

交通意外不是意外 香港行人車禍傷亡報告

‘Collision Not Accident’

An Overview of Road Danger against
Pedestrians in Hong Kong

August 2022

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Data by OpenStreetMap, under ODbL.



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ABOUT STREET RESET

Street Reset is a collective in support of human-oriented transport planning and street design, founded in 2020 by a group of practitioners and students in the field of transport and urban planning, architectural design and social innovation.

We strive to shape better streets for Hong Kong through our imagination, knowledge and experience from around the world. We advocate for Hong Kong's streets to be designed in such a way that people walking and cycling are treated more reasonably, and that road space is utilised in such a way that can enable a wider variety of convenient and reliable mode choices to the public, aside from private cars and rail transport.

INTRODUCTION

Walking is inseparable from our daily lives in Hong Kong. Our compact built environment, together with a high public transport mode share, has made walking an integral part of almost any journey. However, walking is also one of the most vulnerable ways of getting around in Hong Kong, as we saw 350 people lose their lives when walking between 2015 and 2019. While our pedestrian safety is considered above average in comparison to other developed cities, we believe that it can never be acceptable that people are killed or seriously injured when travelling within the road transport system. Much more still need to be done systematically to achieve better safety conditions for people walking, contributing to a truly walkable environment.

To urge the government and the general public to act on this issue, we have undertaken a holistic, spatially-oriented analysis of the state of pedestrian safety in Hong Kong. Having analysed the location and details of traffic injury collision data provided by the Transport Department (TD), we identified the key characteristics and spatial clusters of all pedestrian collisions that happened between 2015 and 2019. This report presents our analysis findings, before putting forward a series of policy and design recommendations.

The data and analyses are available in detail from our Hong Kong Traffic Injury Collision Database.

WORD CHOICE OF 'COLLISION' INSTEAD OF 'ACCIDENT'

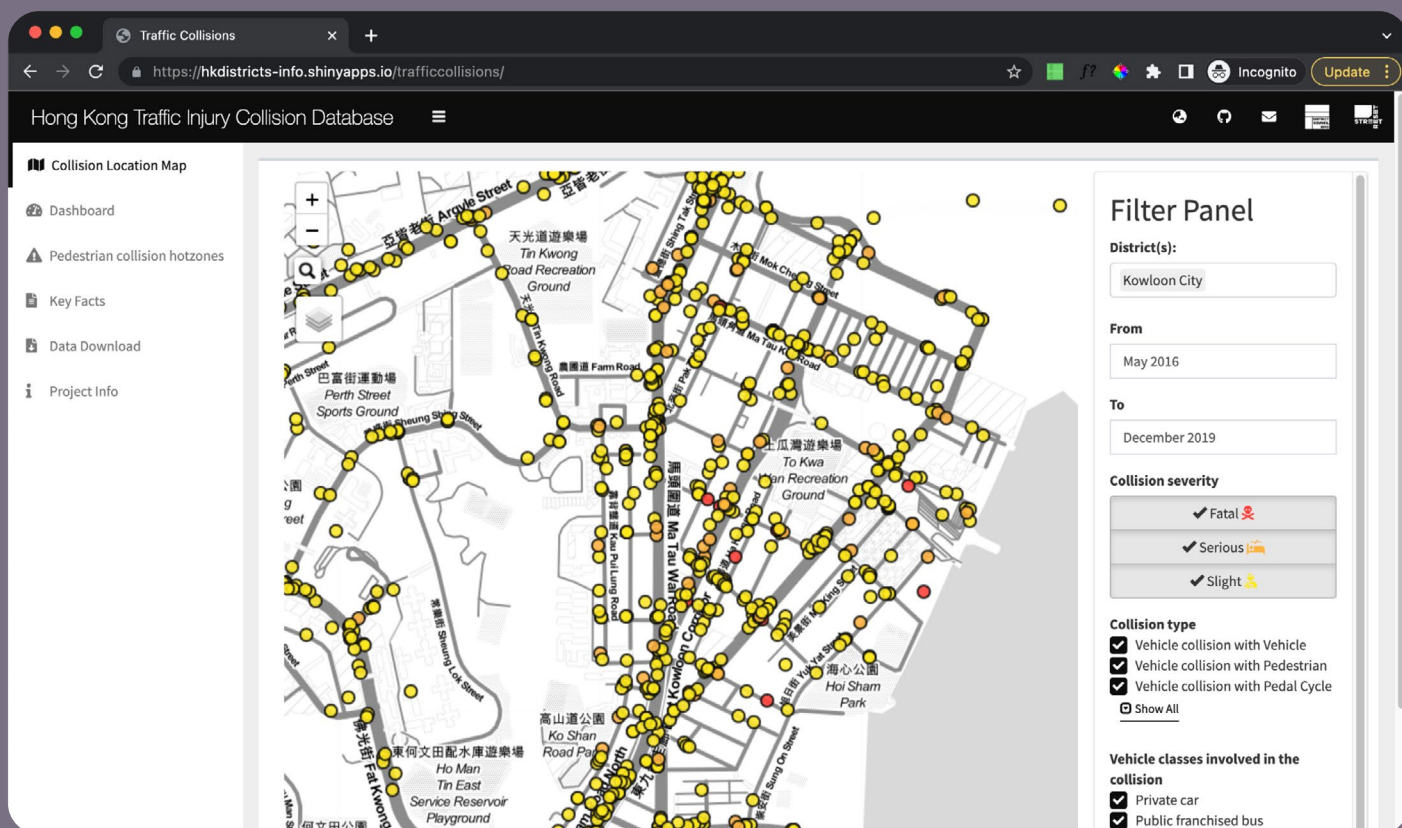
Most traffic collisions are preventable — they are not unexpected events. They are caused by unsafe conditions of our streets and/or unsafe behaviours. The word 'accident' suggests something inevitable or beyond control as though nobody was at fault, which reinforces the perception that nothing can be done about these deaths and injuries, and that they are an acceptable trade-off for having motor vehicles. Hence, when referring to traffic incidents that led to personal injury, we use the word 'collision' instead of 'accident' to proliferate the change in attitudes about road danger.

ABOUT THE HONG KONG TRAFFIC INJURY COLLISION DATABASE

Hong Kong Traffic Injury Collision Database is a project co-developed by Street Reset and Hong Kong District Info, which aims to visualise Hong Kong traffic collision data with interactive mapping. Our objective is three-fold:

- 1) to alert the public on the current severity of traffic collisions in Hong Kong, with particular dire implications for pedestrians and cyclists,
- 2) to draw attention to how street design has contributed to the current situation, and what systemic remedies should be made to enhance the safety of vulnerable road users, and
- 3) to provide journalists, district councillors, and government departments with insights and map-based data evidence to understand this issue.

The database website is now live on <https://hkdistricts-info.shinyapps.io/trafficcollisions/>.



EXECUTIVE SUMMARY

Walking is one of the most vulnerable ways of getting around in Hong Kong. Between 2015 and 2019, a total of 350 pedestrians lost their lives in traffic collisions. Although overall statistics about traffic collisions are publicly available from the TD and the police, it is still very difficult for the general public to gain a clear picture of the geographical pattern of where collisions happened. Such insights provide the means to inform the right set of interventions in reducing collision risks against pedestrians.

Hence, through various Access to Information requests to TD, Street Reset has obtained the details and geo-location of each collision that happened in 2014-2019. Using data in 2015-2019, we have undertaken a holistic, spatially-oriented analysis on the key trends, characteristics and spatial clusters of pedestrian collisions in Hong Kong.



PEDESTRIANS REMAIN THE MOST VULNERABLE AMONGST ALL ROAD USERS

In 2015-2019, 16,243 pedestrians suffered injuries in reported collisions, of which 3,703 were killed or seriously injured. Although only about 19% of all collisions involved pedestrians, pedestrians also accounted for more than half (57%) of the total number of fatalities. Pedestrians accounted for almost one-third (31%) of all Killed or Seriously Injured (KSI) casualties, and suffer from the highest rate of KSI casualties when compared to other road user types.



ELDERLY PEDESTRIANS ARE THE MOST AT RISK

Amongst the 350 pedestrians killed in 2015-2019, 61% (214) aged 65+. Although pedestrian KSI casualties declined in most age groups when compared to 2010-2014, we see a considerable increase of KSI casualties in three elderly age groups (60-64, 65-69 and 80-84) in this five-year period (2015-2019). In particular, the highest increase of 37.1% is recorded for ages 65-69. Even though the total number of pedestrian casualties have declined, elderly pedestrians are becoming more at risk from fatal and serious injuries.



SECONDARY ROADS HAVE THE HIGHEST RISK OF PEDESTRIAN COLLISIONS

Using road classification used by the Lands Department, we found that the majority (71%) of collisions involving pedestrians happened on, or at the junction with, secondary roads (such as side streets and connector roads between main roads). This may be in contrast to general perceptions that most collisions involving pedestrians happens on the main roads, which in fact only accounts for about 20% of pedestrian-related collisions.



TOP 10 HIGH-RISK PEDESTRIAN COLLISION HOTZONES

Using the Hotzone methodology, we ranked the top 10 'High-risk Pedestrian Collision Hotzones' based on crash density (number of collision per kilometre) (see Appendix 1 for details). The list includes 2 hotzones in Wan Chai, 3 hotzones in the New Territories (Tsuen Wan and Yuen Long) and 5 hotzones in Kowloon (Sham Shui Po, Wong Tai Sin, Kwun Tong and Yau Tsim Mong). Wan Chai Road (the section between Heard Street and Burrows Street) is the top ranked hotzone with the highest pedestrian collision density, while the Sham Shui Po Market Area (Pei Ho Street, Kweilin Street, Ki Lung Street, Tai Nan Street and Yu Chau Street) and the section between Johnston Road and Chun Yuen Street in Wan Chai ranked second and third. Most hotzones are located on local streets and four hotzones are located near markets (or municipal services buildings), which have high pedestrian flows and are key destinations in the neighbourhood.

An interactive map showing the hotzones can be found in the Hong Kong Traffic Injury Collision Database (developed by Street Reset): <https://hkdistricts-info.shinyapps.io/trafficcollisions>.

POLICY AND DESIGN RECOMMENDATIONS

To tackle holistically the issues identified, we have put forward ten recommendations ranging from policy approaches to street design measures:

TLB Transport and Logistic Bureau **TD** Transport Department **HyD** Highways Department **RSC** Road Safety Council

1	Adopt the Safe System Approach as the overarching principle in the government's road safety strategy	TLB, TD, HyD, RSC, the Police	Creating a 'forgiving street environment' that is designed around vulnerable road users (including pedestrians) is essential to road safety, particularly because Hong Kong's population is ageing. The road infrastructure should not only work when all pedestrians and motorists obey the traffic rules perfectly, but also reduce the severity of collisions when someone makes a mistake, and prevent fatal and serious injuries as much as possible.
2	Prioritise pedestrians at the Top 10 High-risk Collision Hotzones through holistic street redesign	TD	Given there are so many users competing for space at these locations, it is essential to remove risk factors by reducing vehicle speeds and/or volume. Rather than continuing to correct human behaviour through failed measures, we should provide more dedicated space and/or priority to pedestrians to enable safer and more convenient crossing movements.
3	Utilise 'link and place' street types as a framework to determine modal priorities, context-specific design and speed limits	TLB and TD	'Link and place' street type matrix is a street classification system that can reflect a street's importance by both of their link and place functions. It could be used as a framework to determine modal priorities as well as parameters for context-specific design and speed limits on different sections of road or street. Given the TD has already adopted the 'link and place' concept through their new Pedestrian Planning Framework, we hope that the TLB and TD will systematically identify a 'link and place' street type for all streets and roads in built-up areas, and use it to inform road space reallocation proposals suitable to its context.
4	Lower speed limits on streets with high risk of pedestrian-vehicle conflict	TD	To systematically lower the collision risks and crash severity for pedestrians, TD should implement lower speed limits with effective traffic calming measures at the following high risk locations, in reference to the typologies proposed in the TD's new Pedestrian Planning Framework: • 30 km/h on any 'inner grid' streets, or 'outer grid' streets with high place function and/or footfall, as well as those in proximity to sensitive land uses (such as healthcare facilities, schools and elderly/community centres, etc.) • 40 km/h on 'outer grid' streets in densely populated areas
5	Manage vehicle speeds effectively with a widespread roll-out of physical traffic calming measures, especially on secondary roads	TD and HyD	To manage vehicle speeds effectively, it is important to make the speed limits self-enforcing by installing traffic calming measures wherever possible. Therefore, more physical traffic calming measures, including raised table, should be installed across the road network where feasible, especially on secondary roads where the majority of pedestrian collisions happen.

6	Make crossing points more visible by safeguarding vehicle-pedestrian sight lines	TD and HyD	Kerb build-outs and gateway features should be installed around junctions, and all controlled and uncontrolled (cautionary) crossing points where possible. This approach can physically deter vehicles from illegal parking, safeguarding pedestrian-vehicle visibility from being obscured.
7	Provide more at-grade crossing points that fit better for prevailing pedestrian desire lines where possible	TD	If there is already a strong desire line amongst pedestrians to cross at particular location, the use of guard railing often cannot deter all pedestrians from doing so. Therefore, rather than using physical severance features to make pedestrians cross with an indirect route, we recommend the TD to consider formalising the desire lines by providing at-grade crossings as much as possible.
8	Conduct a comprehensive review on the use of guard railings on all streets in built-up areas	TD	shows that guard railings can increase traffic speeds and cause a higher likelihood of pedestrian KSI (killed or serious injuries) collisions on urban streets. As we also see a higher proportion (8%) of pedestrian KSI casualties at controlled crossings where guard railings are routinely used, this phenomenon may be similar to the situation overseas. Hence, there is a need to comprehensively review the use of guard railings at these locations as well as on all streets in built-up areas. We understand as a result of the Walkability Study, the TD has already begun adopting a “minimal approach” in the provision of pedestrian guard railings and commenced reviewing the use of pedestrian railings since late 2019 at some priority areas. With the potential benefits of reducing vehicle speeds and pedestrian KSI casualties, we suggest the TD to speed up the process of guard railing removal by conducting a comprehensive review in the use of guard railings on all urban streets.
9	Making public service vehicles and goods vehicles safer with more stringent safety standards	TLB and TD	We urge the TLB and TD to mandate the fitting of Intelligent Speed Assistance (ISA) systems on all newly registered public service vehicles and goods vehicles. We also urge the TLB and TD to progressively mandate a comprehensive Visibility Standards for all medium and heavy goods vehicles. Under such standards, all medium and heavy goods vehicles should be equipped with designs or devices that enable drivers to either see directly or monitor every blind spot of their vehicle through equipment.
10	Improve collision data transparency by setting up an official, map-based collision database for public use	TD	To make it easier for the public to gain a clear picture of the geographical pattern of where collisions happened, we recommend the TD to set up an official, map-based collision database for public use, and to release the geo-coordinates and details of all traffic collisions as part of their Annual Spatial Data Plans (ASDP).

BACKGROUND & METHODOLOGY

Data transparency is essential to facilitate an effective public discourse about road safety improvements. Although overall statistics about traffic collisions are publicly available from the TD and the police, it is still very difficult for the general public to gain a clear picture of the geographical pattern of where collisions happened. Such insights provide the means to inform the right set of interventions in reducing collision risks against pedestrians.

Therefore, through various Access to Information requests to TD, we have obtained the details and geo-location of each collision that happened between 2014 and 2019. Such information was originally collected by the police¹ and subsequently validated by TD's Road Safety and Standards Division (RSSD), before being recorded in the Traffic Accident Data System (TRADS). The data obtained from TD has been anonymised and do not contain any personal information.

This report details the analysis we conducted with the data of all collisions involving pedestrians that happened between 2015 and 2019. A five-year period prior to the Covid-19 pandemic has been used to reflect a prolonged collision pattern under typical traffic conditions.

The data was provided in three spreadsheets with detailed information about

- the collision itself ('Accident'),
- the casualties ('Casualty'), and
- the vehicles/drivers involved ('Vehicle').

Each collision incident has been given a unique reference number, which links up the corresponding details from each spreadsheet. Most collisions contain geo-locations in easting and northing coordinates, referenced to the Hong Kong 1980 Grid coordinate system (EPSG:2326).

Microsoft Excel, ArcMap and ArcGIS Pro have been used to conduct this analysis.

¹ For every injury traffic collision reported to the police, a Traffic Accident Report Booklet ('Pol 281', '282' or '283') is compiled in accordance with the injury classification of the collision. This is detailed in Volume 5, Chapter 2 of the TD's Transport Planning and Design Manual (TPDM).



LIMITATIONS

There are a few known limitations in our analysis. While most collisions have been geo-referenced, they only show the approximate location of where collisions occurred (i.e. which junction or section of road). This level of detail is considered sufficient for area-wide level analysis amongst international practice.

In addition, amongst six years' worth of data obtained from the TD, about 6.7% (around 5,000 collisions) have been found to contain incorrect or no geo-coordinates. During our analysis, a small number of collision locations have been cross-checked against the street name data fields and relocated to the right location. Nevertheless, it is worth noting the data and the analysis contain a limited margin of error due to data quality issues.

Last but not least, we were unable to obtain five fields of data from the TD as listed below. These types of information, together with all other data, form a contextualised picture to inform how each collision happened:

- 'How accident happened',
- 'Accident Environment Contributory Factor',
- 'Contributory Factors (for Vehicle)',
- 'Contributory Factors (for Driver)' and
- 'Contributory Factor of Casualty'

These fields were excluded from the data provided citing 'law enforcement, legal proceedings and public safety' reasons, pursuant to paragraph 2.6(c) of the Code on Access to Information. Without the description of how each accident (collision) happened, we were unable to perform a more detailed analysis.

It is worth noting that the data included in this report and our database only include recorded collisions that resulted in personal injury. Hence, collisions that went unreported and/or only resulted in material damage are not included in the data analysed.



LACK OF TRANSPARENCY WITH TRAFFIC COLLISION SPATIAL DATA

Although the details of each traffic injury collision are available by year on the TD's website, it does not contain any information about its precise location except the district where it happened (Figure 1). Similarly, despite the police having included the precise location of collisions when preparing regular road safety figures to report publicly to district councils, such data were not presented spatially (i.e. on a map) to show where collisions had happened (Figure 2).

Compared to the current practice by other overseas counterparts (Figure 3-5), it is evident that the spatial element of our collision data can be better utilised and made more transparent to the general public, to further advance the progress in road safety improvements and public awareness.

