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Policing Strategies on Road Safety Management in Metropolis: Singapore's Experience in Road Safety Education

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Abstract: This paper provides an outline of Singapore's experience in promoting road safety, through the implementation of various initiatives that aim to build and foster a culture of road safety and courtesy among road users. All these new initiatives collectively form the "Safer Roads Singapore" Action Plan, and the action plan rests on the principle that "Every life matters", and one life lost is one too many. These initiatives are formulated based on the Traffic Police's three-pronged approach towards road safety—namely, Enforcement, Engagement, and Education—which has enabled it to gradually reduce the number of road fatalities in Singapore over the last decade. Since the implementation of this Action Plan in 2013, TP has seen further improvement in road fatalities. TP will continue to pursue its strategy in a bid to keep road fatalities low and to ensure safer roads for all, amidst a challenging operating environment. **DOI:** 10.13813/j.cn11-5141/u.2018.0308-en

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1 Background

Singapore has a human population of about 5.6 million⁽¹⁾ and a land area of 719.2 km², with a total public paved road length of 9 310 lane-kilometers. There are about 0.9 million registered motor vehicles, and 1.8 million motorcar and motorcycle license holders (see Table 1 and Table 2).

In spite of an increase in human population (and therefore in the number of road users) in Singapore 1.3% from 5 535 000 in mid-2015 to 5 607 300 in mid-2016, the traffic fatality rate per 100 000 human population for 2016 is 2.51, lower when compared with the rate of 2.73 recorded in 2015. Generally, Singapore's fatality rate over the past decade (2007 to 2016) is also declining (see Figure 1). Compared with other developed countries such as Japan and Switzerland, Singapore's fatality rate of 2.51 in 2016 can be considered as favorable (see Table 3). Compared with other city states, Singapore's road traffic accident fatality rate is also relatively favorable (see Table 4).

The Traffic Police (TP) in Singapore plays a critical role in helping Singapore to achieve these remarkable results and to enhance the safety of road users in this challenging operating environment, through enforcement of traffic rules and regulations, engagement with community partners and

stakeholders, and education of all road users. TP seeks to achieve further improvements in road fatalities through the implementation of the "Safer Roads Singapore" Action Plan.

2 Introduction of Traffic Police

2.1 Responsibilities

TP, a department in the Singapore Police Force (SPF) which comes under the ambit of the Ministry of Home Affairs, is responsible for the enforcement of traffic laws in Singapore. TP also investigates into road traffic accidents, license all drivers and educates all road users on road safety.

2.2 Mission

The mission of TP is to uphold law and order on the roads of Singapore and to promote road safety by shaping positive road-use behavior, thus ensuring that all motorists have the required skills to operate motor vehicles safely. TP aims to be protectors of lives on the roads, champions of road safety and at the same time be a vibrant organization that places great value on its main assets, TP Officers.

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Table 1 Statistics on Singapore Vehicle Population from 2012 to 2016

Category	Type	2012	2013	2014	2015	2016
Cars & Station-wagons	Private cars	535 233	540 063	536 882	519 645	504 160
	Company cars	21 403	21 756	21 860	21 987	22 382
	Tuition cars	899	897	874	841	817
	Rental cars	14 862	16 396	18 847	29 369	51 336
	Off peak cars	45 173	42 233	38 146	30 469	22 562
Taxis	Taxis	28 210	27 695	28 736	28 259	27 534
Motorcycles	Motorcycles	143 286	144 307	144 404	143 279	142 439
Goods & Other vehicles	Goods-cum-passenger vehicles (GPVs)	4 144	3 166	2 868	2 997	2 992
	Light goods vehicles (LGVs)	93 914	92 317	92 731	94 016	95 750
	Heavy goods vehicles (HGVs)	32 313	32 549	32 196	30 155	28 817
	Very heavy goods vehicles (VHGVs)	14 675	16 170	16 712	16 804	16 407
Buses	Omnibuses	4 212	4 552	4 756	5 120	5 470
	School buses(CG)	1 839	1 847	1 845	1 847	1 840
	Private buses	2 968	2 871	2 802	2 717	2 659
	Private hire buses	3 063	2 654	2 152	1 909	1 598
	Excursion buses	4 686	5 141	5 554	6 147	6 771
Tax exempted vehicles	Cars & station-wagons	2 441	2 343	2 414	2 411	2 506
	Motorcycles	824	627	622	621	613
	Buses	394	444	445	443	466
	Goods & other vehicles	15 371	16 142	17 191	18 210	19 311
	Total	969 910	974 170	972 037	957 246	956 430

Source: <http://www.data.gov.sg>.

