled by straight ahead manoeuvres combined with vehicle impact nearside/VRU impact offside
Collision Characteristics Analysis

Target Population Definitions

- **Target population:**
  - “The total number of fatalities and/or injured casualties that a particular safety measure is specifically designed to try to prevent each year”

- **Target populations previously calculated for each safety measure:**
  - Target populations defined using vehicle/VRU manoeuvres, vehicle/VRU impact points and contributory factors from STATS19 (GB)
  - Scaled to EU28 – based on scaling factors developed from ACEA data
  - Defined in VRU-Proxi-09-03

- **Focus on vulnerable road users injured in collisions with vehicles performing low speed manoeuvres**
  - VRU types: pedestrians, cyclists, PTWs
  - Vehicle categories: M1, M2, M3, N1, N2, N3
  - Outcomes: monetary value to society – combining injury severities to one simple metric
Blind-Spot Information System (BSIS)
<table>
<thead>
<tr>
<th>Pedestrian</th>
<th>Cyclist/PTW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle Manoeuvre</td>
<td>Vehicle Impact</td>
</tr>
<tr>
<td>Nearsie turn</td>
<td>Nearsie Front</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
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<td></td>
<td></td>
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</tbody>
</table>
EU28 Target Populations: BSIS

- BSIS target population
- Total annual societal cost to EU28 of €693M
- Collisions between M1 vehicles and VRUs have highest societal costs
- Cyclists most affected casualty
- Ranking of societal costs: M1>N3>N1>M3>N2>M2
Key Collision Characteristics: BSIS

- Comparison of pedestrian manoeuvres for:
  - A. NeARside turn – pedestrian strikes front
  - B. NeARside turn – pedestrian strikes nearside

- Key pedestrian manoeuvres:
  - Crossing from nearside
  - Other manoeuvres negligible

- Bus manoeuvres:
  - Heavier vehicles (M3/N2/N3) associated with nearside impact points
  - Lighter vehicles (M1/N1) associated with frontal impact points
Key Collision Characteristics: BSIS

Key Vehicle and VRU Manoeuvres Characterising Cyclist Collisions

Nearside Turn – Frontal Impact

- Waiting to Turn O/S
- Waiting to Turn N/S
- Slowing or Stopping
- Moving Off
- Waiting to Go Ahead
- Overtaking on Nearside
- Nearside Turn
- Going Ahead - RH Bend
- Going Ahead - LH Bend
- Going Ahead - Other

Proportion of Total TP3 Cost

Vehicle Category: M1, M2, M3, N1, N2, N3, N(un), All

Nearside Turn – Nearside Impact

- Waiting to Turn O/S
- Waiting to Turn N/S
- Slowing or Stopping
- Moving Off
- Waiting to Go Ahead
- Overtaking on Nearside
- Nearside Turn
- Going Ahead - RH Bend
- Going Ahead - LH Bend
- Going Ahead - Other

Proportion of Total TP3 Cost

Vehicle Category: M1, M2, M3, N1, N2, N3, N(un), All

No Turn – Nearside Impact

- Waiting to Turn O/S
- Waiting to Turn N/S
- Slowing or Stopping
- Moving Off
- Waiting to Go Ahead
- Overtaking on Nearside
- Nearside Turn
- Going Ahead - RH Bend
- Going Ahead - LH Bend
- Going Ahead - Other

Proportion of Total TP3 Cost

Vehicle Category: M1, M2, M3, N1, N2, N3, N(un), All
Key Collision Characteristics: BSIS

Key Vehicle and VRU Manoeuvres Characterising Cyclist Collisions

- Comparison of cyclist manoeuvres for:
  - Nearside turn – cyclist strikes front
  - Nearside turn – cyclist strikes nearside
  - No turn – cyclist strikes nearside

- Key cyclist manoeuvres:
  - Going Ahead Other (RH bend/LH bend) most important – ~80% of all casualty costs
    - Particularly important for “No Turn” scenarios, where cyclist is being overtaken
  - Overtaking on nearside (i.e. undertaking), nearside turn with vehicle also important

- Bus manoeuvres:
  - Heavier vehicles (M3/N3) have greater proportion of nearside turn collisions
  - Lighter vehicles (M1/N1/N2) have greater proportion of no turn collisions
Key Collision Characteristics: BSIS