	Serial	Severity	District Council District	Hit and Run	Weather	Rain
1						
2	1	3	CW	2	1	1
3	2	3	E	2	1	1
4	3	3	WCH	2	1	1
5	4	3	SK	2	1	1
6	5	3	SK	2	1	1
7	6	3	KT	2	1	1
8	7	2	SK	2	1	1
9	8	3	SSPO	2	1	1
10	9	2	YL	2	1	1
11	10	3	TM	2	1	1
12	11	3	CW	2	1	1

Figure 1 - Collision database available from TD's website - No location information except district name (TD)

交通及運輸(傳閱)文件第2/2021號

葵涌分區有人受傷交通意外報告 2020年10月

致命	嚴重	輕微	日期	性質	地點	車輛類型	受傷人士		
0	1	23					身份	性別	年齡
			07/10/2020 12:25	嚴重	荔枝嶺路	公共小巴	行人	女	14
涉及行人意外			01/10/2020 09:30	輕微	石排街 / 圍四街	私家車	司機	男	51
			01/10/2020 22:03	輕微	石排街街燈 W1762	私家車	行人	女	65
0(0)			03/10/2020 14:04	輕微	荔枝嶺路 街燈 U7437	電車	司機	男	23
() 括弧內超過65歲人士			03/10/2020 14:02	輕微	荔景山路 / 敬祖路	市區的士	行人	女	53
			07/10/2020 13:00	輕微	葵義路	市區的士	司機	男	61
			09/10/2020 11:45	輕微	華景山路 / 華園路	私家車	司機	男	59
			09/10/2020 15:07	輕微	圍四街 街燈 AC0360	市區的士	乘客	女	49
			09/10/2020 19:45	輕微	昌榮路 街燈 FA6314	私家車	司機	男	37
			09/10/2020 21:06	輕微	葵福路 街燈 AC0535	私家車	司機	男	25
			12/10/2020 23:30	輕微	荔景山路 街燈 FB4035	電車	司機	女	40
			14/10/2020 12:25	輕微	大窩口道 / 信豐工業大廈	市區的士	乘客	女	24
			16/10/2020 14:30	輕微	葵義路 / 葵興路	九巴	司機	男	41
						市區的士	乘客	女	73
						市區的士	乘客	女	71

Figure 2: Police's road safety figures report to each DC - contains text-only data with no maps provided (Kwai Tsing District Council)

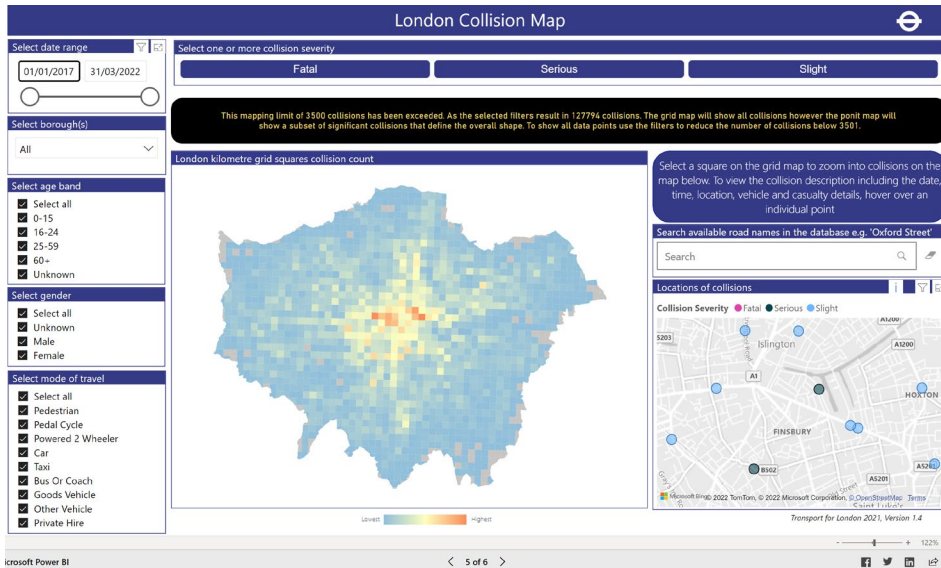


Figure 3: London's Road Danger Reduction Dashboard (Transport for London)

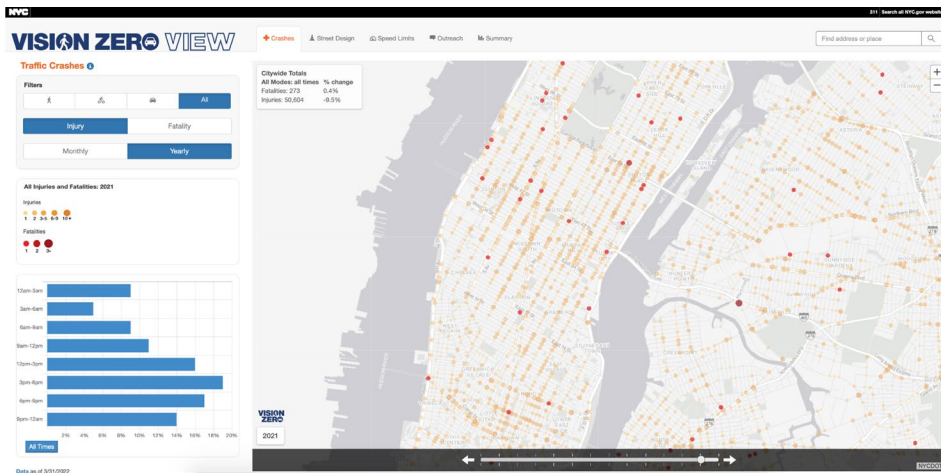


Figure 4: New York City's Vision Zero View - Traffic Crashes Map (Department of Transportation, New York City)

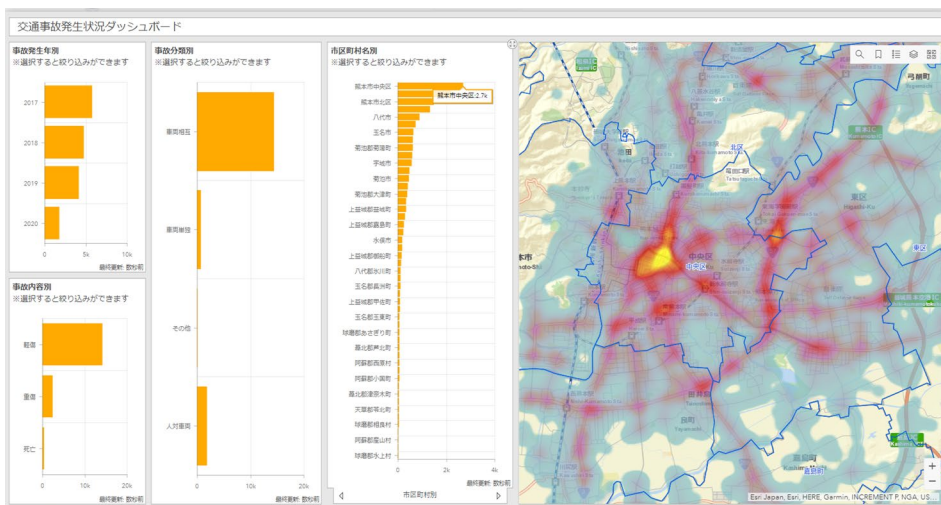


Figure 5: Kumamoto Prefecture's traffic collision map (Kumamoto Prefectural Police, Japan)

PEDESTRIAN COLLISIONS: THE CURRENT SITUATION

In this section, we present the key trends and characteristics of road danger against pedestrians through analysis of collisions that happened between 2015 and 2019. We have also identified their spatial clusters to inform priority areas for pedestrian safety improvements.

GENERAL TREND - PEDESTRIANS REMAIN THE MOST VULNERABLE

In 2015-2019, 16,243 pedestrians were injured in reported traffic collisions, including 3,703 who were killed or seriously injured.

While there was a 21% increase in collisions between vehicles during this five-year period, pedestrian collisions fell by 12% from a total of 17,185 (2010-2014) to 15,045 (2015-2019) (see Figure 6). All pedestrian casualties also fell by 12% during this period, with killed or seriously injured (KSI) casualties dropping by 14% (see Figure 7).

Figure 6: Trends of all traffic injury collisions by type (2010-2019)

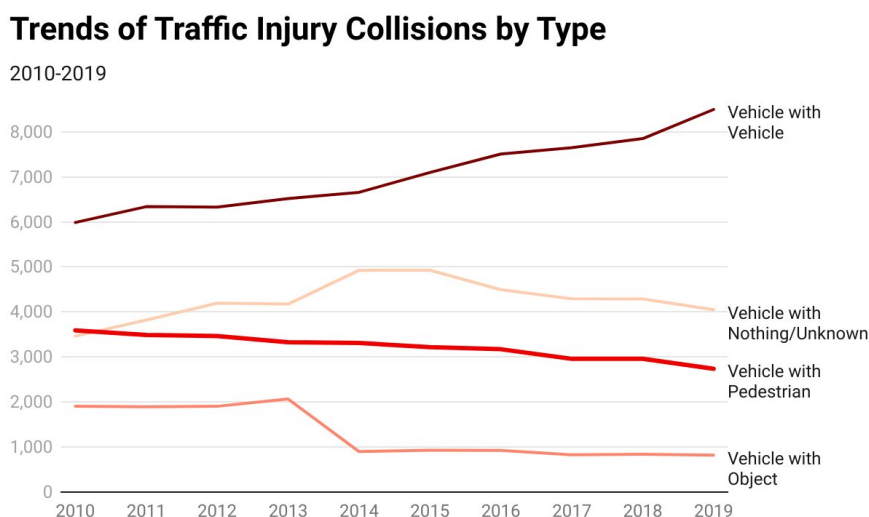


Chart: 街道變革 Street Reset • Source: Transport Department (Figure 2.2 Road traffic accidents by type of accident collision and severity 2015-2019) • Created with Datawrapper

Figure 7: Trends of pedestrian casualties (2010-2019)

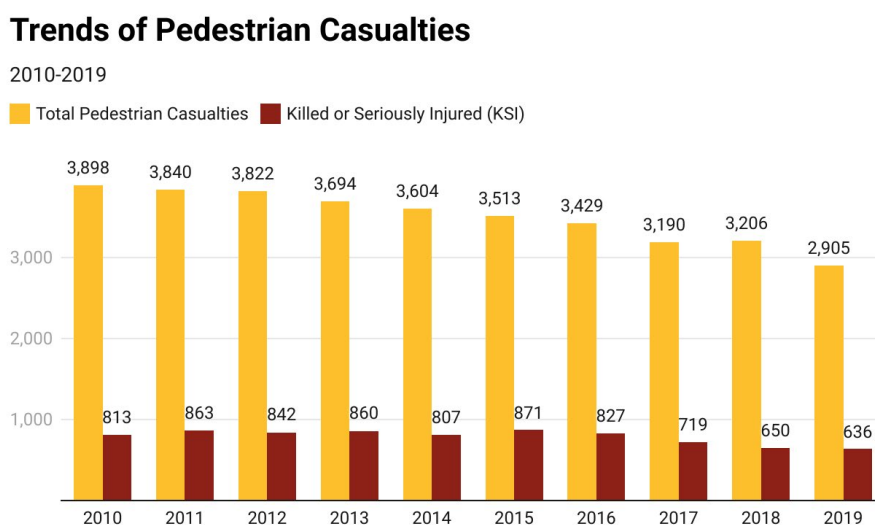


Chart: Street Reset • Source: TD Road Traffic Accident Statistics - Figure 1.6 (Road traffic casualties by class of road user and degree of injury) • Created with Datawrapper

The severity ratio (the percentage of fatal and serious injuries to all injuries) for pedestrian casualties in 2015-2019 was 23%, similar to the figure from 2010-2014 (22%).

While we recognise that the government has made substantial progress in reducing pedestrian casualties over the five years and beyond, there is still much work to be done to deliver a further significant reduction in pedestrians being killed or seriously injured.

Although pedestrians were only involved in about 19% of all collisions in 2015-2019, they accounted for the most fatalities (57%), totaling 350 deaths within the five-year period (Figure 8). Pedestrians accounted for almost one-third (31%) of all Killed or Seriously Injured (KSI) casualties, and suffer from the highest rate of KSI casualties when compared to other road user types.

It is therefore clear that pedestrians are still the most vulnerable group of road users, suffering from the highest risk of serious traffic collisions and injuries.

Figure 8: Proportion of pedestrians amongst all collision fatalities (2015-2019)

Proportion of Pedestrians amongst All Collision Fatalities

2015-2019

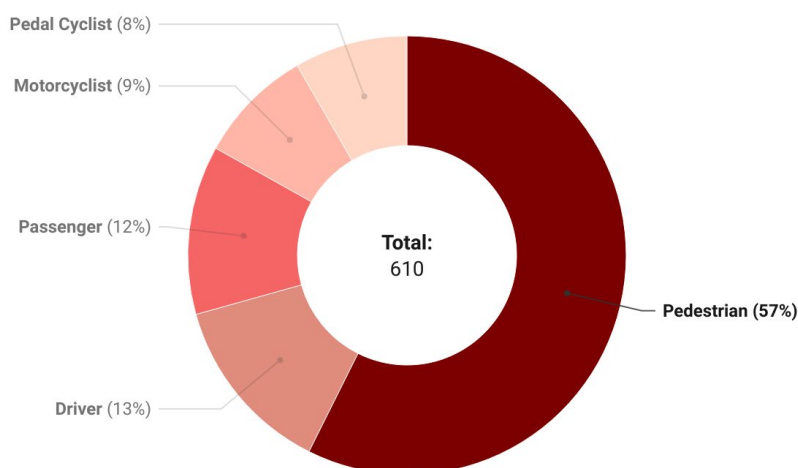


Chart: 街道變革 Street Reset • Source: Transport Department (Figure 1.6 Road traffic casualties by class of road user and degree of injury 2015-2019) • Created with Datawrapper

Table 1: Casualties by degree amongst all road user types (2015-2019)

Class of road user	Degree of injury			Total Casualties	% of KSI casualties amongst all road user types	KSI Casualty rate
	Killed	Seriously injured	Slightly injured			
Pedestrian	350	3,353	12,540	16,243	31%	23%
Vehicle Driver (excl. m/c & p/c)	81	2,128	29,174	31,383	19%	7%
Vehicle Passenger	76	2,357	29,633	32,066	21%	8%
Motorcyclist (m/c)	52	1,902	9,146	11,100	16%	18%
Pedal Cyclist (p/c)	51	1,505	7,908	9,464	13%	16%
Total (2015-2019)	610	11,245	88,401	100,256	100%	12%

WHO IS THE MOST AT RISK?

Amongst the 350 pedestrians killed in 2015-2019, 78% (273) aged 55+, and 61% (214) aged 65+. As shown in Figure 9, despite the number of casualties plateaus at the age group of 55-59, the severity of injuries only rises as age increases further. This is evident from the stark increase in the share of KSI injuries for age groups between 55 and 85+, from 23.8% (55-59) to 43.2% (85+). Therefore, pedestrians aged 55 or above are most at risk from serious injury caused by traffic collisions.

Figure 9: Proportion of KSI casualties increase from age

Pedestrian Casualties & Severity by Age

2015-2019

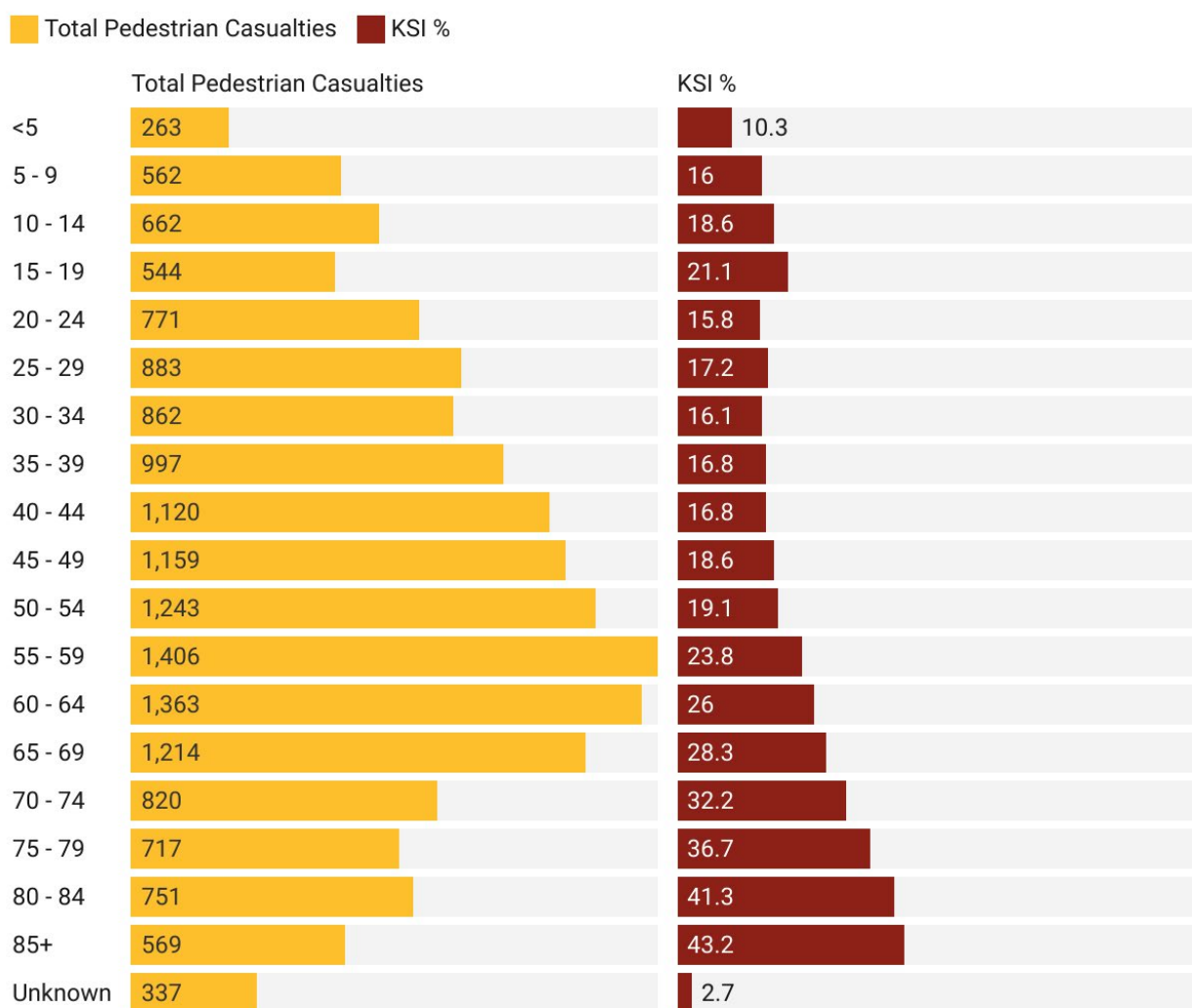


Chart: Street Reset • Source: TD Road Traffic Accident Statistics - Figure 1.10 (Pedestrian casualties by age and degree of injury) • Created with Datawrapper

The number of pedestrian KSI casualties declined in most age groups when compared to the previous five-year period (2010-2014). However, we also see a considerable increase of KSI casualties in three elderly age groups, with the highest increase of 37.1% recorded for ages 65-69 (Figure 10). It shows that even though the total number of pedestrian casualties have declined, elderly pedestrians are becoming more at risk from fatal and serious injuries.