Table 2 Statistics on Singapore Driving Licence Holders from 2012 to 2016

Class of license	2012	2013	2014	2015	2016
2	141 406	142 779	143 690	142 381	133 857
2A	200 794	202 765	204 266	203 175	196 030
2B	456 562	471 380	485 832	498 923	500 413
3	1 660 253	1 708 289	1 754 554	1 782 907	1 770 980
3A	87 204	100 655	114 603	130 254	146 414
3C				12 028	29 732
3CA				44	113
4	141 638	142 954	144 641	143 959	143 624
4A	14 213	15 249	16 564	17 614	18 246
5	66 348	65 910	65 364	63 388	61 627

Note: Each license holder may have more than one class of driving license; Class 3C and 3CA were introduced on June 1, 2015.

Source: <http://www.data.gov.sg>

Table 3 International Comparisons of Road Traffic Accident Fatality Rate per 1 000 000 Human Population

Country (year)	Fatality rate per 100 000 pop	Source
New Zealand (2015)	6.9	Ministry of Transport, New Zealand http://www.transport.govt.nz/research/pages/annualroadtolhistoricalinformation.aspx
Australia (2015)	5.1	Reference [1]
Finland (2015)	4.8	Reference [2]
Japan (2015)	3.8	Reference [2]
Norway(2015)	2.3	Reference [2]
Denmark(2015)	3.1	Statistics Denmark http://www.statbank.dk/statbank5a/default.asp?w=1280
Switzerland (2015)	3.1	Reference [2]
Singapore (2016)	2.5	Traffic Police, Singapore
United Kingdom(2015)	2.8	Reference [2]
Sweden (2015)	2.7	Sweden Traffic Analysis https://www.gov.uk/government/statistical-data-sets/ras52-international-comparisons

Table 4 Major Cities/States/Territories Comparisons of Road Traffic Accident Fatality Rate per 100 000 Human Population

Country (year)	Fatality rate per 100 000 pop	Source
South Australia (2015)	6.0	Reference [1]
Queensland (2015)	5.1	Reference [1]
New South Wales (2015)	4.6	Reference [1]
Victoria (2015)	4.2	Reference [1]
Wales(2015)	3.4	Reference [2]
Macau (2015)	2.3	Government of Macao Special Administrative Region Statistics and Census Service http://www.dsec.gov.mo/Statistic.aspx?NodeGuid=d45bf8ce-2b35-45d9-ab3a-ed645e8af4bb
Singapore (2016)	2.5	Traffic Police, Singapore
England (2015)	2.7	Reference [2]
Hong Kong (2015)	1.7	Reference [3]
Copenhagen(2015)	1.5	Statistics Denmark http://www.statbank.dk/statbank5a/default.asp?w=1280
Oslo(2015)	0.8	Statistics Norway https://www.ssb.no/statistikkbanken/SelectTable/hovedtabelHjem.asp?KortNavnWeb=folkemengde&CMSSubjectArea=befolkning&StatVariant=&PLanguage=1&checked=true https://www.ssb.no/statistikkbanken/SelectTable/hovedtabelHjem.asp?KortNavnWeb=vtu&CMSSubjectArea=transport-og-reiseliv&StatVariant=&PLanguage=1&checked=true
Stockholm (2015)	0.3	Reference [4]

3 Overview of “Safer Roads Singapore”

Safer Roads Singapore (SRS)—launched in March 2013

by then Second Minister of Home Affairs and Second Minister of Trade and Industry, Mr S Iswaran—is a concerted Action Plan initiated by SPF and it involves TP, its partners and the community, to improve the safety of our roads and road users. The SRS Action Plan builds on the three key thrusts of TP’s strategy: Enforcement, Engagement, and Education. The vision of SRS is for a culture of safe and courteous road use to be ingrained in all road users in Singapore, so that safe and courteous road use is instinctive and habitual.