Key Vehicle and VRU Manoeuvres Characterising PTW Collisions

- **Nearside Turn – Frontal Impact**
  - Waiting to Turn O/S
  - Waiting to Turn N/S
  - Slowing or Stopping
  - Moving Off
  - Waiting to Go Ahead
  - Overtaking on Nearside
  - Nearside Turn
  - Going Ahead - RH Bend
  - Going Ahead - LH Bend
  - Going Ahead - Other

- **Nearside Turn – Nearside Impact**
  - Waiting to Turn O/S
  - Waiting to Turn N/S
  - Slowing or Stopping
  - Moving Off
  - Waiting to Go Ahead
  - Overtaking on Nearside
  - Nearside Turn
  - Going Ahead - RH Bend
  - Going Ahead - LH Bend
  - Going Ahead - Other

- **No Turn – Nearside Impact**
  - Waiting to Turn O/S
  - Waiting to Turn N/S
  - Slowing or Stopping
  - Moving Off
  - Waiting to Go Ahead
  - Overtaking on Nearside
  - Nearside Turn
  - Going Ahead - RH Bend
  - Going Ahead - LH Bend
  - Going Ahead - Other
Key Collision Characteristics: BSIS

Key Vehicle and VRU Manoeuvres Characterising PTW Collisions

- Comparison of PTW manoeuvres for:
  - Nearside turn – PTW strikes front
  - Nearside turn – PTW strikes nearside
  - No turn – PTW strikes nearside

- Key PTW manoeuvres:
  - Going Ahead Other (RH bend/LH bend) most important – ~80% of all casualty costs
    - Particularly important for “No Turn” scenarios, where PTW is overtaken/undertaking
  - Overtaking on nearside (i.e. undertaking), nearside turn with vehicles also important

- Bus manoeuvres:
  - N3 vehicles have greater proportion of nearside turn collisions
  - Lighter vehicles (M1/M3/N1/N2) have greater proportion of no turn collisions
Key Collision Characteristics: BSIS

Summary of Key BSIS Collision Characteristics

- Collision characteristics for pedestrian casualties specific to BSIS
  - Pedestrian crossing from the nearside
  - Impacts to nearside of heavier vehicles (M3/N2/N3) and front of lighter vehicles

- Collision characteristics for cyclist casualties specific to BSIS
  - Cyclists primarily travelling straight ahead (i.e. no turn), being overtaken by vehicles
    - Significant cyclist undertaking and cyclist turning with vehicle for heavier vehicles
  - Heavier vehicles (M3/N3) involved in greater proportion of nearside turn collisions, whilst lighter vehicles involved in greater proportion of overtaking collisions

- Collision characteristics for PTW casualties specific to BSIS
  - PTWs primarily travelling straight ahead (i.e. no turn), being overtaken by vehicles
    - Significant PTW undertaking and PTW turning with vehicle for heavier vehicles
  - N3 vehicles involved in greater proportion of nearside turn collisions, whilst all other vehicles involved in greater proportion of overtaking collisions
Reversing Camera & Detection System (REV)
## Target Populations: REV

### REV Target Population Definitions

<table>
<thead>
<tr>
<th>Vehicle Manoeuvre</th>
<th>Pedestrian</th>
<th>VRU Manoeuvre</th>
<th>Vehicle Manoeuvre</th>
<th>VRU Manoeuvre</th>
<th>VRU Impact</th>
<th>Contributory Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reversing</td>
<td>Crossing from driver’s n/s</td>
<td>Reversing</td>
<td>Moving off</td>
<td>Driver Failed To Look Properly (405) OR Vehicle Blind Spot (710)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Crossing from driver’s o/s in carriageway, not crossing</td>
<td>OR</td>
<td>Slowing or stopping</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Walking along back to traffic</td>
<td>OR</td>
<td>Waiting to go ahead</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Walking along facing traffic</td>
<td>OR</td>
<td>Waiting to turn left/right</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reversing</td>
<td>OR</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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EU28 Target Populations: REV