Figure 10: Pedestrian KSI casualties by age - comparison between both 5-year periods

Pedestrian KSI Casualties by age: Comparison between both 5-year periods

2010-14 vs 2015-19

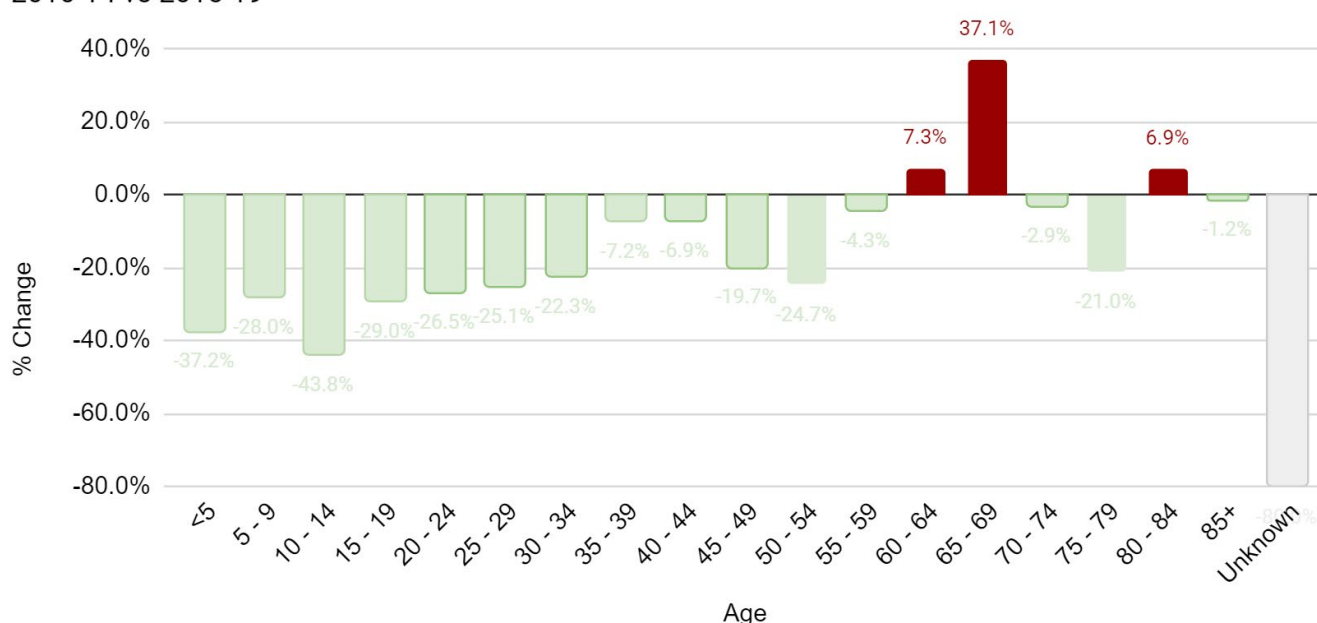


Chart: Street Reset • Source: TD Road Traffic Accident Statistics - Figure 1.10 (Pedestrian casualties by age and degree of injury)

WHERE ARE PEDESTRIANS MOST AT RISK?

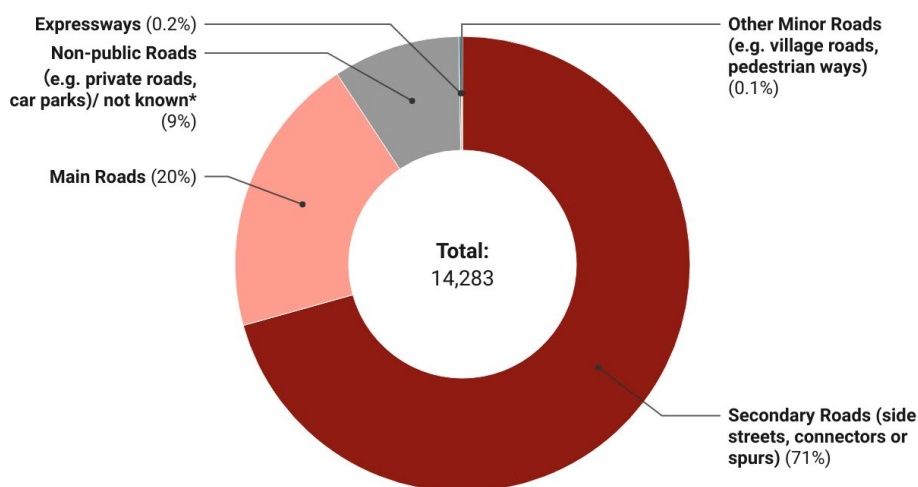
ROAD TYPE

Using road classification used by the Lands Department², we found that the majority (71%) of collisions involving pedestrians happened on, or at the junction with, secondary roads (such as side streets and connector roads between main roads). This may be in contrast to general perceptions that most collisions involving pedestrians happen on the main roads, which in fact only accounts for about 20% of pedestrian-related collisions.

Figure 11: Location of collisions involving pedestrians (2015-19)

Location of collisions involving pedestrians

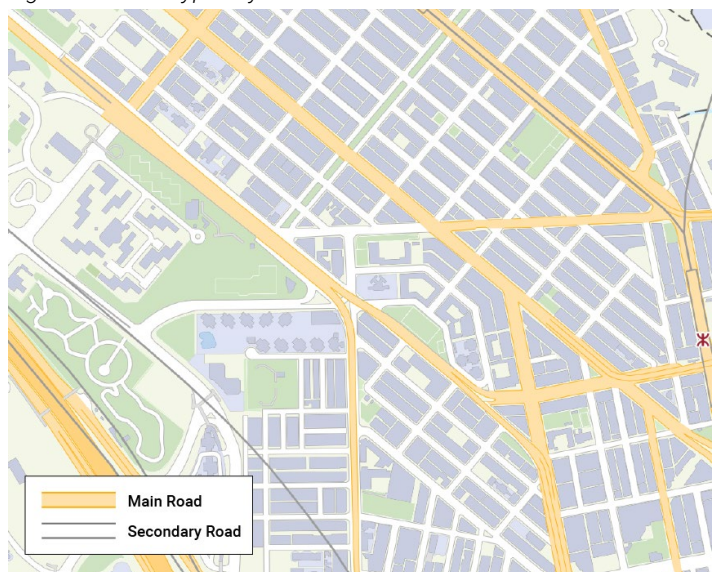
2015-2019 (according to road type designated by LandsD)



*Due to incorrect or missing geo-coordinates

Chart: Street Reset • Source: TD Road Traffic Accident Statistics • Created with Datawrapper

Figure 12: Road types by LandsD definition



² While the TD has established a road classification system as stipulated in Volume 2, Chapter 3.2 of the Transport Planning and Design Manual, we are unable to obtain an authoritative dataset from the department showing the official road type classification for every road in the territory. The classification by the Lands Department is also easier to understand from laymans' perspective as it classifies roads according to spatial function rather than desirable design characteristics.

PEDESTRIAN LOCATION WHEN COLLISION HAPPENED

Majority (72%) of pedestrian-related collisions happened on or around the edge of footpath, as well as on carriageway with no crossing control in place.

However, in terms of proportion of KSI casualties from pedestrian-related collisions, those happening on or within 15m of controlled crossings tend to cause more serious injuries (29.4% and 26.3% respectively), compared to the average for those that happened elsewhere (21.7%).

Pedestrian Location When Collision Happened

2015-2019

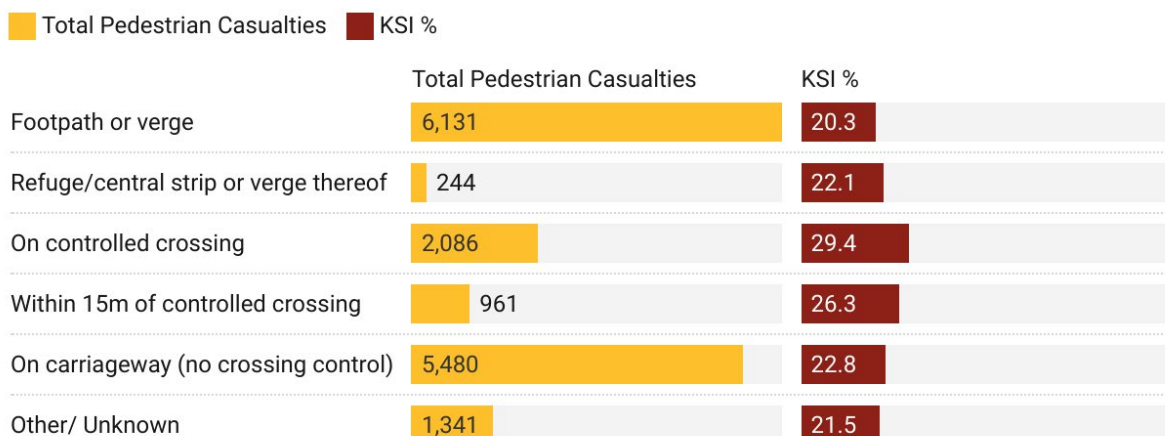


Chart: Street Reset • Source: TD Road Traffic Accident Statistics - Figure 1.12 (Pedestrian casualties by location of pedestrian and degree of injury) • Created with Datawrapper

Figure 13: Pedestrian location when collision happened (2015-19)

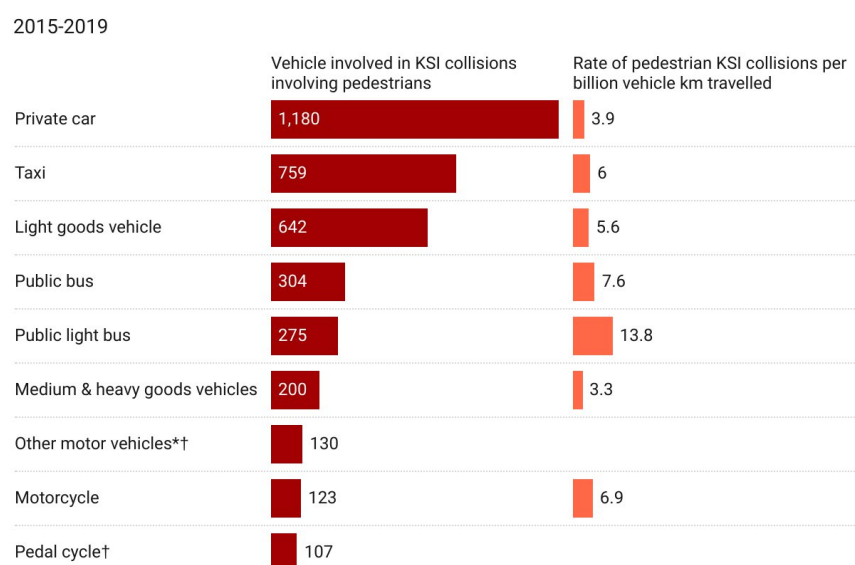
WHICH TYPE OF VEHICLE CAUSED THE MOST RISK TO PEDESTRIANS?

In 2015 - 2019, over half (59%) of all pedestrian KSI collisions involved commercial freight and public service vehicles. In particular, 20% (759) involved taxis and 17% (642) involved light goods vehicles. Private cars were involved in 32% (1,180) of all pedestrian KSI collisions.

In terms of collision frequency (involvement rate) relative to vehicle distance travelled, public light buses are the most prone to pedestrian KSI collisions amongst all vehicle types (13.8). Public buses have the second highest rate (7.6) of involving in pedestrian KSI collisions per billion kilometre travelled.

Figure 14: Vehicle involved in pedestrian KSI collisions by type, with involvement rate (2015-19)

Vehicle involved in pedestrian KSI collisions by type, with involvement rate



*Other motor vehicles include tram, light rail vehicle, trailer, special purpose vehicle, private light bus, private bus, golf cart and village vehicle, etc. | †Vehicle km travelled data not available

Chart: Street Reset • Source: TD Road Traffic Accident Database & Statistics Figure 3.1 & 3.5 • Created with Datawrapper

HOW DID COLLISIONS HAPPEN?

In-depth knowledge of the details of collisions, including the conflict type and information about the other vehicles involved, informs what action is needed to improve the safety of pedestrians. The top 8 conflict types most commonly resulting in all collisions and KSI between one vehicle and pedestrians in 2015-2019 are summarised in Table 2 and Table 3 below.

We were declined from obtaining the detailed collision description ('How did accident happen') as part of our data request from TD. However, by analysing the conflict types through vehicular manoeuvre and pedestrian action in each collision, we are still able to understand the prevailing conflict type that are most likely to lead to pedestrian collisions.

Table 2: The top 8 conflict types most commonly resulting in all collisions between one vehicle and pedestrians (2015-2019)

Conflict Rank	Pedestrian action	Main vehicle manoeuvre	Collision number	% in total collisions
1	Walking - facing traffic	Going straight ahead (with priority)	3,525	24%
2	Crossing from near-side	Going straight ahead (with priority)	2,595	18%
3	Walking - back to traffic	Going straight ahead (with priority)	1,587	11%
4	Crossing from off-side	Going straight ahead (with priority)	1,259	9%
5	Walking - facing traffic	Making right turn	615	4%
6	Standing	Going straight ahead (with priority)	592	4%
7	Crossing from near-side	Making right turn	470	3%
8	Crossing from off-side	Making right turn	303	2%

Table 3: The top 8 conflict types most commonly resulting in pedestrian KSIs (2015-2019)

Conflict Rank	Pedestrian action	Main vehicle manoeuvre	KSIs number (% in total)	Serious (% in total)	Fatal (% in total)
1	Walking - facing traffic	Going straight ahead (with priority)	838 (25%)	785 (25%)	53 (18%)
2	Crossing from near-side	Going straight ahead (with priority)	753 (22%)	677 (22%)	76 (25%)
3	Crossing from off-side	Going straight ahead (with priority)	326 (10%)	299 (10%)	27 (9%)
4	Walking - back to traffic	Going straight ahead (with priority)	309 (9%)	292 (9%)	17 (6%)
5	Walking - facing traffic	Making right turn	166 (5%)	143 (5%)	23 (8%)
6	Crossing from near-side	Making right turn	130 (4%)	112 (4%)	18 (6%)
7	Crossing from off-side	Making right turn	94 (3%)	87 (3%)	7 (2%)
8	Standing	Going straight ahead (with priority)	78 (2%)	72 (2%)	6 (2%)

In 2015-2019, the total number of collisions involving one vehicle and one pedestrian was 14,609 (97% of all pedestrian collisions). Meanwhile, the total number of pedestrian KSI collisions involving one vehicle and one pedestrian was 3,419 (including 3,120 serious injuries & 299 fatal), which accounted for 23.4% of all pedestrian collisions.

A large proportion of pedestrians are injured in head-on collisions with one vehicle in Hong Kong. The number of total crashes and KSI indicated that the most common conflict (rank 1) is a collision between a pedestrian walking and facing the traffic and a vehicle going straight ahead with priority. Meanwhile, crossing the road is also a common conflict type.

Collisions between a vehicle going straight (with priority) and pedestrians crossing the road (including those crossing from both vehicle's near-side and off-side) are the second and third-most conflict types in terms of KSI (also ranked 2 and 4 in total crashes type). Meanwhile, The rear-end collision (people walking back to the traffic and a vehicle going straight ahead with priority) is the following in the KSI ranking. The other common conflict type includes pedestrians (walking to the traffic or crossing from the vehicle's near-side and off-side) and a vehicle turning right, and standing pedestrians with a vehicle going straight.

Overall, the top 8 conflict types of total collisions and crashes involving KSI are similar, with slight differences in ranking.

PEDESTRIAN COLLISION HOTZONE ANALYSIS

BACKGROUND OF THE HOTZONE ANALYSIS

The TD currently analyses the traffic collision based on the hotspot (or junction blacksites) analysis, identifying specific road intersections of a relatively high number of traffic crashes. However, dangerous road locations do not only include road junctions, but also some road sections, requiring corrective measures. For example, almost no hotspots can be identified on expressways. It is important to identify the dangerous road sections in order to devise preventive measures in advance, and to further reduce the number of traffic crashes and promote road safety³.

To better identify the hazardous road locations falling outside the intersections, an alternative method to examine traffic collisions and road sections is needed. Loo (2009) develops a hotzone methodology to identify continuous road segments of a certain threshold of traffic crashes⁴.

Hotzone is different from **hotspot** - A hotspot refers to a dangerous road location where the actual crash rate is higher than the critical crash rate. Meanwhile, a hotzone refers to dangerous road locations made of two or more continuous segments that contain an actual crash rate higher than a threshold value for each spatial unit.⁵

The hot zone methodology takes network contiguity into account instead of identifying single hot spots of road crashes. It is very useful in road safety analysis because a hot spot might be a result of randomness rather than a systematic deficiency.⁶

Figure 15: hotzone identification methodology developed by Loo (2009), image from Tsoi (2020)⁷



3 Tsoi, Ka Ho Jason (2020) Where are the most dangerous road locations in Hong Kong?, ArcGIS StoryMap, <https://arcg.is/jCWTX>

4 Loo, B. P. Y. (2009) The Identification of Hazardous Road Locations: A Comparison of the Blacksites and Hot Zone Methodologies in Hong Kong, International Journal of Sustainable Transportation, Volume 3, 2009, Issue 3, Pages 187-202, <https://www.tandfonline.com/doi/abs/10.1080/15568310801915583>

5 Satria, R., Tsoi, K.H., Castro, M. and Loo, B.P.Y. (2020) A Combined Approach to Address Road Traffic Crashes beyond Cities: Hot Zone Identification and Countermeasures in Indonesia. Sustainability, 12(5), 1801. <https://hub.hku.hk/bitstream/10722/284132/1/content.pdf?accept=1>

6 Loo, 2009

7 Tsoi, 2020

METHODOLOGY

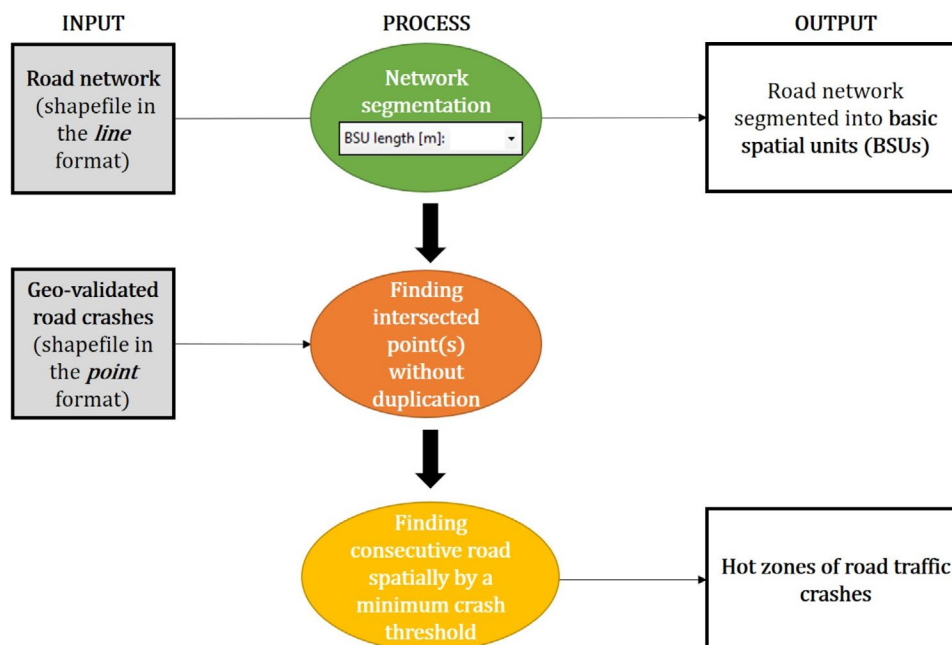
“Hotzone Generation Add-in”, a GIS-based add-in integrated with Python Scripting developed by Professor Becky P. Y. Loo, Dr. Tobias Grubenmann, and Mr. Tsoi Ka Ho, from the Department of Geography at the University of Hong Kong, was used to analyse the hotzone⁸. The hotzone methodology includes mainly three essential steps: (i) segmenting the road network to split the road into various sections, (ii) finding intersection points on the road network and (iii) finding the consecutive road sections above the minimum threshold (see Figure 14).⁹

Two variable values have to be defined for running the add-in, namely Basic special units and Crash threshold. ‘Basic special units’ (BSUs) represents the basic unit of analysis for calculating crash intensities and is the basis for forming spatial clusters. On the other hand, “Crash threshold” is the minimum number of crashes in a BSU to be considered as a dangerous road section. Only when contiguous BSUs (more than 1 BSUs) are found exceeding the minimum threshold of crashes are considered as a hotzone.