TP has continuously gone by the three-pronged approach for its efforts and multiple initiatives on road safety over the past few years. Aside from being seen as ‘enforcers’ of the roads, TP uses all three approaches in hopes to bring about a positive mind set, attitudinal and behavioral change among road users where the road environment and culture is safe for all.

4 Enforcement

Under the SRS Action Plan, a key set of initiatives is focused enabling TP to carry out effective enforcement of road traffic laws. The intent is to target errant drivers and the more egregious traffic violations, although TP views all traffic offences and lapses in road safety seriously. This will be achieved by increasing TP’s enforcement resources, as well as leveraging technology to multiply the effectiveness of limited resources. Patrol officers will be able to strike a balance between attending to accident messages and performing enforcement rounds. The deployment of Auxiliary Police Officers (APOs) will allow areas of complaints (of traffic offences) by members of public to be visited more frequently.

In addition to boosting strategic resources and capabilities, TP also revised its Demerit Improvement Points System (DIPS) to ensure greater consistency in giving timely punishment for offenders facing a mandatory 1-week suspension of their driving licenses. TP will ensure that penalties remain fair in the context of increased enforcement action. These measures will benefit the majority of motorists, while ensuring that reckless and recalcitrant offenders are firmly dealt with. More details of various enforcement initiatives under the SRS Action Plan are elaborated below.

4.1 Covert enforcement operations

Since 2016, TP’s Special Operations Team (SOT) started conducting covert enforcement operations using “stealth” (unmarked) motorcars and motorcycles to clamp down on errant motorists who commit common traffic violations such as making illegal U-turns, using mobile phones while driving, failure to keep left and weaving across lanes in a reckless manner. These covert enforcement initiatives complement the highly visible enforcement cameras in deterring careless or inconsiderate driving/riding behavior.

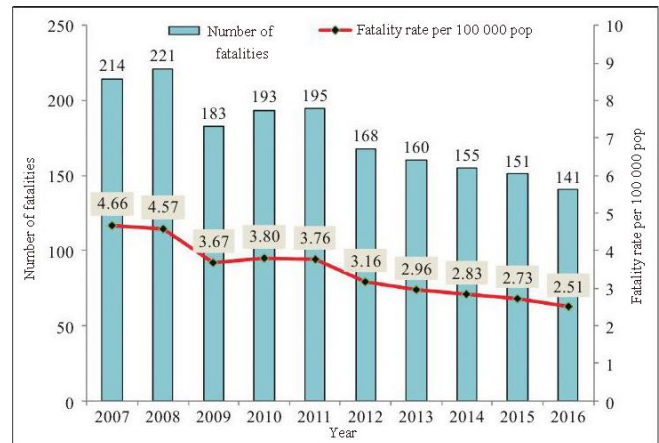


Figure 1 Traffic accident fatality rates per 100 000 human population from 2007 to 2016

Source: Singapore Traffic Police

4.2 Digitization and increase in enforcement cameras

There are about 280 digital red light and speed enforcement cameras deployed island-wide. TP has been constantly leveraging on traffic enforcement technologies to multiply the effectiveness of limited resources, such as using various traffic enforcement cameras.

The use of digital technology will increase the probability of detection as the enhanced capabilities of the digital traffic enforcement cameras can better identify the offending vehicles. It can also eradicate the issue of wet-film run-out. The new cameras will also have the ability to transmit images wirelessly. As such, TP’s lead time for processing of such summonses is also shorter and the traffic offenders can receive their summonses more quickly, so motorists have the opportunity to rectify their errant road user behavior more promptly and effectively.