- REV target population
- Total annual societal cost to EU28 of €422M (for on-road only)
- Collisions between M1 vehicles and VRUs have highest societal costs
- Pedestrians most affected casualty
- Ranking of societal costs:
  - M1>N1>N2>N3>M3>M2

Total Annual Societal Costs of REV VRU Casualties (EU28)

- Monetised cost to society (€M)

- Vehicle Category: M1, M2, M3, N1, N2, N3, N(un), All

- Cost breakdown:
  - Pedestrian: 13.4, 1.2, 3.8, 14.2, 14.6, 9.0, 0.0, 0.0, 14.5
  - Cyclist: 15.6, 0.1, 0.1, 2.6, 0.0, 0.0, 0.0, 32.4
  - PTW: 1.2, 0.0, 0.0, 0.7, 0.0, 0.0, 0.0, 0.0

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Key Collision Characteristics: REV

- Comparison of pedestrian manoeuvres for:
  A. Reversing – driver failed to look properly
  B. Reversing – vehicle blind spot
  C. Reversing – both contributory factors
  D. Reversing – either contributory factor

- Key pedestrian manoeuvres:
  - Crossing from nearside/offside
  - In carriageway – relatively small proportion

- Vehicle categories:
  - M3 vehicle collisions primarily associated with vehicle blind spots – CMS needed?
  - Other vehicles dominated by driver failing to look properly – information systems needed?
Key Collision Characteristics: REV

- Comparison of pedestrian manoeuvres for:
  A. Reversing – driver failed to look properly
  B. Reversing – vehicle blind spot
  C. Reversing – both contributory factors
  D. Reversing – either contributory factor

- Key pedestrian manoeuvres:
  - Crossing from nearside/offside
  - In carriageway – relatively small proportion

- Vehicle categories:
  - M3 vehicle collisions primarily associated with vehicle blind spots – CMS needed?
  - Other vehicles dominated by driver failing to look properly – information systems needed?
Moving-Off Information System (MOIS)
# Target Populations: MOIS

## MOIS Target Population Definitions

<table>
<thead>
<tr>
<th>Vehicle Manoeuvre</th>
<th>Vehicle Impact</th>
<th>VRU Manoeuvre</th>
<th>Vehicle Manoeuvre</th>
<th>VRU Manoeuvre</th>
<th>VRU Impact</th>
<th>Contributory Factors</th>
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<tr>
<td>Moving off</td>
<td>Front</td>
<td>VRU Impact</td>
<td>Front</td>
<td>VRU Impact</td>
<td>-</td>
<td>Driver Failed To Look Properly (405)</td>
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<td>Slowing or stopping</td>
<td></td>
<td>Crossing from driver’s n/s Slowing or stopping</td>
<td>Waiting to go ahead Waiting to turn left/right</td>
<td></td>
<td>OR</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Crossing from driver’s o/s in carriageway, not crossing Walking along back to traffic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Walking along facing traffic Moving off Slowing or stopping</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</table>

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EU28 Target Populations: MOIS

- MOIS target population
- Total annual societal cost to EU28 of €573M
- Collisions between M1 vehicles and VRUs have highest societal costs
- Equal importance for all VRU casualty types
  - Pedestrians affected for N3/M3
  - Cyclists/PTW affected for M1/N1
- Ranking of societal costs:
  - M1>N3>N1>M3>N2>M2

Total Annual Societal Costs of MOIS VRU Casualties (EU28)
Key Collision Characteristics: MOIS

### Key Vehicle and VRU Manoeuvres Characterising Pedestrian Collisions

- **Comparison of pedestrian manoeuvres for:**
  - A. Moving off collisions
  - B. Slowing/stopping collisions

- **Key pedestrian manoeuvres:**
  - Cross from nearside/offside
  - Cross from nearside while masked by another vehicle also significant
  - In carriageway - negligible

- **Bus manoeuvres:**
  - M3 vehicles have a greater proportion of slowing/stopping – bus stops?
Key Collision Characteristics: MOIS

Key Vehicle and VRU Manoeuvres Characterising Cyclist Collisions

Moving Off – Cyclist Not Crossing

- Waiting to Turn Right
- Waiting to Turn Left
- Slowing or Stopping
- Moving Off
- Waiting to Go Ahead