In this study, the collision location dataset between 2015 to 2019 and Hong Kong’s road network dataset has been used. We set the length of basic special units (BSUs) as 100 m, which is a common guideline figure used in hotzone analysis. To identify areas with different risk levels, two crash frequency thresholds were used:

- The first was ‘3 crashes per 100m’, which represents road sections with a noticeable density of pedestrian collisions (‘Minor Pedestrian Collision Hotzones’)
- The second was ‘6 crashes per 100m’, which represents road sections with a severe density of pedestrian collisions (‘Major Pedestrian Collision Hotzones’)

Figure 16: Steps of Hotzone analysis, image from Tsoi (2020)¹⁰



8 Grubenmann, T., Tsoi, K.H. and Loo, B.P.Y. (2019) Hotzone Generation Add-in for ArcGIS. Available at <http://arcg.is/1T0bKv>

9 Loo, 2009

10 Tsoi, 2020

RESULTS AND ANALYSIS

The distribution of Pedestrian Collision Hotzones is shown in Figure 16. Between 2015 and 2019, there were a total of 790 hotzones with a noticeable crash number (when the threshold is set to be 3 traffic crashes or above in each BSU, and with each BSU of 100m). Meanwhile, there were a total of 79 hotzones with serious crash numbers (when the threshold is set to be 6 traffic crashes or above in each BSU with the same BSU length). Overall, the hotzones are mainly distributed in the urban area with high population density, especially hotzones with serious crash numbers in Kowloon and Hong Kong Island (Yau Tsim Mong, Sham Shui Po, Wan Chai, etc.). Also, some are distributed in new towns like Yuen Long, Sha Tin, and Tai Po, but are much fewer compared to urban areas.

Some hotzones are concentrated in specific areas, so we grouped those hotzones and ranked them according to the crash density (collisions per kilometre). The top 10 hotzones with the highest collision density are identified as '**High-risk Pedestrian Collision Hotzones**' and listed in Table 4. The list included 2 hotzones in Wan Chai, Hong Kong island, 2 hotzones in the New Territories, 6 hotzones in Kowloon. A section of Wan Chai road is the top ranked hotzones with the highest collisions per metre.

Most hotzones involved local streets, while 4 areas of hot zones in the list are near to the market or municipal services building. These areas are with high pedestrian flow and strong place function.

Figure 17: Distribution of all Pedestrian Collision Hotzones (Major & Minor) in 2015-2019

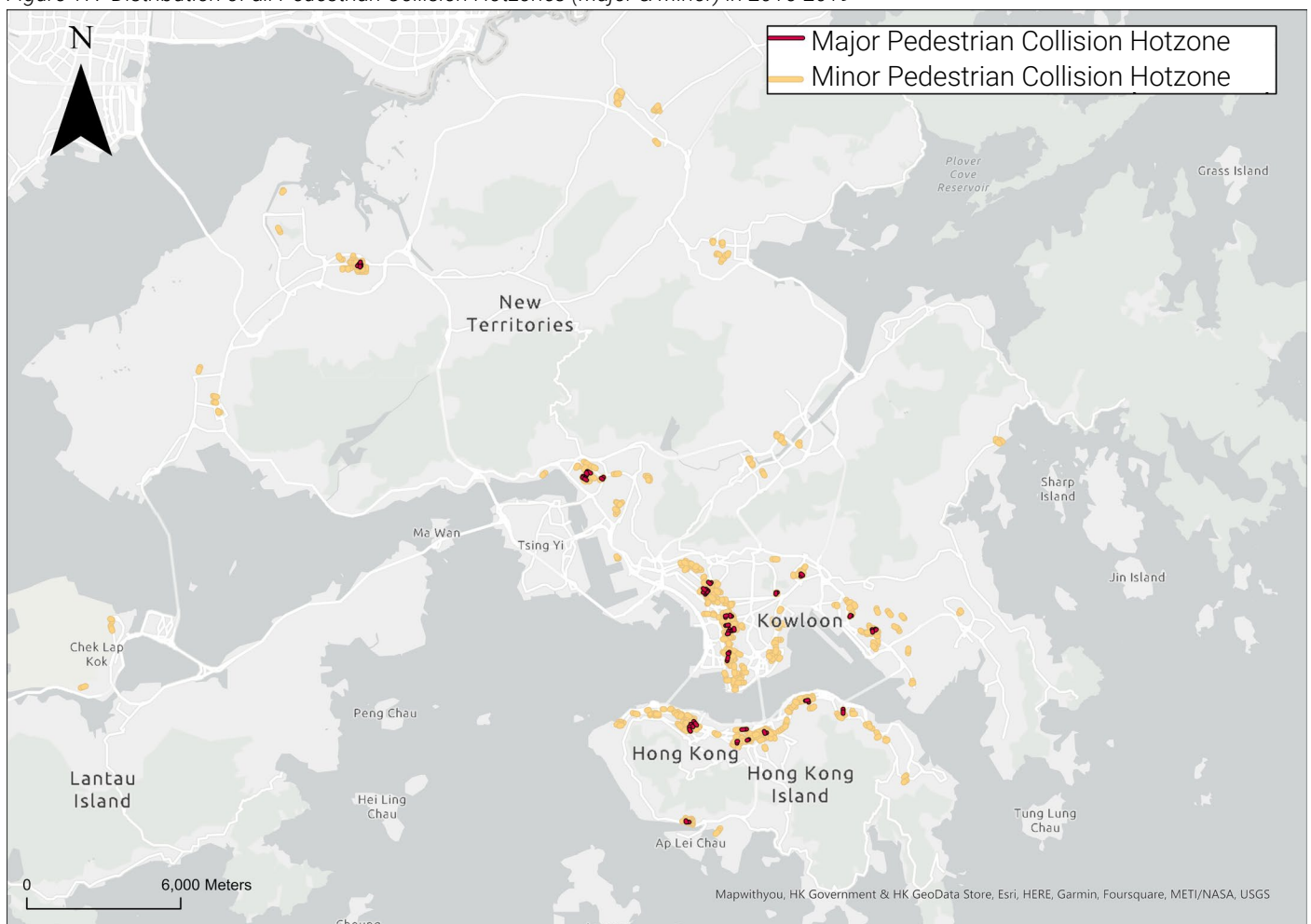


Table 4: Top 10 High-risk Pedestrian Collision Hotzones with the highest collision density

Rank	Location	District	Total no. of pedestrian collisions in the zone (2015-2019)	Total road length in the zone (m)	Calculated Collision per kilometre
1	Wan Chai Road	Wan Chai	21	86	243
2	Market Streets near Pei Ho Street Municipal Services Building (Pei Ho Street, Kwellin Street, Ki Lung Street, Tai Nan Street & Yu Chau Street)	Sham Shui Po	126	758	166
3	Johnston Road at the Junction of Spring Garden Lane	Wan Chai	19	118	161
4	Hong Keung Street & Tseuk Luk Street	Wong Tai Sin	26	187	139
5	Market Streets near Yeung Uk Road Market (Chuen Lung Street, Ho Pa Street, San Tusen Street)	Tsuen Wan	99	747	133
6	Market Streets near Shui Wo Street Municipal Services Building (Shui Ning Street, Shui Wo Street & Fu Yan Street)	Kwun Tung	31	266	117
7	Shanghai Street at the Junction of Jordan Road	Yau Tsim Mong	29	266	109
8	Tsuen Kwai Street at the Junction of Tsuen Fu Street	Tsuen Wan	18	166	109
9	Market Streets near Tung Yick Market (Tai Tong Road , Kuk Ting Street, Fau Tsoi Street, Hop Choi Street & Yat San Street)	Yuen Long	50	467	107
10	Area at the junction of Nathan Road and Dundas Street (Nathan Road, Dundas Street, Portland Street, Hamilton Street & Fa Yuen Street)	Yau Tsim Mong	94	884	106

POLICY AND DESIGN RECOMMENDATIONS

To tackle holistically the issues identified, we have put forward ten recommendations ranging from policy approaches to street design measures. Case studies, explainers and research references have been provided alongside to support our viewpoints.



1. ADOPT THE SAFE SYSTEM APPROACH AS THE OVERARCHING PRINCIPLE IN THE GOVERNMENT'S ROAD SAFETY STRATEGY

The 'Zero accident' approach, which was branded in a well-known motto 'Zero accident, Hong Kong Goal' (「路上零意外, 香港人人愛」), has been long held as the target in Hong Kong's road safety strategies. Particular focus has been put on public education and enforcement campaigns to 'foster change in road user behaviour', as human factors are involved in most collisions.¹¹ Hence, quarterly promotion and enforcement rounds targeting specific groups of road users have been undertaken by the police, with over 85,000 penalty notices issued to pedestrians between 2015-2019.¹² Junction blackspots identification and road engineering treatments have also been undertaken by the TD to improve road safety at specific locations, at which many were implemented as reactive measures after collisions happened.

Given the progress we saw in reducing pedestrian casualties during this five-year period, this traditional '3Es' approach ('Education, Enforcement and Engineering') appears to be effective to a certain degree. However at the same time, we also see a disproportionate amount of pedestrian casualties amongst elderly age groups, and numerous clusters of pedestrian casualties where collisions happened again and again over these five years. The age and spatial disparity of pedestrian casualties tell us that the '3Es' approach can only help so much - they are only part of the solution.

After all, all road users are human beings, and humans will continue to make mistakes or misjudge. Hence, a realistic approach that takes into account human error and vulnerability is much needed to better manage risks on our streets. The Safe System Approach, also known as 'Vision Zero' or 'Sustainable Safety', is based upon the core idea of 'fault tolerance' - the road infrastructure should not only work when all pedestrians and motorists obey the traffic rules perfectly, but also reduce the severity of collisions when someone makes a mistake, and prevent fatal and serious injuries as much as possible.

To systemically ensure pedestrian safety, we urge the Transport and Logistics Bureau (TLB), Transport Department (TD), Highways Department (HyD), the Road Safety Council (RSC) and the Police to jointly adopt the Safe System Approach as the overarching principle of the government's road safety strategy. By doing such, it means to create a 'forgiving street environment' that is designed around vulnerable road users. For instance, instead of continuing to attribute blame on pedestrians, we should focus on accommodating direct pedestrian desire lines by providing more formal crossings at convenient locations. Wherever crossing movements are physically possible, traffic speeds should also be made safe enough so that no one would be killed or seriously injured even if pedestrians or motorists make a mistake. (see Recommendation #4 for more details)

Adopting the Safe System Approach is essential to pedestrian's safety, particularly because Hong Kong's population is ageing. Elderly age groups (65+) currently already made up over 60% of all pedestrian fatalities. By 2035, the population of elderly people will be doubled to 30%.¹³ Due to deterioration of mobility and cognitive ability, senior citizens may not always be able to judge risks correctly like the young and able-bodied. Therefore, we must refocus efforts on preventing more deaths and serious injuries on our streets through accommodating human mistakes and reducing impact forces to tolerable levels.¹⁴

11 Road Safety Council (2020) Annual Report, https://www.roadsafety.gov.hk/doc/annual2020/annual_report_2020_tc.pdf

12 HKSARG (2016-2020) Controlling Officer's Report (Head 122 - Hong Kong Police Force), Budget 2016-2020, <https://www.budget.gov.hk/2020/eng/pdf/head122.pdf>

WHAT IS THE SAFE SYSTEM APPROACH/ VISION ZERO?

The Safe System Approach, or Vision Zero, is a concept and best practice that originated from Sweden and the Netherlands and is now being adopted as the mainstream road safety strategy in Europe and many US cities. It is based on an underlying principle that it is never morally acceptable for anyone to be killed or seriously injured when travelling within the road transport system, even if someone makes a mistake. The Safe System Approach is considered the best practice in road safety according to the World Health Organisation (WHO) and the Organisation of Economic Cooperation and Development (OECD).

By acknowledging that the causes of traffic collisions are related to the inherent risks of using the road infrastructure, the Safe System Approach no longer sees human error as the primary cause of collisions and relies on perfecting human behaviour. Instead, it aims to design road infrastructure in a way that is forgiving of mistakes, taking into account the limitations and vulnerability of human beings.¹⁷

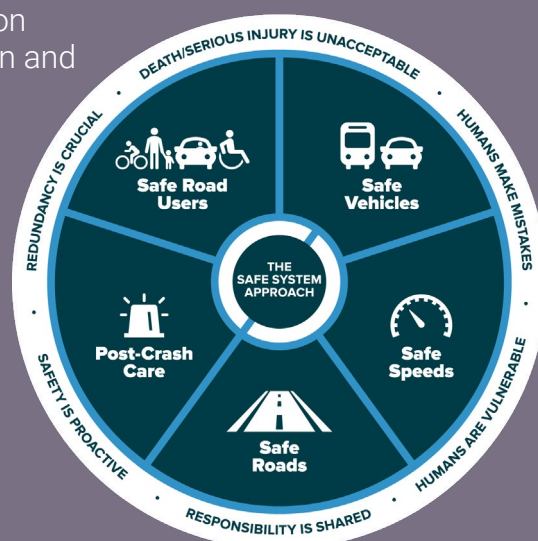


Figure 18: An illustration showing the five pillars of the Safe System Approach (image from FHWA, 2020)¹⁶

13 Census and Statistics Department (2020) Hong Kong Population Projections 2020-2069, <https://www.statistics.gov.hk/pub/B1120015082020XXXXB0100.pdf>

14 Federal Highway Administration (FHWA) (2020), Safe System Approach flyer, https://safety.fhwa.dot.gov/zerodeaths/docs/FHWA_SafeSystem_Brochure_V9_508_200717.pdf

15 OECD (2016) Zero Road Deaths and Serious Injuries: Leading a Paradigm Shift to a Safe System https://www.oecd-ilibrary.org/transport/zero-road-deaths-and-serious-injuries_9789282108055-en

16 Ibid, Federal Highway Administration (2020)

17 Federal Highway Administration, 2020

There are five essential elements in the Safe System Approach to achieve its key principles:¹⁸

1. Safe roads and roadsides

Roads should be designed to reduce the risk of collisions and the severity of injury, should a collision occur. This can be achieved by segregating different kinds of road users, segregating traffic moving in different directions or at a different speed. If this is not feasible, an appropriate speed limit should be implemented to protect the most vulnerable road users.

2. Safe speeds

Appropriate speed limits should be established according to the protective quality of the road, the function it serves and the physical tolerance of road users present. Effective speed management features or actions should also be implemented to ensure compliance.

3. Safe vehicles

Vehicles should be designed and regulated to minimise the occurrence and severity of collisions using safety measures that incorporate the latest technology.

4. Safe road use

Education interventions and enforcement actions continue to play an important role, to ensure that road users are risk aware and act appropriately to keep themselves and others safe on the road.

5. Post-crash response

Road collisions should be effectively responded to and investigated. Health outcomes for victims of collisions rely on the ability of the emergency medical care system to quickly locate and provide paramedic care to stabilise the victim and transport them to hospital for the appropriate care and treatment.¹⁹

In a system where human mistakes are accounted for, a large share of responsibility shifts from the individual to the transport and road management authorities, automotive industry and politicians. All bear joint responsibility for providing a road environment that anticipates potential mistakes and deals with them to avoid serious injury or death.²⁰

18 The Royal Society for the Prevention of Accidents (2021) Road Safety factsheet: Safe System, <https://www.rospa.com/media/documents/road-safety/factsheets/safe-system-factsheet.pdf>

19 DfT (2015) Working Together to Build a Safer Road System: British Road Safety Statement, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/487704/british_road_safety_statement_print.pdf

20 The Royal Society for the Prevention of Accidents, 2021

Within this approach, speed limits are a complementary intervention to creating safer roads, roadsides and vehicles that together work to accommodate driver error. All parts of the system need to be strengthened—roads, roadsides, speed restrictions and vehicles—so that if one part of the system fails, other parts will still protect any person who is involved in a crash.²¹

Table 5: Paradigm shift from traditional road safety strategies to the Safe System Approach, table adapted from WSP (2018)²²

	Traditional/ Prevailing	Safe System Approach/ Vision Zero
Issue	Preventing all crashes	Preventing fatalities and serious injuries
Premise	Deaths are inevitable	Deaths are preventable
Focus	Perfecting human behaviour	Designing a road system that accounts for human error
Responsibility	Individual road users	Shared: road users and system designers

21 WHO (2015) Global status report on road safety 2015, https://www.afro.who.int/sites/default/files/2017-06/9789241565066_eng.pdf

22 WSP (2018) Vision Zero: Setting a higher standard for road safety, <https://www.wsp.com/en-GL/news/2018/vision-zero-a-road-transportation-system-free-of-fatalities-and-serious-injuries>





2. PRIORITISE PEDESTRIANS AT THE TOP 10 COLLISION HOTZONES THROUGH HOLISTIC STREET REDESIGN

Amongst the top 10 Pedestrian Collision Hotzones identified (page 23), half of them are located in open-air market streets areas, with another half located along main streets and its side street junctions. Pedestrian activity in these areas are often very high, with substantial crossing demands from pedestrians most of the time. Despite some of these streets being lined with guard railings and equipped with signs prohibiting pedestrians to cross, they are proven ineffective by the high pedestrian collision rate recorded.

Hence, we urge the TD to undertake further measures at these top 10 locations to reduce collision risks against people walking. Given there are so many users competing for space at these locations, it is essential to remove risk factors by reducing vehicle speeds and/or volume. Rather than continuing to correct human behaviour through failed measures, we should provide more dedicated space and/or priority to pedestrians to enable safer and more convenient crossing movements.