To further strengthen TP’s capability against speedsters, TP operationalized and upgraded several new speed enforcement systems in 2016 and will be procuring more cameras in the coming years. Several types of cameras applied by TP are as following.

- 1) Mobile Speed Cameras (MSCs), functions like a mobile digital speed enforcement camera, with wireless transmission of violation images back to TP for processing. MSCs can be readily deployed and redeployed within short notice at locations plagued with speeding issues to deter and detect against such violations.

- 2) Police Video Speed Cameras (PVSCs), will be deployed for ad-hoc anti-speeding operations. This technology is highly portable and can be carried by TP’s motorcycles (two-wheelers). An improvement of PVSCs over the conventional speed laser guns is that they are equipped with photo and video-recording capabilities to better identify the violation vehicles.

- 3) Police Speed Laser Cameras (PSLCs) is part of TP’s new arsenal against speeding offenders. Equipped with

longer battery life to support prolonged anti-speeding deployments at locations plagued with speeding issues, PSLCs are capable of identifying and tracking speeding targets at a longer distance than current cameras. With video-recording capabilities, PSLCs are also able to better identify the violation vehicles.

4) Police Radar Speed Cameras (PRSCs) that would replace conventional dashboard mounted in-vehicle radar guns are superior in that they have video-recording capabilities to better identify the vehicles committing speeding violations.

5) Average Speed Cameras (ASCs), uses a refreshing new concept of speed enforcement over a section of road known as a “speed enforcement zone”, where vehicle speed is determined by dividing the distance travelled over total time taken. This calculated average speed will be used to determine whether speeding violations have been committed over a stretch of road.

4.3 Enforcement against violations involving Heavy Vehicles (HVs)

Although HVs are installed with speed limiters, there are still fatal and injury accidents caused by speeding HVs. Hence, from November 1, 2013, HVs that are installed with speed limiters are required to go for additional inspections, also known as Offence Inspections (OIs), if they are caught speeding. The intent of the OIs is to ensure that the speed limiters are properly maintained and function properly. This in-turn prevents the HVs from going above the speed limit.

HVs that are caught speeding for the first and second time will be required to go for OIs every six months for a period of two years. HVs that are caught speeding for three times or more will be required to go for OIs every three months for a period of two years. These speed limiter checks will only cease if the HVs stay free of speeding offences for two years from the last speeding offence. The cost of the additional speed limiter checks will be borne by the vehicle owners.

4.4 Increased demerit points in school zones

TP introduced a stiffer penalty for traffic offences committed within school zones with the aim of getting motorists to drive safely, and deterring them from committing traffic violations and endangering the lives of vulnerable road users, such as young children and students who use the roads within the vicinity of the schools.

From January 1, 2014, motorists who had been caught committing the offences of careless driving, inconsiderate driving, beating the red lights, or speeding within school zones were given an additional demerit point.

4.5 Vehicles used in routine enforcement

TP's Patrol Officers conduct regular patrol daily on Singapore roads to ensure that motorists abide by the traffic laws. Their primary roles are to deter and detect traffic

violations, and to respond to accidents. In order to perform their duties, Patrol Officers are equipped with Yamaha Diversion 900 cc motorcycles as well as Yamaha NXC 125 and Gilera scooters. An Expressway Patrol Unit (EPU) under TP patrols all the highways in Singapore using Volvo motorcars. EPU cars are brightly colored with ultra-compact blue led lights and ultra-bright flat bar lights, features that enhance visibility to other motorists. The cars also come with a retractable Variable Messaging System (VMS) which is used to display road safety and warning messages.

4.6 TP's Investigations Branch (IB)

The IB is the other enforcement element in TP. IB's officers follow-up on the Patrol Officers' enforcement efforts by processing the summons issued and handle any appeals from offending motorists. Every month, the Compounding Officers in IB handle more than 7 000 appeals from members of public.

IB Officers also investigate into road traffic accidents involving injuries or damage to government/public property. There are various teams within IB that investigate both general and specialized traffic cases. The general traffic cases are investigated by three teams who work on shifts. The specialist teams investigate into more specific cases such as Drink Driving, Fatal Accidents, Hit-and-Run Accidents.

