

Figure A1 The eye tracker and vehicle

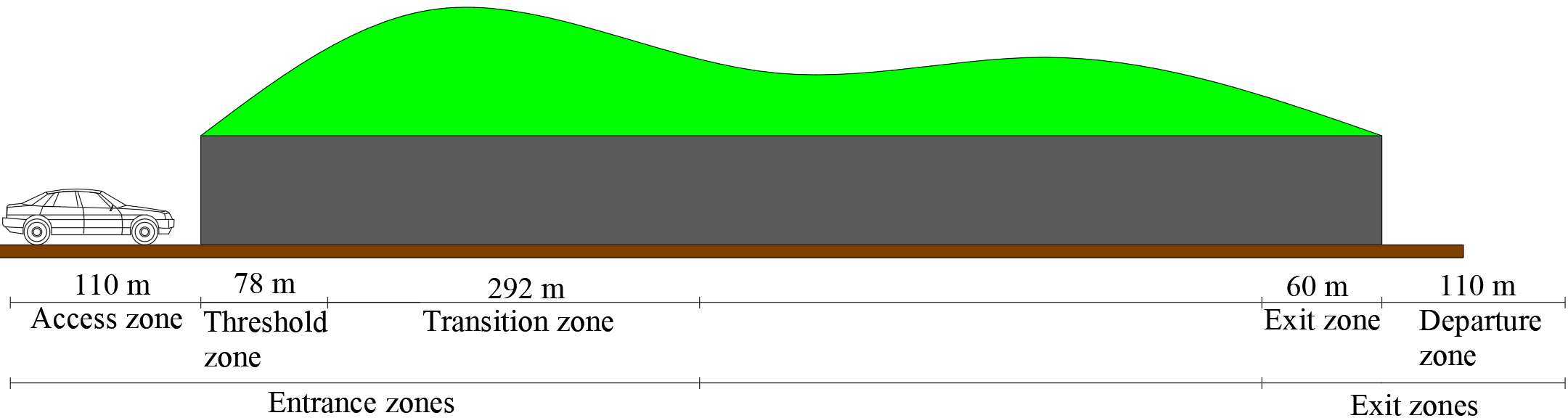


Figure A2. Schematic figure of each zone

Table A1. The information of the tunnel

|  |  |
| --- | --- |
| Structure | Divided; two-way four lanes |
| Length | 4048 m |
| Speed limit | 80 km/h |
| Width | 11.10 m |
| Height | 7.27 m |
| Maximum longitudinal gradient | 0.6% |

Table A2. The details of the participants

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| The number of participants | | Age | | Driving age | |
| 20 | | 22 - 46 years old | | 3 - 20 years | |
| 6 women | 14 men | M =34.55 | S.D. =7.28 | M = 7.40 | S.D. = 4.29 |

Table A3. Mean and SD of MTVV values in different zones at different time periods (mm2).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Time Periods  Zones | Daytime | | Twilight | | Nighttime | | ANOVA |
| Mean | SD | Mean | SD | Mean | SD |
| Access | 7.492 | 4.474 | 32.678 | 11.024 | 44.175 | 18.100 | *F* = 839.816,  *P* ≤ 0.001 |
| Threshold | 14.226 | 8.243 | 66.393 | 40.609 | 71.691 | 37.787 | *F* = 209.047,  *P* ≤ 0.001 |
| Transition | 21.418 | 25.015 | 34.557 | 28.031 | 57.956 | 35.726 | *F* = 389.128,  *P* ≤ 0.001 |
| Exit | 33.921 | 28.897 | 40.410 | 30.249 | 55.416 | 39.454 | *F* = 26.814,  *P* ≤ 5.575E-12 |
| Departure | 3.812 | 2.637 | 20.009 | 23.645 | 109.777 | 38.723 | *F* = 1572.999,  *P* ≤ 0.001 |
| ANOVA | *F* = 113.728, *P* ≤ 0.001 | | *F* = 117.371, *P* ≤ 0.001 | | *F* = 196.506, *P* ≤ 0.001 | |  |

Table A4. Two-Way ANOVA of MTVV values.

|  |  |  |
| --- | --- | --- |
| Index  Factors | *F* | *P* |
| Zones | 88.657 | ≤ 0.001 |
| Time periods | 1386.704 | ≤ 0.001 |
| Interaction | 185.746 | ≤ 0.001 |

Table A5. Comparative analysis of the overall visual load in entrance and exit zones.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MTVV (mm2/s) | | | <31.5 | 31.5–56.5 | 56.5–90 | 90–142.5 | 142.5–225 | >225 |
| Daytime | Entrance zones | Distance (m) | 410 | 35 | 30 | 5 | 0 | 0 |
| Proportion (%) | 85.42 | 7.29 | 6.25 | 1.04 | 0 | 0 |
| Conversion values | 22.349 | | | | | |
| Exit zones | Distance (m) | 145 | 20 | 5 | 0 | 0 | 0 |
| Proportion (%) | 85.30 | 11.76 | 2.94 | 0 | 0 | 0 |
| Conversion values | 20.654 | | | | | |
| Twilight | Entrance zones | Distance (m) | 235 | 150 | 60 | 35 | 0 | 0 |
| Proportion (%) | 48.96 | 31.25 | 12.50 | 7.29 | 0 | 0 |
| Conversion values | 38.766 | | | | | |
| Exit zones | Distance (m) | 140 | 25 | 0 | 5 | 0 | 0 |
| Proportion (%) | 82.35 | 14.71 | 0 | 2.94 | 0 | 0 |
| Conversion values | 22.750 | | | | | |
| Nighttime | Entrance zones | Distance (m) | 115 | 175 | 110 | 70 | 10 | 0 |
| Proportion (%) | 23.96 | 36.46 | 22.92 | 14.58 | 2.08 | 0 |
| Conversion values | 56.938 | | | | | |
| Exit zones | Distance (m) | 30 | 10 | 50 | 60 | 20 | 0 |
| Proportion (%) | 17.65 | 5.88 | 29.41 | 35.29 | 11.76 | 0 |
| Conversion values | 89.294 | | | | | |



Figure A3. Changes in drivers’ pupil area at different time periods in the entrance zones



Figure A4. Changes in drivers’ pupil area at different time periods in the exit zones

Table A6 Mean and standard deviation (SD) of drivers’ pupil area (mm2)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Times periods  Zones | Daytime | | Twilight | | Nighttime | | ANOVA |
| Mean | SD | Mean | SD | Mean | SD |
| Access | 3.969 | 0.340 | 7.749 | 0.787 | 17.839 | 2.230 | *F* = 8822.408,  *P* ≤ 0.001 |
| Threshold | 8.945 | 3.074 | 11.464 | 1.693 | 16.531 | 2.123 | *F* = 661.803,  *P* ≤ 0.001 |
| Transition | 16.628 | 1.454 | 15.035 | 1.109 | 15.441 | 1.997 | *F* = 65.563,  *P* ≤ 0.001 |
| Exit | 9.026 | 1.940 | 9.713 | 1.686 | 16.790 | 1.745 | *F* = 1942.122,  *P* ≤ 0.001 |
| Departure | 3.981 | 0.255 | 5.337 | 0.764 | 16.026 | 2.018 | *F* = 8002.150,  *P* ≤ 0.001 |
| ANOVA | *F* = 2492.3548,  *P* ≤ 0.001 | | *F* = 2611.516,  *P* ≤ 0.001 | | *F* = 238.261,  *P* ≤ 0.001 | |  |