For example, provision of wider footway space, guard railing removal, more safer crossings, lower speed limits and traffic calming features could be considered. Although these measures should be implemented subject to specific conditions of each site, authorities should not be afraid of putting in measures that would reduce motor vehicle access or priority to enable these to happen.

Figure 19 & 20: Two of the High-risk Pedestrian Collision Hotzones - Wan Chai Road and Shum Shui Po market areas



3. UTILISE 'LINK AND PLACE' STREET TYPES AS A FRAMEWORK TO DETERMINE MODAL PRIORITIES, CONTEXT-SPECIFIC DESIGN AND SPEED LIMITS

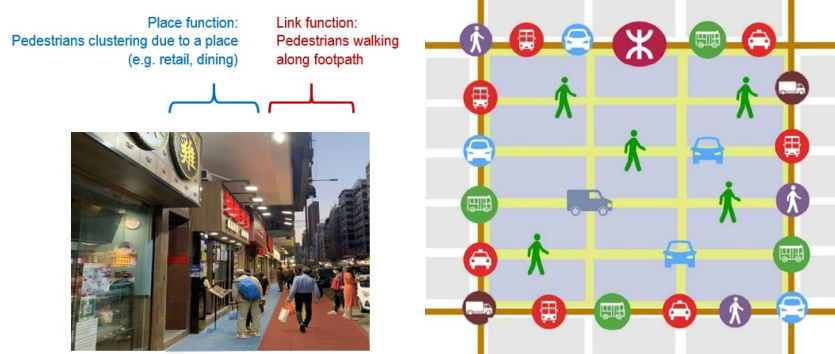
Most pedestrian collision clusters are located on streets with very high levels of pedestrian activity, which are attributable to the frequent crossing demands and inadequate footway space. In fact, as mentioned in Table 2 (page 18), about 35% of pedestrian collisions happened while the victim was walking on the carriageway. It is evident that more road space reallocation to pedestrians, lower speeds or change of priority are much needed to prevent further traffic injuries in the future.

However, many of the streets concerned also carry a strategic role facilitating traffic movements across the city. To better manage the competing demands between improving pedestrian safety and strategic traffic functions, we therefore propose that the TLB and TD should systematically identify a 'link and place' street type for all streets and roads in built-up areas. It should be utilised as a framework to determine modal priorities as well as parameters for context-specific design and speed limits on different sections of road or street.

We understand the TD has already adopted the 'link and place' concept through the new Pedestrian Planning Framework released in December 2021 as a result of the Walkability Study. In this framework, we also note the 'Urban Grid for Mobility' concept that sets a higher priority for pedestrians on side streets bound by main roads ('inner grid'). We look forward to understanding the concrete timeframe and targets in which this framework will be used to deliver pedestrian safety benefits.

To further enhance pedestrian safety, we hope that the TD could speed up the process in identifying street types and the reallocation of road space to pedestrians. We also believe that a more transparent process can help better harness the support from the general public, which will enhance the credibility of this designation process and ensure the buy-in from the local community.

Figure 21 & 22: Two key concepts from the TD's new Pedestrian Planning Framework - 'Link and place' and 'Urban Grid for Mobility' (images from TD, 2021) ²⁴



23 TD (2021) Walk in HK, https://www.td.gov.hk/en/transport_in_hong_kong/pedestrians/w_city/index.html

24 Ibid, TD (2021)

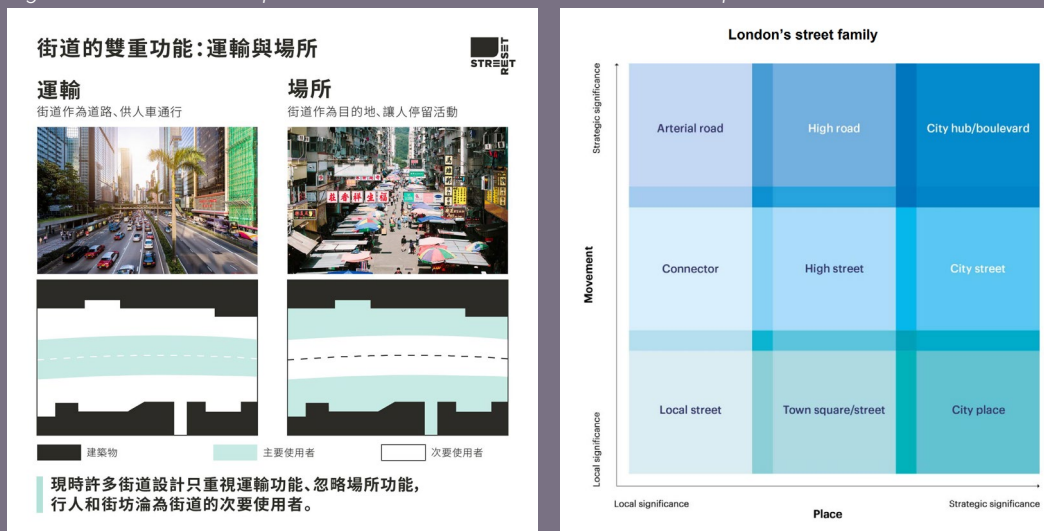


Figure 23-26: Examples of streets with high pedestrian and/or place function (From top left to bottom right: South Wall Road in Kowloon City, Cheung Sha Wan Road in Shum Shui Po, Chun Yeung Street in North Point & Mong Kok flower market areas)

'LINK AND PLACE' STREET TYPES

Streets are not only how we get from point A to point B, but also an important part of our public realm. Hence, streets embody both functions as a 'link' and a 'place'.

Figure 27 & 28: 'Link and place' illustration & London's 'movement and place' matrix²⁵



Traditionally, the hierarchy of roads are designated solely based on their strategic traffic importance. Such a classification only takes into account the traffic flows and capacity, without any considerations about the street's function as a place and for the local community.

Hence, a 'Link and place' street type matrix classification system was invented by researchers in 2007. Street types are defined by land use context and transportation characteristics, which are mapped against both axes shown in the matrix above, reflecting the importance of their link and place functions.²⁶

Through this framework, we will be able to ensure that both the 'place function' and the 'movement function' are equally considered, in order to develop a space allocation, design and speed limit that is truly appropriate for the street, balancing the needs of each street user in a practical way.

Cities like London ²⁷, San Francisco ²⁸ and Seattle ²⁹ have already designated a 'link and place' street type for most streets or roads within their administrative boundary, which have been used as a guiding framework to formulate street designs that work better for all road users.

²⁵ Roads Task Force (2013) London's street family: Theory and case studies, <https://content.tfl.gov.uk/londons-street-family-chapters-1-2.pdf>

²⁶ Ibid, Roads Task Force (2013)

²⁷ Ibid, Roads Task Force (2013)

²⁸ SF Better Streets (2015) Street Types, <https://www.sfbetterstreets.org/design-guidelines/street-types/>

²⁹ City of Seattle (2017) 2 - Street Type Standards, <https://streetsillustrated.seattle.gov/street-type-standards/>



4. LOWER SPEED LIMITS ON STREETS WITH HIGH RISK OF PEDESTRIAN-VEHICLE CONFLICT

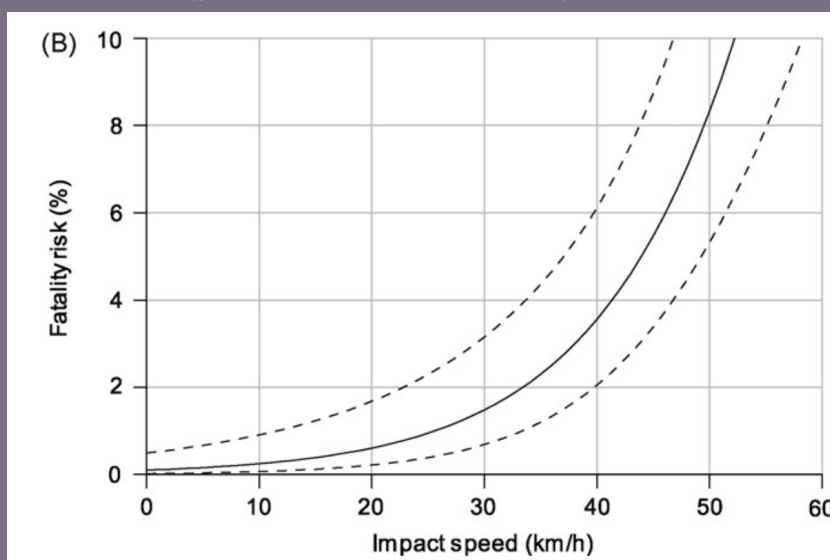
We cannot effectively address pedestrian safety without truly recognising the role of speeds contributing to pedestrian casualties. Speed not only affects the severity of a crash, but also directly relates to the chance of a collision occurring. The faster the speed, the longer it takes for the driver to react and stop the vehicle.

As identified in Figure 11 on page 16, the majority (71%) of pedestrian-related collisions happened on (or at the junction with) secondary roads like side streets, connectors and spur roads. Many of these streets or roads not only contain a moderate to high level of pedestrian activity and crossing demand. However, it is often technically infeasible to design conflict out of these streets with grade separation like main roads. In addition, secondary roads often contain frequent kerbside activity and a lot of roadside parking, causing pedestrians to be masked by parked vehicles when they attempt to cross. Hence, it is of priority to reduce traffic speeds on secondary roads where pedestrian collision risk is already high. Sections along urban main roads with high pedestrian activity and risk of conflict with vehicles also warrant appropriate speed reduction to minimise risk of severe casualties.

THE IMPORTANCE OF APPROPRIATE SPEEDS

According to literature review collated by the OECD's International Transport Forum (ITF), the pedestrian's risk of death is about 4-5 times higher in collisions with a car at 50 km/h compared to the same type of collisions at 30 km/h.³⁰ Another study by the Transport Research Lab also found a direct correlation between speed and crash risk - for every 1 mph (1.6 km/h) reduction in average speed on urban roads, there was an average reduction of 5% in the chance of a collision.³¹

Figure 29: The fatality risk (solid line shown below) of an adult pedestrian being hit by passenger car is only about 1.5% at 30km/h, as opposed to over 8% if they are hit at 50km/h (graph from Rosén and Sander, 2009)³²



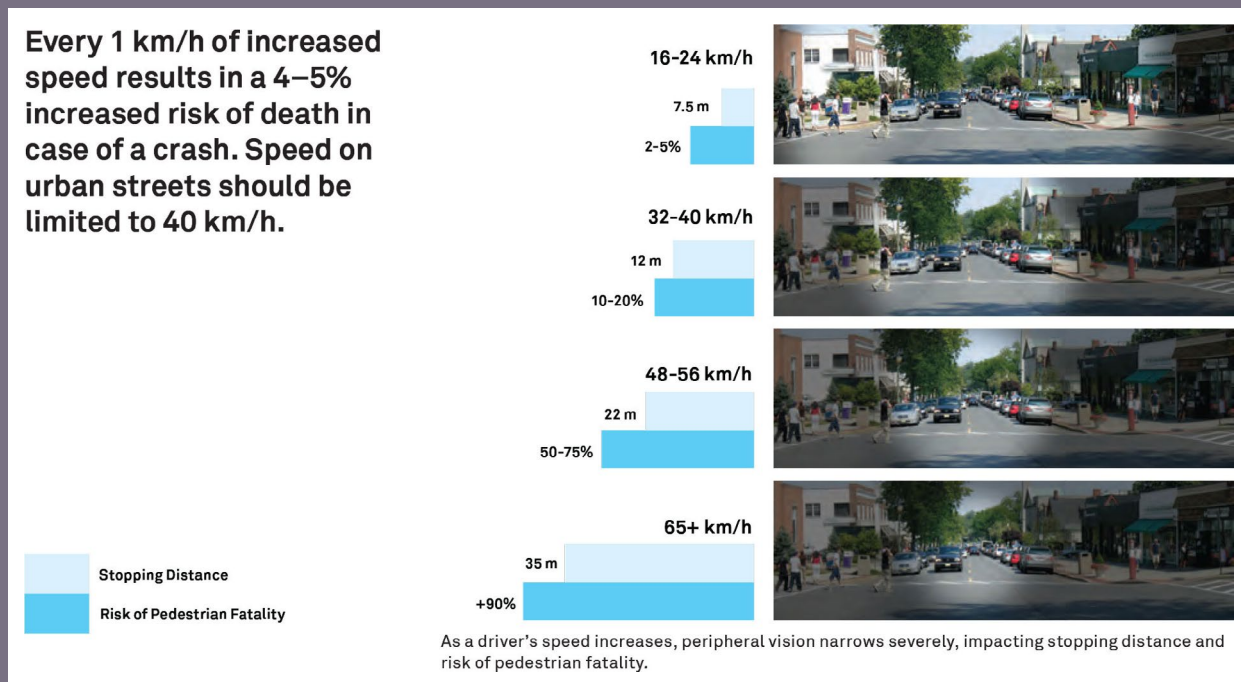
³⁰ ITF-OECD (2018) Speed and Crash Risk, <https://www.itf-oecd.org/sites/default/files/docs/speed-crash-risk.pdf#page=15>

³¹ Taylor C, Lynam D C, Baruya A (2000) The effects of drivers' speed on the frequency of road accidents, TRL 421, <https://trl.co.uk/uploads/trl/documents/TRL421.pdf>

³² Rosén and Sander (2009) Pedestrian fatality risk as a function of car impact speed, Accident Analysis & Prevention, Volume 41, Issue 3, May 2009, Pages 536-542, <https://doi.org/10.1016/j.aap.2009.02.002>

Therefore, on urban streets and roads where pedestrian-vehicle conflicts are frequent, it is particularly important to manage risk effectively by setting an appropriate speed limit.

Figure 30: Illustration explaining drivers' diminishing peripheral vision and increasing risk of pedestrian fatality related to vehicle speeds, image from Global Designing Cities Initiative³³



In addition, risks are even higher for older pedestrians than for younger pedestrians. A research by the American Automobile Association Foundation for Traffic Safety suggests that the standardised risk of severe injury for a 70-year-old pedestrian struck at any given speed was approximately equal to the average risk for a 30-year-old struck by a vehicle travelling 9.3 mph (15 km/h) faster.³⁴ This finding not only explains the especially high proportion of KSI casualties amongst the elderly age groups, but also highlights the immense potential safety benefits that speed reduction would make to protect the elderly pedestrians from the danger of death.

To systematically lower the collision risks and crash severity for pedestrians, we urge the TLB and TD to implement lower speed limits with effective traffic calming measures at the following high risk locations, in reference to the typologies proposed in the TD's new Pedestrian Planning Framework:

- 30 km/h on any 'inner grid' streets, or 'outer grid' streets with high place function and/or footfall, as well as those in proximity to sensitive land uses (such as healthcare facilities, schools and elderly/community centres, etc.)
- 40 km/h on 'outer grid' streets in densely populated areas

33 Global Designing Cities Initiative (2016) Global Street Design Guide, <https://globaldesigningcities.org/publication/global-street-design-guide/design-controls/design-speed/>

34 Tefft, B.C. (2011). Impact Speed and a Pedestrian's Risk of Severe Injury or Death (Technical Report). Washington, D.C.: AAA Foundation for Traffic Safety. <https://aaafoundation.org/wp-content/uploads/2018/02/2011PedestrianRiskVsSpeedReport.pdf>

Such a proposal has already become a common sight in many places around the world. In recent years, many major cities have already implemented low speed limit zones with traffic calming measures on a large scale in urban areas. Aside from arterial roads and most main roads, many side streets and connector roads have already implemented the speed limit of 30 or 40 km/h, in order to create a safe and forgiving street environment to systematically prevent fatal or serious pedestrian injuries (see explainer and case studies below).

We understand the TD has successfully trialled 30km/h speed limit on Wai Chi Street in Shum Shui Po since November 2020, as part of the Walkability Study. We hope that the TD will implement more lower speed limits across the territory based on the typologies listed above.

Figure 31 & 32: Speed limit sign and raised table traffic calming on Wai Chi Street in Shum Shui Po for TD's 30km/h speed limit trial



AREA-WIDE LOWER SPEED LIMITS

The concept of area-wide low speed limits is becoming a worldwide norm. Many major cities, including London, Paris, Tokyo, Singapore, Sydney, New York City and Shanghai, have already implemented large-scale speed reductions (to 30 and/or 40 km/h) in residential areas or areas with high footfall to reduce traffic collisions and pedestrian fatalities. In London, 60% of the streets have implemented a 20mph (32 km/h) speed limit.³⁵ Shanghai's Street Design Guidelines published in 2016 also stipulates that minor roads should be implemented with a 30 km/h speed limit.³⁶

Both the Netherlands and Spain have recently adopted 30 km/h as the default speed limit on all urban secondary roads^{37 38}, and Wales has also just passed the law to enable a default 20mph (32 km/h) urban/village limit to be implemented by September 2023.³⁹

Evidence from multiple cities/countries have also demonstrated the effectiveness of area-wide lower speed limits in reducing the number of pedestrian casualties. A list of selected figures are presented in Table 5 below.

Table 6: Selected list of cities/countries implemented with area-wide lower speed limits & change in casualty figures

Cities/Countries	Speed Limit Reduction	Change in casualty figures
London, UK	From 30mph to 20mph (48 km/h -> 32 km/h)	-42% in all casualties -35% in pedestrian KSI casualties ⁴⁰ No casualty migration to nearby areas
Singapore	From 50 km/h to 40 km/h	-75% in collision rates involving senior pedestrians ⁴¹
Japan	From 50 km/h to 30 km/h	1,704 injuries prevented ⁴² (across 3,105 low speed zones in a 5-year period)
Barcelona	From 50 km/h to 30 km/h	-29% in all casualties ⁴³
New York City, USA	From 25mph to 20mph (40 km/h -> 32 km/h)	-9% in all casualties ⁴⁴

35 Transport for London (2022) London Digital Speed Limit Map, <https://content.tfl.gov.uk/london-digital-speed-limit-map.pdf>

36 Shanghai Bureau of Planning and Land Resources (2016) Shanghai Street Design Guidelines (Chinese only), <http://files.in5.cn/201906/jiedaodaoze/%E4%B8%8A%E6%B5%B7%E8%A1%97%E9%81%93%E8%AE%BE%E8%AE%A1%E5%AF%BC%E5%88%99%E5%85%AC%E7%A4%BA%E7%89%88.pdf>

37 SWOV (2022) What are the speed limits in the Netherlands? <https://swov.nl/en/fact/speed-what-are-speed-limits-netherlands>

38 Global Alliance of NGOs for Road Safety (2021, May 25) 30 km/h Becomes Default Urban Limit in Spain, <https://www.roadssafetyngos.org/events/30-km-h-becomes-default-urban-limit-in-spain/#:~:text=On%2011%20May%202021%2C%20in,vary%20from%20city%20to%20city.>

39 Welsh Government (2022, July 12) UK first – Welsh Senedd gives green light for 20mph legislation, <https://gov.wales/uk-first-welsh-senedd-gives-green-light-20mph-legislation>

40 Across 200 20mph zones in London, between 1986 and 2006, after adjusting for background trends. See Grundy, C., Steinbach, R., Edwards, P., Green, J., Armstrong, B., & Wilkinson, P. (2009). Effect of 20 mph traffic speed zones on road injuries in London, 1986-2006: controlled interrupted time series analysis. *BMJ (Clinical research ed.)*, 339, b4469. <https://doi.org/10.1136/bmj.b4469>

CASE STUDY: SINGAPORE'S SILVER ZONE

The Silver Zone scheme was implemented by the Singapore's Land Transport Authority (LTA) in 2014. Silver Zones typically have a reduced speed limit of 40 km/h, additional traffic-calming and other senior-friendly road safety features. They are implemented where there have been senior pedestrian collisions and in areas with a high proportion of senior residents and senior amenities such as medical establishments. By 2019, LTA has already implemented 15 Silver Zones, and intends to implement a total of 50 Silver Zones by 2023.