Moving Off – Cyclist Crossing from Offside

- Going Ahead - RH Bend
- Going Ahead - LH Bend
- Going Ahead - Other

Slowing/Stopping – Cyclist Not Crossing

- Waiting to Turn Right
- Waiting to Turn Left
- Slowing or Stopping
- Moving Off
- Waiting to Go Ahead

Moving Off – Cyclist Crossing from Nearside

- Going Ahead - RH Bend
- Going Ahead - LH Bend
- Going Ahead - Other
Key Collision Characteristics: MOIS

**Key Vehicle and VRU Manoeuvres Characterising Cyclist Collisions**

- Comparison of cyclist manoeuvres for:
  - Moving off – cyclist not crossing
  - Slowing/stopping – cyclist not crossing
  - Moving off – cyclist crossing from nearside
  - Moving off – cyclist crossing from offside

- Key cyclist manoeuvres:
  - Cyclist crossing from offside most important for M1/M3/N1/N2 vehicles
    - Representing a vehicle moving off at a junction where the cyclist crosses the vehicle path
  - Cyclist not crossing most important for N3 vehicles – cyclist waiting/also moving off
    - Representing a vehicle moving off where the cyclist is travelling/located directly in the vehicle path

- Bus manoeuvres:
  - Few collisions occur while vehicles slowing/stopping
Key Collision Characteristics: MOIS

Key Vehicle and VRU Manoeuvres Characterising PTW Collisions

Moving Off – PTW Not Crossing

![Graph showing vehicle categories and their corresponding manoeuvres for MOIS collisions involving PTW not crossing during moving off.]

- Waiting to Turn Right
- Waiting to Turn Left
- Slowing or Stopping
- Moving Off
- Waiting to Go Ahead

Moving Off – PTW Crossing from Offside

![Graph showing vehicle categories and their corresponding manoeuvres for MOIS collisions involving PTW crossing from offside during moving off.]

- Going Ahead - RH Bend
- Going Ahead - LH Bend
- Going Ahead - Other

Slowing/Stopping – PTW Not Crossing

![Graph showing vehicle categories and their corresponding manoeuvres for MOIS collisions involving PTW not crossing during slowing/ stopping.]

- Waiting to Turn Right
- Waiting to Turn Left
- Slowing or Stopping
- Moving Off
- Waiting to Go Ahead

Moving Off – PTW Crossing from Nearestside

![Graph showing vehicle categories and their corresponding manoeuvres for MOIS collisions involving PTW crossing from nearside during moving off.]

- Going Ahead - RH Bend
- Going Ahead - LH Bend
- Going Ahead - Other
Key Collision Characteristics: MOIS

Key Vehicle and VRU Manoeuvres Characterising PTW Collisions

- Comparison of PTW manoeuvres for:
  - Moving off – PTW not crossing
  - Slowing/stopping – PTW not crossing
  - Moving off – PTW crossing from nearside
  - Moving off – PTW crossing from offside

- Key PTW manoeuvres:
  - PTW not crossing important for all vehicles
    - PTW may be waiting, moving off, slowing/stopping
    - More important for heavier (M3/N2/N3) vehicles
  - PTW crossing from offside important for lighter (M1/N1) vehicles

- Bus manoeuvres:
  - Slowing/stopping collisions primarily involved PTW not crossing collision scenarios
  - Moving off collisions are the principle vehicle manoeuvre, for all but M3 vehicles
Key Collision Characteristics: MOIS

Summary of Key MOIS Collision Characteristics

- Collision characteristics for pedestrian casualties specific to MOIS
  - Pedestrian primarily crossing from the nearside, but also offside
  - Pedestrians may also be masked by other vehicles

- Collision characteristics for cyclist casualties specific to MOIS
  - Cyclists crossing from offside most important for M1/M3/N1/N2 vehicles
    - Cyclists crossing at junction as vehicle moves off
  - Cyclist not crossing (moving off/waiting) most important for N3 vehicles
    - Cyclists travelling/located within the vehicle path as vehicle moves off