4.7 Technology/systems used in investigation

Investigation officers also use technology and systems to assist them in their investigation. For example, the Traffic Incident Management System (TIMS) is used to track the status of investigations, while the Electronic Testing and Licensing System (ELITES) contains a database of all the drivers in Singapore and their offence history. Also, in collaboration with VICOM, a private company, TP utilizes the Accident Reconstruction software to reconstruct the accident scene in fatal accident cases.

5 Engagement

5.1 'Use Your Road Sense' Movement

Also, TP's Engagement initiatives are under the SRS Action Plan, including the “Use Your Road Sense” Movement. Introduced in 2015, the “Use Your Road Sense” Movement aimed to actively engage road users and various key stakeholders in the community, such as the transport industry, to instil and spark a positive pro-active change in the road user mind set. Through holding active dialogues and discussion sessions, the movement was meant to encourage all road users to play their part in shaping a safe road culture in Singapore.

In 2016, TP had collaborated with the Singapore Road Safety Council (SRSC) and other various key partners, to

spearhead and organize a number of outreach campaigns, dialogues and activities to generate and cultivate greater road safety awareness among the various groups of road users (more details on SRSC are provided in the next sub-section below). These events created platforms for TP to introduce new initiatives and provide opportunities for TP to engage more with road user groups like children, motorcyclists and their pillion riders, and also the elderly pedestrians, taxi drivers and heavy vehicle drivers.

Apart from the various outreach activities, TP continued to leverage on television, print and social media platforms as additional tools to disseminate road safety messages, advisories and information on initiatives to the general public. Publicity on TP's engagement efforts through the Traffic Community Policing (TCOP) unit, new mobile enforcement cameras, areas of concerns for vulnerable road user groups, as well as publicity on TP's enforcement operations to generate and enhance awareness on road safety, were carried out throughout the year.

5.2 Singapore Road Safety Council (SRSC)

Established in 2009 by the Ministry of Home Affairs with the support of the Ministry of Transport, SRSC comprises representatives from the academia, commercial, industrial and public sectors, including TP and Land Transport Authority (LTA). The SRSC is incorporated as a charity relying on donations and sponsorships to education campaigns and programs of road safety. The SRSC's mission is to reduce the number of traffic accidents and traffic related injuries and deaths. To encourage safe and responsible behavior by road-users, SRSC's efforts are aiming at addressing information gaps and correcting unsafe habits.

5.3 Safer Roads Industry Taskforce

The Safer Roads Industry Taskforce (SRIT), chaired by then Senior Minister of State for Ministry of Home Affairs and Ministry of Foreign Affairs, Mr Masagos Zulkifli, was set up to specifically discuss and assess issues pertinent to this group of road users, whose nature of work required them to spend many hours on the roads and it was therefore imperative that they exercised good road safety habits. The SRIT comprised representatives from various industry sectors, industry associations, unions and the government.

After consulting the industry widely over since its inception in end 2013, Mr K Shanmugam, Minister of Home Affairs and Minister of Law, announced the SRIT's recommendations that cover three key thrusts which could benefit both the industry and the overall road situation—leveraging technology as enabler; broadening training and outreach; and strengthening company processes and systems. Various agencies and stakeholders such as LTA, Ministry of Manpower and Workplace Safety and Health (WSH) Council will work together on these different thrusts to ensure a well-functioning ecosystem to encourage safe driving.

5.4 'E-Feedback on Road Users' Portal

TP introduced the 'E-Feedback on Road Users' portal on March 15, 2014. This portal allows members of the public to report road traffic violations, as well as report on responsible road use behaviors exhibited by conscientious road users, without the need for an email facility. The main benefit of the 'E-Feedback On Road Users' portal is that it enables members of public to act as additional pairs of "eyes" for TP on the roads. It is envisaged that motorists will be more aware of their undesirable driving behavior and drive carefully if they know that there is a possibility that such behavior may be reported to TP by a fellow road user.