LTA statistics show that the collision rates involving senior pedestrians within Silver Zones have been reduced by almost 75%. Collisions overall have also decreased from 14 cases to 4 cases per year (on average) in the 15 completed Silver Zones.⁴⁵

In 2021, LTA announced that speed limits at least five Silver Zones will be progressively lowered from 40 km/h to 30km/h following a successful trial in 2020.⁴⁶

Figure 33 & 34: Singapore's Silver Zone Traffic Calming Features (image from LTA)⁴⁷



41 Land Transport Authority (2019, Mar 7) Factsheet: 20 More Silver Zones to Enhance Road Safety by 2020, <https://www.lta.gov.sg/content/ltagov/en/newsroom/2019/3/2/factsheet-20-more-silver-zones-to-enhance-road-safety-by-2020.html>

42 Inada, H., Tomio, J., Nakahara, S., & Ichikawa, M. (2020). Area-Wide Traffic-Calming Zone 30 Policy of Japan and Incidence of Road Traffic Injuries Among Cyclists and Pedestrians. *American journal of public health*, 110(2), 237–243. <https://doi.org/10.2105/AJPH.2019.305404>

43 Change between overall monthly average number of injured in 2009 and pre-intervention period in 2007 across 5 areas; time trend and seasonality adjusted. See Pérez, K., Santamariña-Rubio, E., Novoa, A.M., et al (2011) Effectiveness of Zones 30 km/h in the number of Road Traffic Injuries in Barcelona, ISEE Conference Abstracts 2011(1), <https://ehp.niehs.nih.gov/doi/abs/10.1289/isee.2011.00657>

44 Included 26 lower speed zones implemented from 2012 to 2015. See Jiao B, Kim S, Hagen J, et al (2019) Cost-effectiveness of neighbourhood slow zones in New York City, *Injury Prevention* 2019;25:98-103. <https://injuryprevention.bmj.com/content/25/2/98>

45 Land Transport Authority (2019)

46 Channel News Asia (2021, Aug 13) Speed limit at some Silver Zone locations to be lowered to 30kmh, <https://www.channelnewsasia.com/singapore/silver-zone-lower-speed-limit-30-kmh-lta-2110711>

47 Land Transport Authority (2022) Road Safety, https://onemotoring.lta.gov.sg/content/onemotoring/home/driving/road_safety_and_vehicle_rules/road-safety.html



5. MANAGE VEHICLE SPEEDS EFFECTIVELY WITH A WIDESPREAD ROLL-OUT OF PHYSICAL TRAFFIC CALMING MEASURES, ESPECIALLY ON SECONDARY ROADS

To manage vehicle speeds effectively, it is important to make the speed limits self-enforcing by installing traffic calming measures where possible. Such an approach will be the most cost effective in maximising speed limit compliance, as the Police would not have an infinite amount of resources to enforce speed limits everywhere.

We are aware that the TD has already successfully trialled the use of raised tables as part of the Walkability Study. Therefore, we urge the TD and HyD to install more raised tables across the road network where feasible, especially on secondary roads where the majority of pedestrian collisions happen.

We also recommend the TD and HyD to trial and use a wider variety of traffic calming measures, as listed below. Some of these measures are new to the context of Hong Kong, which may require amendments to the Transport Planning and Design Manual (TPDM) to permit their use. By enabling their use, it will offer engineers and street designers a wider variety of measures available in their toolbox. More traffic calming measures can therefore be implemented flexibly based on site-specific constraints and circumstances, maximising pedestrian safety benefits.

RAISED TABLE

Raised tables are formed by raising sections of the road with a flat top, typically 6–9 m long. Raised tables can be used to reduce vehicle speeds and increase drivers' likelihood to give way to pedestrians.⁴⁸ They can also provide a levelled surface for pedestrians to cross comfortably, and can be used along bus routes without significant impact to passenger comfort.

We are aware that the TD has already successfully trialled the use of raised tables at junctions, mid-link and street entry points at limited locations in Hong Kong, including Shum Shui Po, Kai Tak, Central and Sha Tin.

Figure 35: Raised Table (illustration from GCDI)⁴⁹

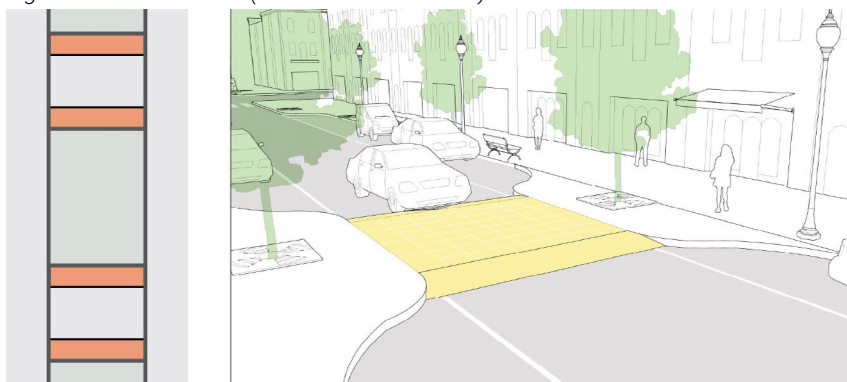


Figure 36: A raised table junction trialled in Shum Shui Po

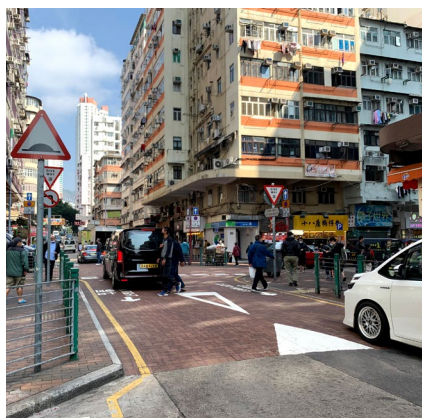
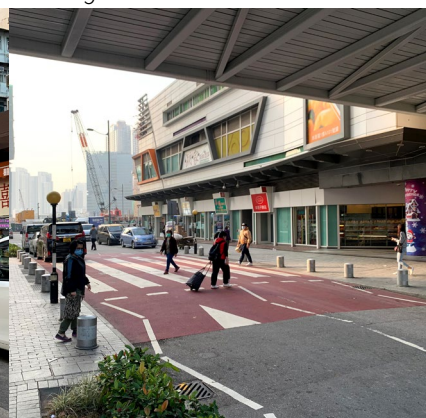


Figure 37: A mid-link raised table zebra crossing trialled in Kai Tak



⁴⁸ Martin, A (2006) for Transport for London, Factors influencing pedestrian safety: A literature review, PPR241, TRL Limited, <https://content.tfl.gov.uk/factors-influencing-pedestrian-safety-literature-review.pdf>

⁴⁹ Global Design Cities Initiative (GCDI) (2016) Traffic Calming Strategies, Global Street Design Guide, <https://globaldesigningcities.org/publication/global-street-design-guide/designing-streets-people/designing-for-motorists/traffic-calming-strategies/>

ROAD HUMPS

Road humps are formed by raising sections of the road in a sinusoidal shape, typically 10–15 cm high and 4–6 m long. They can be extremely effective in keeping vehicle speeds low. Researches conducted by the UK Transport Research Laboratory found that road humps can reduce mean and 85th percentile speeds between humps by an average of 10mph (16km/h)⁵⁰ According to general practice in the UK, road humps are usually placed in a regular interval along a street every 180 m.

Unlike speed bumps used regularly in car parks and private roads, road humps have a gentler profile and long travel distance, which only cause minor discomfort to car occupants. Road humps are already being used on some village and rural roads in the New Territories, usually managed by the Home Affairs Department.

Figure 38: Speed hump (illustration from GCDI)⁵¹

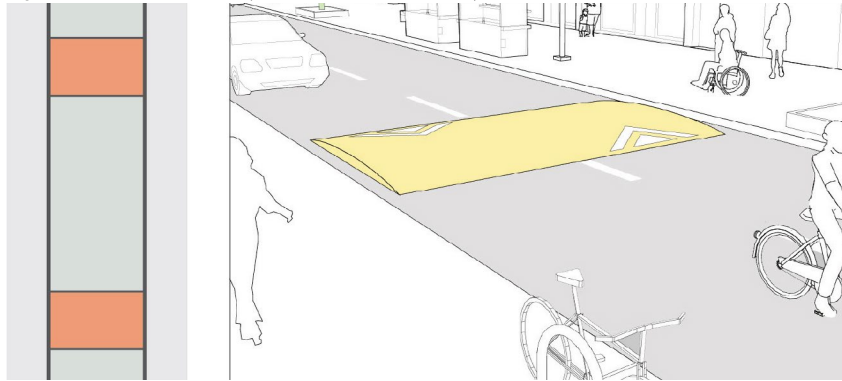


Figure 39: A speed hump installed on a village road in Tuen Mun



⁵⁰ Ibid, Martin, A (2006)

⁵¹ Ibid, GCDI (2016)

LANE WIDTH REDUCTION

Most streets and roads in Hong Kong adopt a standard lane width of 3.65 m or wider where possible, as set by the minimum carriageway width specified in the TPDM.⁵² However, plenty of overseas research suggests that such widths are too wide, which can contribute to excessive speeds and negative pedestrian safety impacts.

The Manual for Street 2, published by the Chartered Institution of Highways and Transportation (CIHT) and endorsed by the UK Department for Transport (DfT), specifies that lane widths narrower than 3.65m will be appropriate in many circumstances (particularly in built-up areas) as it could encourage low traffic speeds without causing a significant loss of traffic capacity and the carriageways easier for pedestrians to cross.⁵³ This is supported by Transport Research Lab's findings about the association between reduced road widths and lower speeds.⁵⁴

Such views are echoed by counterparts in the United States. The Urban Street Design Guide, published by the National Association of City Transportation Officials (NACTO), also specifies that lanes greater than 11 feet (3.35 m) should not be used as they may cause unintended speeding.⁵⁵ Research also suggests that each additional metre of lane width is related to a 15 km/h increase in drivers' speeds.⁵⁶

Hence, we recommend that lane widths be reduced to between 3 and 3.2 m in order to make speed limits more self-enforcing. If lane width reduction is not feasible due to local circumstances, the use of special road markings or material to give the appearance of reduced lane width should at least be implemented.

Figure 40: Lane width reduction (illustration adapted from GCDI)⁵⁷



52 Table 3.4.2.1 (Minimum Carriageway Widths in Urban Areas), Volume 2, Chapter 3 of the Transport Planning & Design Manual (TPDM)

53 CIHT (2010) Manual for Streets 2: Wider Application of the Principles, <https://tsrgd.co.uk/pdf/mfs/mfs2.pdf>

54 York, A Bradbury, S Reid, T Ewings and R Paradise (2007) The Manual for Streets: Redefining Residential Street Design. TRL Report No. 661. Crowthorne: TRL https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/3893/manualforstreetsvidence.pdf

55 NACTO (2013) 'Urban Street Design Guide', <https://nacto.org/publication/urban-street-design-guide/>

56 Fitzpatrick, K. et al. (2000) 'Design Factors That Affect Driver Speed on Suburban Arterials', Transportation Research Record 1751 (2000):18–25. https://nacto.org/docs/usdg/design_factors_that_affect_driver_speed_fitzpatrick.pdf

57 Ibid, GCDI (2016)

TIGHTENING CORNER RADII

Many junctions in Hong Kong have generous corner radii (7m or wider) to facilitate swift vehicle turning movements. However, such large radii can cause more danger to pedestrians. As vehicles can turn faster (32-48 km/h) compared to smaller radii (16-24 km/h), it can cause more danger to pedestrians, with fast turning vehicles being more likely to cut across crossing movements. Large corner radii also requires deflection to the pedestrian desire lines since it requires detour to minimise crossing distance, as illustrated in Figure 40 below. Pedestrians must also look further behind to check for fast turning vehicles and cannot normally establish priority to cross.

Narrowing corner radii can reduce vehicle turning speeds as well as pedestrian crossing distances. Minimising the size of a corner radius is critical to creating safe and compact intersections.

However, it is well noted that this measure is not suitable for junctions with higher speed roads. It may also not be feasible on roads with a high frequency of larger vehicle use. At some signalised junctions, stop lines may need to be moved back in the side road to support the safe turning of some larger vehicles.

Figure 41: Negative impacts of large corner radii on pedestrians (image from *Manual for Streets*)⁵⁸

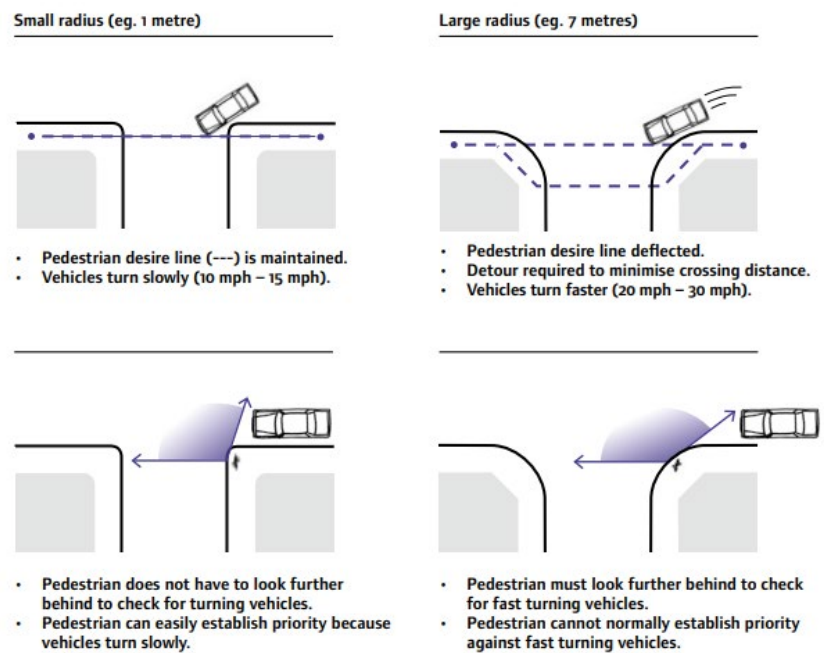
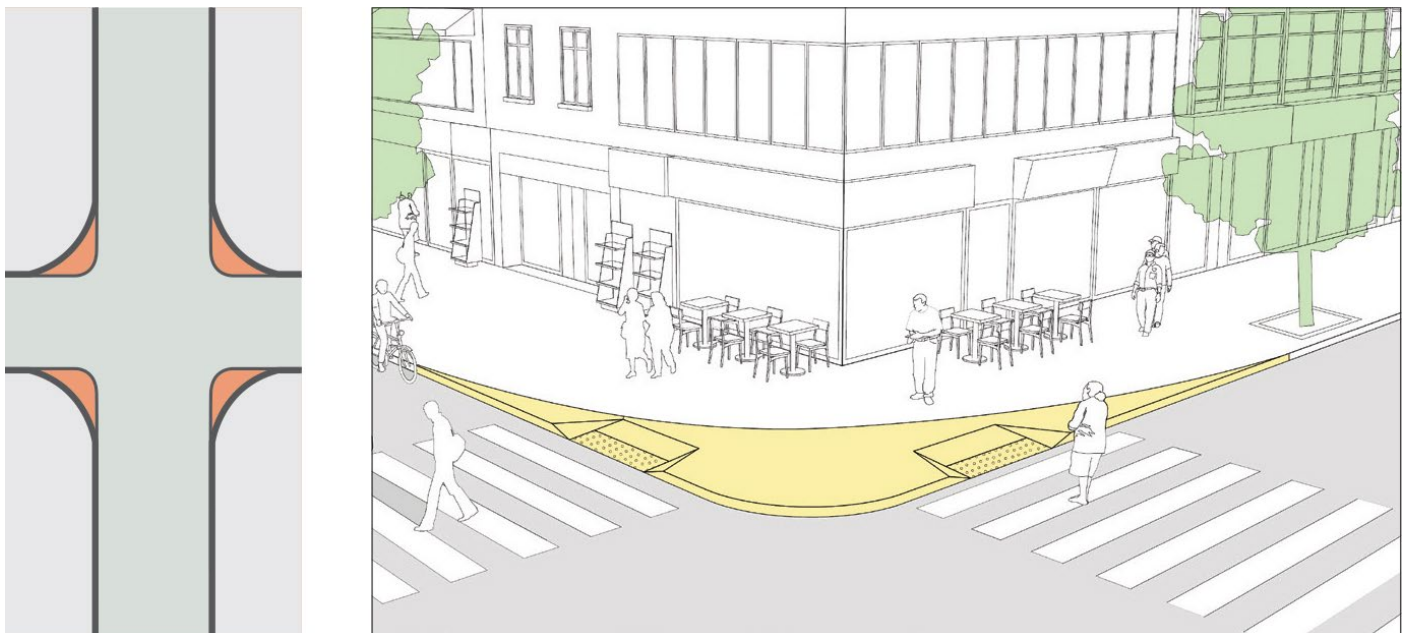


Figure 42: Tightening corner radii (illustration from GCDI)⁵⁹



⁵⁸ Department for Transport (2007). *Manual for Streets*. Thomas Telford, London, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1072722/Essex_Manual_for_Streets_Redacted.pdf

⁵⁹ Ibid, GCDI (2016)

CHICANES AND LANE SHIFTS

Chicanes and lane shifts use alternating parking, kerb extensions, or edge islands to form an S-shaped path of travel which lowers vehicle speeds.

A study conducted by the UK Transport Research Laboratory in 1998 studied 142 chicanes across the UK. The study found a mean speed reduction of 12 mph (19.3 km/h) between one-way chicanes, and 6 mph (9.7 km/h) between two-way chicanes.⁶⁰

Figure 43: Chicanes and Lane Shifts (illustration from GCDI)⁶¹



Figure 44: A chicane used in Singapore's Silver Zone (image from LTA)⁶²



60 Transport for London (2019) Achieving lower speeds: the toolkit, <https://content.tfl.gov.uk/achieving-lower-speeds-toolkit.pdf>

61 Ibid, GCDI (2016)

62 Land Transport Authority (2022) Road Safety, https://onemotoring.lta.gov.sg/content/onemotoring/home/driving/road_safety_and_vehicle_rules/road-safety.html



6. MAKE CROSSING POINTS MORE VISIBLE BY SAFEGUARDING VEHICLE-PEDESTRIAN SIGHT LINES

The increasing parking demand has become a serious problem for road safety. Many parked vehicles often illegally obstruct pedestrian crossing points, are parked next to junctions or crossings or even double parked, resulting in reduced lines of sight for both pedestrians and vehicle drivers. Such conditions consequently obscure crossing pedestrians, posing threats to both perceived and actual safety of road users. These issues are particularly serious on secondary roads of old urban districts.