- Collision characteristics for PTW casualties specific to BSIS
  - PTW not crossing (moving off/waiting) important for all vehicles
    - Particularly for heavier (M3/N2/N3) vehicles
    - For both moving off and slowing/stopping vehicle manoeuvres
  - PTW crossing from offside most important for lighter (M1/N1) vehicles
Direct Vision (DIR)
### Target Populations: DIR

#### DIR Target Population Definitions

<table>
<thead>
<tr>
<th>Pedestrian</th>
<th>Cyclist/PTW</th>
<th>Contributory Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vehicle Manoeuvre</strong></td>
<td><strong>Vehicle Impact</strong></td>
<td><strong>VRU Manoeuvre</strong></td>
</tr>
<tr>
<td>Moving off Slowing or stopping</td>
<td>Front</td>
<td>Moving off Slowing or stopping Waiting to go ahead Waiting to turn left/right</td>
</tr>
<tr>
<td>Nearside turn Offside turn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crossing from driver’s n/s Crossing from driver’s o/s In carriageway, not crossing Walking along back to traffic Walking along facing traffic</td>
<td>Nearside</td>
<td>Left turn Moving off Slowing or stopping Waiting to go ahead Waiting to turn left/right</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offside turn</td>
<td>Offside</td>
<td>Right turn Moving off Slowing or stopping Waiting to go ahead Waiting to turn left/right</td>
</tr>
</tbody>
</table>


### EU28 Target Populations: DIR

- **DIR target population**
- **Total annual societal cost to EU28 of €151M**
- **Collisions between N3 vehicles and VRUs have highest societal costs**
- **Pedestrians most affected casualty**
- **Ranking of societal costs:**
  - N3>M1>M3>N2>N1>M2

#### Total Annual Societal Costs of DIR VRU Casualties (EU28)

<table>
<thead>
<tr>
<th>Vehicle Category</th>
<th>Monetised cost to society (€M)</th>
</tr>
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<tbody>
<tr>
<td>M1</td>
<td>2.3</td>
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<tr>
<td>M2</td>
<td>1.4</td>
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<td>M3</td>
<td>11.4</td>
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<td>12.1</td>
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<td>N(un)</td>
<td>10.2</td>
</tr>
<tr>
<td>All</td>
<td>137.0</td>
</tr>
</tbody>
</table>

- **Pedestrians**
- **Cyclists**
- **PTW**
Key Collision Characteristics: DIR

Key Vehicle and VRU Manoeuvres Characterising Pedestrian Collisions

Moving Off – Nearside Impact

Moving Off – Offside Impact

Moving-Off – Frontal Impact

Vehicle Category

Proportion of Total TP3 Cost
Key Collision Characteristics: DIR

Key Vehicle and VRU Manoeuvres Characterising Pedestrian Collisions

Nearside Turn – Frontal Impact

- Walking Along Back to Traffic
- Walking Along Facing Traffic
- In Carriageway, Not Crossing
- Crossing from Offside
- Crossing from Nearside

Offside Turn – Frontal Impact

- Walking Along Back to Traffic
- Walking Along Facing Traffic
- In Carriageway, Not Crossing
- Crossing from Offside
- Crossing from Nearside

Nearside Turn – Nearside Impact

- Walking Along Back to Traffic
- Walking Along Facing Traffic
- In Carriageway, Not Crossing
- Crossing from Offside
- Crossing from Nearside

Offside Turn – Offside Impact

- Walking Along Back to Traffic
- Walking Along Facing Traffic
- In Carriageway, Not Crossing
- Crossing from Offside
- Crossing from Nearside
Key Collision Characteristics: DIR

Comparison of pedestrian manoeuvres for:
- Moving off – pedestrian strikes front/nearside/offside
- Nearside turn – pedestrian strikes front/nearside
- Offside turn – pedestrian strikes front/offside

Key pedestrian manoeuvres:
- Crossing from nearside in majority of key collision scenarios
  - Consistent for all vehicle categories when considered across all collision scenarios

Bus manoeuvres:
- Moving off manoeuvre important for N category vehicles
- M1 vehicles associated with offside turn collisions associated with vehicle blind spots – related to blind spots created by offside A/B pillars?
- M3 vehicles associated with nearside turn collision associated with vehicle blind spots – related to blind spots created by A-Pillar, door frame and driver cab screen interaction
Questions?

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