Apart from reporting of violations, the portal is also able to receive feedback on positive road use behavior, which allows the community of road users to acknowledge and promote courteous and gracious road use habits. In order to facilitate the reporting of violations and provision of feedback, TP enhanced the portal with an uploading function in December 2014. This improvement allowed members of public to upload video footages of up to 50 megabytes related to the violation or feedback onto the portal. Several mandatory fields (e.g. willingness to be a witness) were introduced for the reporting portal so that only reports that satisfied all the mandatory fields would be accepted and followed up by TP. This helps to minimize unnecessary work in processing the violation reports.

5.5 Singapore Road Safety Award

The Singapore Road Safety Award (SRSA) is an annual award that recognizes organizations which have significantly contributed to the promotion of road safety mind sets, and gracious road use behavior within their companies.

In 2016, organizations and individuals in eight categories were commended as follows:

Corporate Categories

1) Road Safety Award for Companies with Heavy Goods Vehicle Fleet—An award to recognize companies with heavy goods vehicles that show strong commitment in road safety through the development of training initiatives for drivers, enhancing operation techniques and leveraging technology to improve road safety.

2) Road Safety Award for Bus Fleet—An award to recognize transport companies that show strong commitment in road safety through the development of training initiatives for drivers, enhancing operation techniques and leveraging technology to improve road safety.

3) Road Safety Award for Motorcycle Fleet—An award to recognize F & B Delivery Services and Courier Services companies that show strong commitment in road safety through the development of training initiatives for riders, enhancing operation techniques and leveraging technology to improve road safety.

Individual Categories

4) Road Safety Award for Safe Driver (Heavy Goods

Vehicle Fleet, Bus Fleet, & Taxi Fleet)—An award to recognize individual drivers of the respective fleets who have consistently exhibited safe road use behaviors. This will encourage the drivers to continue exhibiting desirable driving behaviors and at the same time, inspire other drivers to follow suit.

5) Road Safety Award for Most Improved Driver (Heavy Goods Vehicle Fleet) & (Bus Fleet)—An award to recognize drivers in the respective fleet who have shown vast improvement in their driving behavior. This award seeks to encourage drivers to improve their undesirable driving behavior and reward them if they have shown significant improvements.

The assessment period for the SRSA 2015 was from January 1, 2015 to December 31, 2015. The award presentation took place on December 16, 2016 in Traffic Police where the awards were jointly presented by Commander Traffic Police, SAC Sam Tee and SRSC Chairman, Mr Bernard Tay.

5.6 Singapore Road Safety Month Campaign

As part of the SRS Action Plan, SRSC launched the inaugural Singapore Road Safety Month (SRSM) in 2013. It is a multi-agency campaign to turn all road-users into champions for safer roads, Singapore, which calls out to the community to play an active role towards greater road safety and to embrace safe and courteous road use as a way of life.

The SRSC, working closely with TP and other partners⁽²⁾, launched the SRSM 2016 at Qihua Primary School on May 25, 2016. SRSM activities sought to reach out to various road user groups like the heavy vehicle drivers and school children. SRSC together with Volvo Trucks Singapore, launched the ‘Stop, Look, Wave’ program for children, where theory and hands-on sessions were conducted to learn about heavy vehicles’ blind spots and road safety practices. An initiative by the LTA and SRSC, the Safe Cycling Program (SCP) was also announced – following the announcement of the new recommendations of rules and code of conduct for cyclists by the Active Mobility Advisory Panel.

5.7 Safer Roads Campaign

Since 2013, the Traffic Police and the SRSC launched the Safer Roads Campaign. The annual Road Courtesy Campaign has been renamed to Safer Roads Campaign sponsored by a major Insurance company. Besides noting motorists’ courteous road behaviors, the new campaign also focuses on encouraging the conscientious practice of good road use habits such as keeping a safe distance, adhering to traffic rules and signals at all time to ensure road safety of all road users.