We recommend the TD and HyD to install more kerb build-outs and gateway features around junctions, and all controlled and uncontrolled (cautionary) crossing points where possible. This approach can physically deter vehicles from illegal parking, safeguarding pedestrian-vehicle visibility from being obscured.

It is important to install kerb build-outs or other physical features to deter parking that obstructs sightlines. Painted hatched markings are ineffective for this purpose, as shown in images below.

Figure 45: Kerb build-outs are more effective in safeguarding pedestrian-vehicle sightlines against obstruction caused by parked vehicles

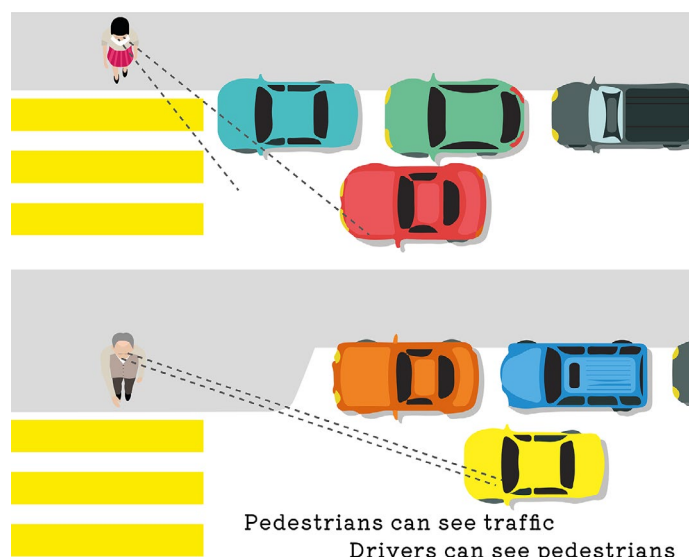


Figure 46: Kerb extension build-outs with gateway features (illustration from GCDI)⁶³



Figure 47-49: Parked vehicles obstructing vehicle-pedestrian sightlines in Shum Shui Po



Figure 50 & 51: Painted hatched marking are ineffective in deterring parking that obstructs pedestrian sightlines





7. PROVIDE MORE AT-GRADE CROSSING POINTS THAT FIT BETTER FOR PREVAILING PEDESTRIAN DESIRE LINES WHERE POSSIBLE

Although most grade-separated crossing facilities (e.g. subways or footbridges) have been mostly fitted with lifts to ensure accessibility for people with mobility needs, it is often still a considerable detour route compared to crossing directly at-grade. The mismatch between crossing facilities and desire lines can sometimes cause pedestrians to take more risks and climb over barriers to cross, which could often result in severe injuries. Hence, we believe that it is essential to provide more at-grade crossing points that cater for prevailing pedestrian desire lines where possible.

If there is already a strong desire line amongst pedestrians to cross at a particular location, the use of guard railing often cannot deter all pedestrians from doing so. As such, the railings caused some pedestrians to become trapped in the road, taking longer to reach the safety of the footway. Railings can also become useless when there are inevitable gaps due to the presence of junctions, bus stops, vehicular accesses and median openings.

Therefore, rather than using physical severance features to make pedestrians cross with an indirect route, we recommend the TD to consider formalising the desire lines by providing at-grade crossings as much as possible.

Figure 52-55: Guard railings and signs are ineffective to deter pedestrians from crossing the road if there are gaps. In such cases, authorities should consider formalising the crossing point to accommodate prevailing pedestrian desire lines. (From top left to bottom right: Des Voeux Road in Central, Wan Chai Road, Junction between Kweilin Street and Yu Chau Street in Shum Shui Po, and Kowloon Park Drive in Tsim Sha Tsui)



(Figure 52-53 sources: Google Map Street View)



8. CONDUCT A COMPREHENSIVE REVIEW ON THE USE OF GUARD RAILINGS ON ALL STREETS IN BUILT-UP AREAS

When guard railings are used at the right location, they may render some safety benefits. However, overseas evidence shows that guard railings can increase traffic speeds and cause a higher likelihood of pedestrian KSI (killed or serious injuries) collisions on urban streets. As we also see a higher proportion of pedestrian KSI casualties at controlled crossings where guard railings are routinely used, there is a need to comprehensively review the use of guard railings at these locations as well as on all streets in built-up areas.

Although guard railings may be effective in reducing the number of collisions involving pedestrians, collisions tend to be much more serious when they happen. A study commissioned by Transport for London in 2017 has compared the collision rates before and after guard railing removal at 70 junctions and crossings in London. The results show a 53% statistically significant reduction in pedestrian KSI collisions compared to the three years before. There was also a 47% statistically significant reduction in KSI collisions involving all users.⁶⁴ Another study in 2003 by researchers at the University of Southampton also showed that sites with railings have a slightly higher 85th percentile speed (+4 km/h) compared to sites without.⁶⁵

These findings could be applied to the situation in Hong Kong. According to TD's statistics shown in Figure 13 (page 17), the percentage of pedestrian KSI casualties is much higher on (29.4%) or within 15m (26.3%) of controlled crossings, compared to the average for those that happened at other locations (21.7%). This suggests that controlled crossings still cannot guarantee pedestrian safety if vehicle speeds remain high, which could be related to the use of guard railings at or on approach to controlled crossings. As the 2017 London study suggests, railings can sometimes give drivers 'tunnel vision' and a feeling that pedestrians are safely tucked behind them. Without the railings, the feeling that pedestrians could step out from anywhere appears to make drivers slow down and pay more care and attention.⁶⁶

We understand as a result of the Walkability Study, the TD has already begun adopting a "minimal approach" in the provision of pedestrian guard railings and commenced reviewing the use of pedestrian railings since late 2019, with priorities given to areas with busy footfall, or upon receipt of complaints, occurrence of traffic collisions and planning for traffic improvement works. We also note that the TD has agreed to step up efforts in demonstrating to the public the enhanced benefits of appropriately removing pedestrian railings without compromising safety, as mentioned in response to the Director of Audit's recommendations.⁶⁷

With the potential benefits of reducing vehicle speeds and pedestrian KSI casualties, we suggest the TD to speed up the process of guard railing removal by conducting a comprehensive review in the use of guard railings on all urban streets. We also suggest the TD to release a before-and-after study of collision figures where railings have been removed, in order to convince the public effectively about the benefits of railing removals.

64 Street Behaviour (2017) for Transport for London, Collisions Before and After the Removal of Pedestrian Railings at 70 Junctions and Crossings on the Transport for London Road Network, <https://content.tfl.gov.uk/pedestrian-railings-removal-report.pdf>

65 Zheng, P and R D Hall (2003) for Transport for London, Pedestrian Guard Railing: A Review of Criteria for Installation, University of Southampton: Southampton, <https://content.tfl.gov.uk/pedestrian-guardrailing-review-of-criteria-for-installation.pdf>

66 Street Behaviour (2017) for Transport for London

67 SAudit Commission (2021) Chapter 1 Highways Department: Maintenance of public footpaths, Report No. 77 of the Director of Audit, https://www.aud.gov.hk/pdf_e/e77ch01.pdf



9. MAKING PUBLIC SERVICE VEHICLES AND GOODS VEHICLES SAFER WITH MORE STRINGENT SAFETY STANDARDS

As evidenced in Figure 14 (page 17), public light buses are involved in more pedestrian KSI collisions than any other modes per kilometre travelled. Together with goods vehicles and other public service vehicles (except trams and light rail), they accounted for 59% of all pedestrian KSI collisions. This number is even higher for elderly pedestrian fatalities (79%) in 2019.⁶⁸

Hence, we urge the TLB and TD to mandate the fitting of Intelligent Speed Assistance (ISA) systems on all newly registered public service vehicles and goods vehicles.

In addition, we also urge the TLB and TD to progressively mandate a comprehensive Visibility Standards for all medium and heavy goods vehicles. Under such standards, all medium and heavy goods vehicles should be equipped with designs or devices that enable drivers to either see directly or monitor every blind spot of their vehicle through equipment (see more at the explainer below).

We understand that it is now compulsory for all new buses to be fitted with the ISA systems. The implementation process should render useful to inform the technical feasibility in rolling out ISAs to all other public service vehicles and good vehicles.

68 Hong Kong Police (2020), Elderly Pedestrian Traffic Accident Fatalities of 2019, <https://i0.wp.com/transitjam.com/wp-content/uploads/2020/06/police-infographic-elderly.jpg?ssl=1>

THE NEED FOR A MANDATORY VISIBILITY STANDARDS FOR ALL MEDIUM & HEAVY GOODS VEHICLES

Blind spots on medium and heavy goods vehicles have become one of the main causes of fatal or serious collisions involving elderly pedestrians, according to the Police.⁶⁹

Through analysis on collisions that happened in 2019, the Police found that nearly 80% of elderly pedestrian fatalities involved medium and heavy vehicles such as lorries and buses, and many of these were caused by vehicle blind spots. At present, the usual design of lorries creates many blind spots, making it difficult for drivers to detect pedestrians if they are within 3 metres of the front of the vehicle. In addition, the windscreen pillars (A-pillars) on either side of the windscreen of a vehicle can partially block the driver's view when turning. If a pedestrian enters the area blocked by the pillars, it is difficult for the driver to detect them in time. Besides, the police found 12 fatal accidents involving right-hand turns. As the right A-pillar was closer to the driver, it was more obscured and accounted for 35% of all fatal collisions involving elderly pedestrians in 2019.

The current legislation only mandates the installation of Reversing Video Devices (RVDs) on all goods vehicles, but there is no safety equipment requirement for the blind spots in front and on both sides. Drivers often have to check multiple reflective mirrors for clearance, which leaves a high chance for human error. Given many private passenger cars are now equipped with sensors and video devices to eliminate blind spots, the lack of such safety equipment on most goods vehicles is unacceptable.

69 Ockenden, J (2020, June 13) CSI bemoans lack of sensor tech on death truck, Transit Jam, <https://i0.wp.com/transitjam.com/wp-content/uploads/2020/06/police-infographic-elderly.jpg?ssl=1>

Figure 56: Blind spots of a lorry vehicle

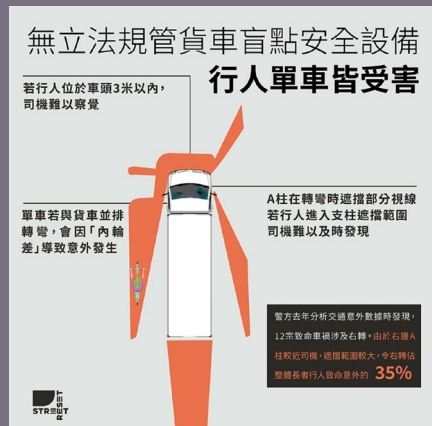


Figure 57: Large vehicle size makes it difficult for drivers to detect pedestrians if they are within 3 metres of the front of the vehicle. Note that the vehicle shown is classed as a medium goods vehicle.



The European Union has already made the installation of side-facing radar mandatory for all goods vehicles from 2022, which is expected to reduce the number of serious collisions involving goods vehicles and bicycles by up to 60%. The UK's Transport for London, which introduced the 'Direct Vision Standard' for all heavy goods vehicles (HGV) in 2019, will also require all HGVs entering the city to meet the new standard by 2024, allowing drivers to see directly or monitor their vehicles' blind spots with equipment. To cope with the new standards, commercial fleet owners in London are in the progress of switching to newly designed vehicles, namely 'Direct Vision HGVs'. Direct Vision HGVs are equipped with a low windscreen and fully transparent doors, allowing drivers to see directly ahead and to the sides of the vehicle (see Figure 48 & 49).

Figure 58: Comparison of direct vision coverage between conventional (in red) and Direct Vision HGV (in blue) (image from TfL)⁷⁰



Figure 59 & 60: Examples of Direct Vision HGVs operating in London

To prevent more collisions caused by lorries' limited visibility, we urge the TD to take action as soon as possible to establish a comprehensive, mandatory Vision Standards for all medium and heavy goods vehicles. All medium and heavy goods vehicles should be progressively mandated to be equipped with designs or devices that allow the driver to either see directly or monitor every blind spot of their vehicle through equipment.

⁷⁰ Transport for London (2016) Direct vision – Working towards the Direct Vision Standard for London's heavy goods vehicles, <https://content.tfl.gov.uk/working-towards-direct-vision-hgvs.pdf>



10. IMPROVE COLLISION DATA TRANSPARENCY BY SETTING UP AN OFFICIAL, MAP-BASED COLLISION DATABASE FOR PUBLIC USE

As mentioned in the beginning of this report, although overall statistics about traffic collisions are publicly available from the TD, it is still very difficult for the general public to gain a clear picture of the geographical pattern of where collisions happened.

Therefore, we recommend the TD to set up an official, map-based collision database for public use, and to release the geo-coordinates and details of all traffic collisions as part of their Annual Spatial Data Plans (ASDP), in order to proliferate public discourse about how to make our streets safer.

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CONCLUSION

Traffic collisions do not happen by accident. Although collisions happen as a direct result of human errors, they are so often contributed by the unsafe conditions of our streets. While we recognise that the government has made substantial progress in reducing pedestrian casualties, much more still needs to be done systematically to achieve better safety conditions, contributing to a truly walkable environment.

To make the streets safer for pedestrians, we sincerely hope that the government will take swift and concrete actions in giving pedestrians more space and priority at high-risk corridors or areas. There needs to be context-specific street design and lower speed limits, in order to create a 'forgiving street environment' that prevents fatal and serious injuries as much as possible even when someone makes a mistake.

These schemes will no doubt be controversial and there will be criticism especially from motorist groups. However, they are the necessary steps to take in making pedestrians safer and preventing more avoidable casualties in the future. By making the related data more transparent and engaging the community meaningfully, we believe that they will be crucial in convincing the public of their benefits and ensuring credibility in the decision-making process.



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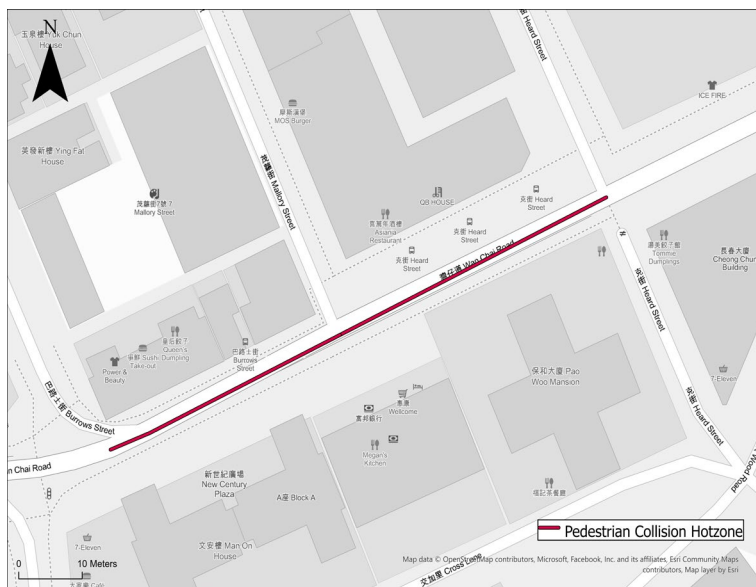
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APPENDIX 1 - TOP 10 HIGH-RISK PEDESTRIAN COLLISION HOTZONES

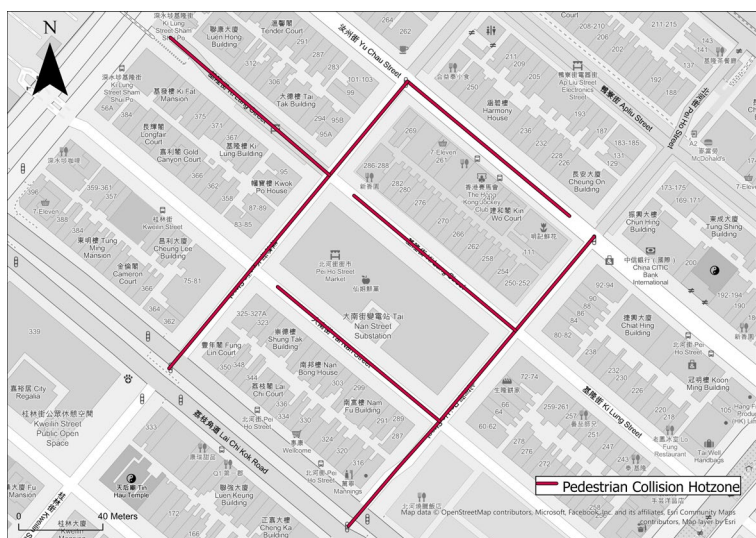


Rank 1 - Wan Chai Road, Wan Chai 灣仔區 灣仔道(克街與巴路士街之間的路段)

Wan Chai Road is one of the busiest streets in Wan Chai, and is part of the routes for many bus, trucks and other vehicles. There are many commercial activities on both sides of the road, as well as loading and unloading areas and bus stops, attracting a lot of pedestrians and having important link and place function.

The section between Wan Chai Road - Heard Street and Burrows Street is the most serious traffic collision hotzone involving pedestrians in Hong Kong, with 21 collisions from 2015 to 2019, or an average of 243.4

collisions per kilometre. There were 9 serious pedestrian injuries and 12 slight injuries, and more than half of the accidents involving pedestrians occurred on carriageways without crossings, reflecting the possibility of insufficient pavement space or lack of crossings to meet pedestrian needs.



Rank 2 - Market Streets near Pei Ho Street Municipal Services Building (Pei Ho Street, Kwellin Street, Ki Lung Street, Tai Nan Street & Yu Chau Street) - Sham Shui Po 深水埗市集區 (北河街、桂林街、基隆 街、大南街及汝州街)

Pei Ho Street, Kwellin Street, Ki Lung Street, Tai Nan Street & Yu Chau Street are the market streets in Sham Shui Po, with many commercial activities on both sides of the streets, attracting a large number of pedestrians and some trucks, private cars and other vehicles passing by.

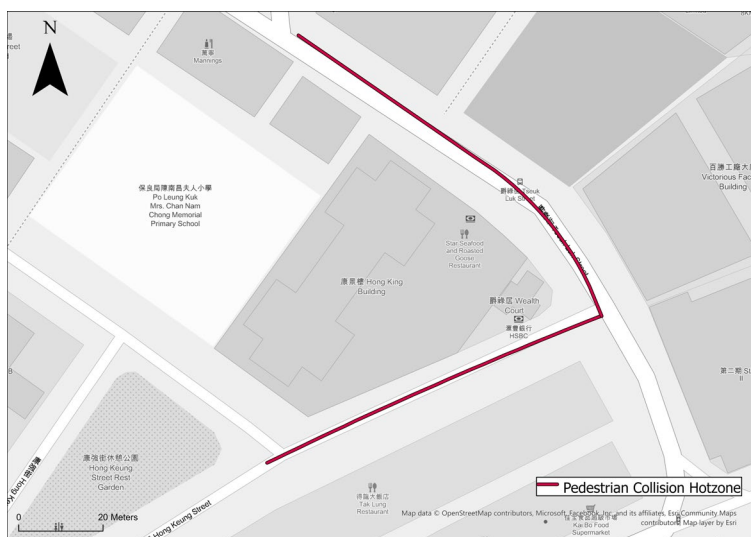
The Sham Shui Po Market area is the second most serious pedestrian collision hotzone in Hong Kong, with 126 collisions with pedestrians from 2015 to 2019, an average of 166.3 accidents per kilometre. There were 13 pedestrians who were seriously injured and 113 were slightly injured, while 68 pedestrian crashes occurred on footpath, safety island or central area and crossing, and 41 pedestrian collisions occurred on roads without crossing, reflecting the serious situation of pedestrian-vehicle competition for road spaces. There are also problems such as insufficient pedestrian space or lack of crossings to meet desire lines of pedestrians.



Rank 3 - Johnston Road at the Junction of Spring Garden Lane - Wan Chai 灣仔區 莊士敦道與春園街之間的路段

Johnston Road is another street in Wan Chai, and is part of the routes for bus, tram, trucks and other vehicles. There are many commercial activities on both sides of Johnston Road and Spring Garden Lane, as well as loading and unloading areas and tram stops in Johnston Road, , attracting a lot of pedestrians and having important link and place function.

The section of Johnston Road at the Junction of Spring Garden Lane is the third most serious pedestrian collision hotzone in Hong Kong, with 19 collisions from 2015 to 2019, an average of 160.9 collisions per kilometre. There was one fatality, 3 serious injuries and 15 slight injuries related to pedestrians, and there were 12 collisions involving pedestrians occurred on carriageways without crossings, reflecting the possibility of insufficient pavement space or lack of crossings to meet pedestrian needs.

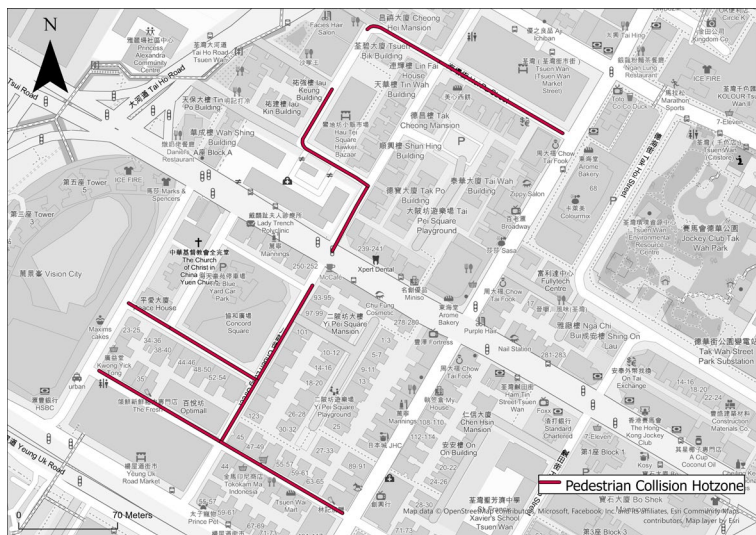


Rank 4 - Tseuk Luk Street & Hong Keung Street - Wong Tai Sin 黃大仙區 新蒲崗爵祿街康強街(工業區)

Tseuk Luk Street & Hong Keung Street are in industrial area of San Po Kong, surrounding with residential, commercial and industrial activities, loading and unloading areas and bus stops, so a certain pedestrian, trucks and vehicle flow are attracted, showing a local level of link and place function.

The road section at Hong Keung Street in San Po Kong is one of the most serious pedestrian collision hotzones in Hong Kong,

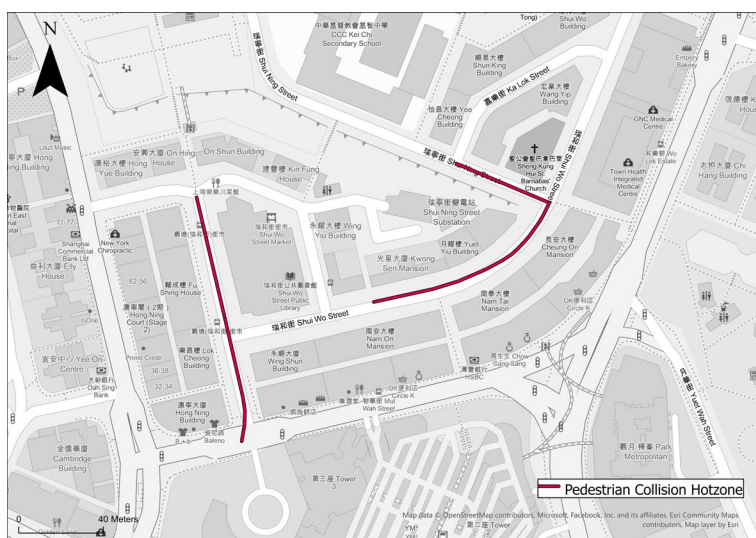
with 26 collisions from 2015 to 2019, an average of 139.4 accidents per kilometre. Among these collisions, there was one pedestrian fatality, four serious pedestrian injuries and 21 slight injuries, while 11 accidents involved pedestrians crossing the road, reflecting the lack of pedestrian-friendly crossing points on the road.



Rank 5 - Market Streets near Yeung Uk Road Market (Chuen Lung Street, Ho Pa Street, San Tusen Street, Ho Pui Street, Hau Tei Square) - Tsuen Wan 荃灣區 近楊屋道街市市集區 (川龍街、海壩街、新村街、河背街、蟹地坊)

Chuen Lung Street, Ho Pa Street, San Tusen Street, Ho Pui Street and Hau Tei Square are the market streets near Yeung Uk Road Market in Tsuen Wan, with many commercial activities on both sides of the streets, attracting a large number of pedestrians and some trucks, private cars and other vehicles passing by.

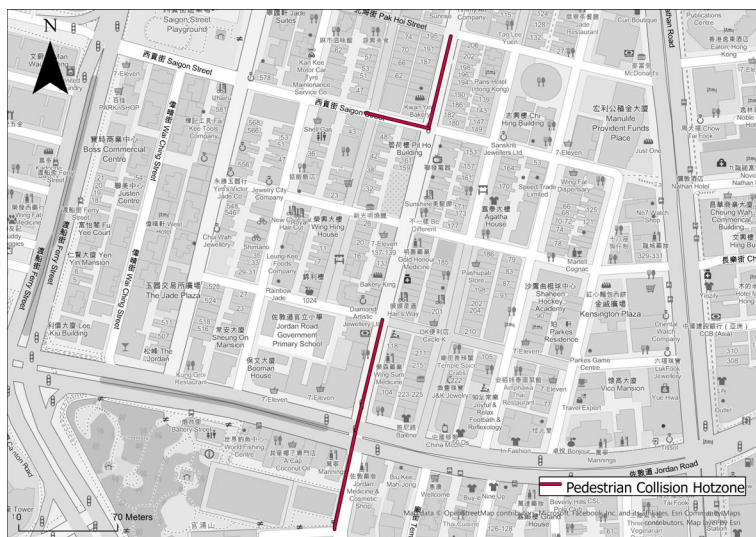
Market Streets near Yeung Uk Road Market is the fifth most serious pedestrian collision hotzone in Hong Kong, with 99 collisions with pedestrians from 2015 to 2019, an average of 132.5 accidents per kilometre. There were 11 pedestrians who were seriously injured and 88 were slightly injured, while 37 pedestrian crashes occurred on footpaths, and 49 pedestrian collisions occurred on carriageway without crossing, reflecting the serious situation of pedestrian-vehicle competition for road spaces and many pedestrians walking on carriageway. It might indicate the problem of insufficient pedestrian space or lack of crossings to meet desire lines of pedestrians.



Rank 6 - Market Streets near Shui Wo Street Municipal Services Building (Shui Ning Street, Shui Wo Street & Fu Yan Street) - Kwun Tung 觀塘區 瑞和街街市市集區 (瑞和街、瑞和街及輔仁街)

Shui Ning Street, Shui Wo Street and Fu Yan Street are the market streets near Shui Wo Street Market (Shui Wo Street Municipal Services Building) in Kwun Tung, with many commercial activities on both sides of the streets, attracting a large number of pedestrians and some trucks, mini bus and other vehicles passing by.

Market Streets near Shui Wo Street Market is the sixth most serious pedestrian collision hotzone in Hong Kong, with 31 collisions with pedestrians from 2015 to 2019, an average of 116.6 accidents per kilometre. There were 7 pedestrians who were seriously injured and 24 were slightly injured, while a total of 19 pedestrian crashes occurred on on footpath, safety island or central area and crossing, reflecting the problem of insufficient pedestrian space and safety measures to meet the needs of pedestrians.



Rank 7 - Shanghai Street at the Junction of Jordan Road - Yau Tsim Mong 油尖旺區 上海街 (近佐敦道路段)

Shanghai Street is one of the busiest streets in Yau Tsim Mong, and is part of the routes for bus, mini-bus, trucks and other vehicles. There are many commercial activities on both sides of Shanghai Street, as well as loading and unloading areas and mini-bus stops attracting a lot of pedestrians and having a certain level of link and place function.

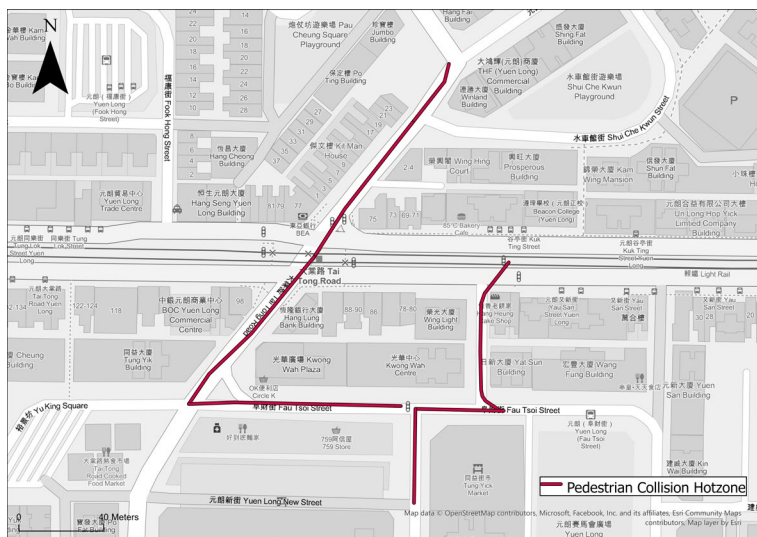
The section of Shanghai Street at the Junction of Jordan Road is the seventh most serious pedestrian collision hotzone in Hong Kong, with 29 collisions from 2015 to 2019, an average of 116.6 collisions per kilometre. There was 1 fatality, 6 serious injuries and 22 slight injuries related to pedestrians, while 13 pedestrian crashes occurred on footpath, and 12 pedestrian collisions occurred on carriageway without crossing, reflecting the serious situation of unsafe walking environment and pedestrian-vehicle competition for road spaces. It might indicate the problem of insufficient pedestrian space, safety measures or crossings to meet the needs of pedestrians.



Rank 8 - Tsuen Kwai Street at the Junction of Tsuen Fu Street - Tsuen Wan 荃灣區 荃貴街荃富街

Tsuen Kwai Street and Tsuen Fu Street are local streets in Tsuen Wan, and are part of the routes for bus, mini-bus, trucks and other vehicles. There are many commercial activities and residential areas on both sides of the streets, as well as loading and unloading areas, bus stops and mini-bus stops, attracting a lot of pedestrians and having a certain level of link and place function.

The section of Tsuen Kwai Street and Tsuen Fu Street is the eighth most serious pedestrian collision hotzone in Hong Kong, with 18 collisions from 2015 to 2019, an average of 108.6 collisions per kilometre. There were 5 serious injuries and 13 slight injuries related to pedestrians, while 10 pedestrian crashes occurred on footpath, and 7 pedestrian collisions occurred on carriageway without crossing, reflecting the serious situation of unsafe walking environment and pedestrian-vehicle competition for road spaces. It might indicate the problem of insufficient pedestrian space, safety measures or crossings to meet the needs of pedestrians.

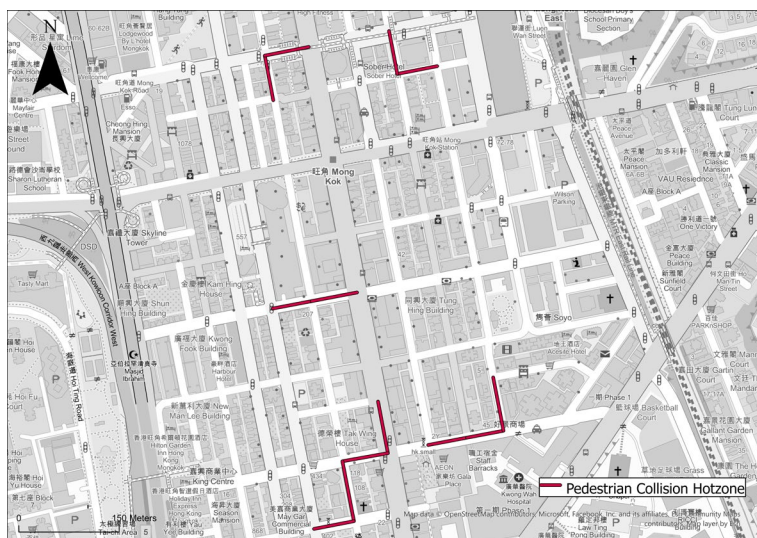


Rank 9 - Market Streets near Tung Yick Market (Tai Tong Road , Kuk Ting Street, Fau Tsoi Street, Hop Choi Street & Yat San Street) - Yuen Long 元朗區 同益街市附近的市集街道 (大棠路、谷亭街、阜財街、合財街、日新街)

In Yuen Long, Tai Tong Road is one of the main roads, and Kuk Ting Street, Fau Tsoi Street, Hop Choi Street & Yat San Street are the streets near Tung Yick Market, with many commercial activities on both sides of the streets, attracting a large number of pedestrians and some mini buses trucks,

private cars and other vehicles passing by. Those streets have a certain level of link function and strong place function.

Market Streets near Tung Yick Market is the ninth most serious pedestrian collision hotzone in Hong Kong, with 50 collisions with pedestrians from 2015 to 2019, an average of 107 accidents per kilometre. There was 1 fatality, 17 serious injuries and 32 slight injuries related to pedestrian, while a total of 25 pedestrian crashes occurred on on footpath, safety island or central area and crossing, and 24 pedestrian collisions occurred on carriageway without crossing, reflecting the serious situation of unsafe walking environment and pedestrian-vehicle competition for road spaces. It might indicate the problem of insufficient pedestrian space, safety measures or crossings to meet the needs of pedestrians.



Rank 10 - Area at the junction of Nathan Road and Dundas Street (Nathan Road, Dundas Street, Portland Street, Hamilton Street & Fa Yuen Street) - Yau Tsim Mong 油尖旺區 彌敦道及登打士街附近區域 (彌敦道、登打士街、砵蘭街、咸美頓街及花園街)

Nathan Road and Dundas Street are busy high streets in Yau Tsim Mong, and are part of the routes for many bus, trucks and other vehicles. There are many commercial activities on both sides of the road, as well as loading and unloading areas and bus stops, attracting a lot of pedestrians and having important link and place function.

The section of Nathan Road and Dundas Street area is the tenth most serious traffic collision hotzone involving pedestrians in Hong Kong, with 94 collisions from 2015 to 2019, or an average of 106.3 collisions per kilometre. There was 1 fatality, 11 serious injuries and 82 slight injuries related to pedestrians, while a total of 43 pedestrian crashes occurred on footpaths, and 18 pedestrian collisions occurred on carriageway without crossing, reflecting the serious situation of unsafe walking environment and pedestrian-vehicle competition for road spaces. It might indicate the problem of insufficient pedestrian space, safety measures or crossings to meet the needs of pedestrians.

APPENDIX 2 - GLOSSARY OF DEFINITIONS

術語	Term	定義	Definition
車禍	Collision	一宗交通事故發生於本港道路上，涉及一輛或以上車輛，並已向警方備案，而在此事故中涉及傷亡者。	A traffic incident reported to the Police, involving personal injury occurring on roads in the Territory, in which one or more vehicles are involved.
傷亡者	Casualty	在一宗車禍中導致受傷或死亡的人士，而在這事件中或涉及多於一位傷亡者。	A person killed or injured in a collision in which there may be more than one casualty.
致命車禍	Fatal Collision	在車禍中有一位或多位人士於發生車禍後三十日內死亡。	A fatal collision is where one or more persons dies within 30 days of the collision.
嚴重車禍	Serious Collision	在車禍中有一位或多位受傷人士因車禍而留醫超過十二小時。	One or more persons injured and detained in hospital for more than twelve hours.
輕微車禍	Slight Collision	在車禍中只涉及一位或多位受傷人士，他們如需要留醫，均不超過十二小時。	One or more persons injured and detention in hospital, if required, will not be more than twelve hours.
死亡者	Killed Casualty	受害者在車禍後三十日內持續受傷最後導致去世。	Sustained injury causing death within 30 days of the collision.
重傷者	Serious Casualty	受傷人士入院後留醫超越十二小時視作嚴重受傷。受傷人士於車禍後三十日以上才去世亦屬此項。	An injury for which a person is detained in hospital as an 'in-patient' for more than twelve hours. Injuries causing death 30 or more days after the collision is also included in this category.
輕傷者	Slight Casualty	受傷人士屬輕微性如扭傷或割傷而非嚴重者，又如輕微休克而需在路旁照顧及不需要入院或只留院少於十二小時者。	An injury of a minor character such as a sprain, bruise or cut not judged to be severe, or slight shock requiring roadside attention and detention in hospital is less than 12 hours, or not required.
死亡或重傷者	Killed or Seriously Injured (KSI) Casualty	受傷人士屬死亡者或重傷者。	An injury belongs to killed casualty or serious casualty.
道路使用者	Road users	行人和車輛使用者包括所有車內人士(如駕駛者和乘客，包括上落車而受傷的人士)。	Pedestrians and vehicle users which include all occupants (i.e. driver or rider and passengers, including persons injured while boarding or alighting from the vehicle).
牽涉車輛	Vehicle Involved	包括受傷的駕駛者或乘客所乘坐的車輛，或撞倒行人的車輛，或涉及該車禍中的另一車輛受損毀或有車內人士受傷，或導致該車禍發生的其他車輛。	Vehicles whose drivers or passengers are injured, which hit a pedestrian, or which are hit by another vehicle.



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