5.8 Shell Traffic Games

Since the 80s, TP has been working closely with the Ministry of Education to generate greater road safety awareness to the pre-schoolers, school children and elderly participants. The importance of road safety will be reinforced to the participants involved in the Shell Traffic Games. The Shell Companies in Singapore is the title sponsor for the event. Through the year since 1958, Shell Companies have been actively partnering TP and SRSC in promoting road safety among younger generation. The students would compete for the Shell Challenge Trophy and other prizes for the finals annually.

TP and SRSC, together with title sponsor—Shell Companies in Singapore—held the 36th Shell Traffic Games (STG) on November 4 2016 at St Hilda’s Primary School. The event also saw the launch of three Road Safety Corners—a follow-up initiative by TP, SRSC and Shell Singapore that was first launched at St Hilda’s Primary School—at Zhenghua Primary School, Qihua Primary School, and Gan Eng Seng Primary School. These Road Safety Corners are small and permanent exhibition areas in the schools that help to raise awareness of road safety among school children.

Furthermore, TP and SRSC—working closely with students from Nanyang Polytechnic and technology partner Samsung—announced that a new Road Safety Community Park (RSCP) Mobile App will be introduced and utilized in tandem with future training sessions at the RSCP from 2017. The app will educate students on road safety through fun and interactive functions.

5.9 Singapore Ride Safe

TP and SRSC launched the Singapore Ride Safe since 2014. The objective of the campaign was to educate motorcyclists and their pillion riders on the importance of safe riding. The focus of the event was to equip motorcyclists with safe riding habits so that they will adopt the right mind-set and be safe when they ride on the roads. There was sharing of practical advice on riding-related matters, relevant road regulations, case studies on accidents involving motorcyclists and sharing of perceptions of other motorists on motorcyclists.

Besides involving many motorcycle partners, one noteworthy initiative at this event was the appointment of riding ambassadors to promote road safety within their organizations. These ambassadors were given training on a quarterly basis, on the effectiveness of the appointment. The ambassadors would also impart their knowledge from their training to their colleagues and friends and gather feedback on unsafe riding practices.

The tag line—“Think of your loved ones. Ride Safe” is to remind the motorcyclists of being responsible for their own safety and to ride safely as any mishap upon them will eventually affect their loved ones.

Singapore Ride Safe 2016 was launched by TP and SRSC, together with LTA, the WSH Council and WSH Institute, on August 20, 2016 at Singapore Expo. This event was held in conjunction to the Singapore Bike Show 2016 and was sponsored by Harley Davidson Singapore. The message for Singapore Ride Safe 2016 was “Wear Safe. Ride Safe”—focusing on encouraging riders to wear appropriate attire to ensure that they are able to protect themselves in the event of an accident. There was also a brief presentation by Dr Caroline Simon from Khoo Teck Puat Hospital, where insights on the consequences of not wearing protective riding gear was shared. The campaign also focused on reaching out to delivery companies that deploy riders, to encourage them to adopt safer road practices for the safety of their employees and other road users.

5.10 Enhancing outreach to foreigners and senior citizens

Specially-tailored activities were also regularly conducted for vulnerable groups like elderly pedestrians and foreign pedal cyclists under the aegis of the Road Safety Outreach since 2008. Road safety collaterals—videos, posters and leaflets—carrying road safety messages in foreign languages such as Bengali, Mandarin and Thai, were distributed to dormitories and at exhibitions. A video highlighting correct road-user behavior on our Singapore roads was also jointly produced by TP and the Ministry of Manpower (MOM), and aired at MOM’s premises, Immigrations Checkpoint Authority (ICA) and large foreign dormitories.

During the *Community for All Ages* event by Bedok South Community Centre on November 13, 2016, the Road Master Test Kit—a self-test kit meant for elderly road users to test on three aspects: sight, sound and reaction time—was launched and distributed to the elderly residents. The initiative is a new initiative embarked by TP and SRSC, in hopes to raise road safety awareness amongst the elderly pedestrian road-user group. Mr Lim Swee Say, Minister for Manpower, was the Guest-of-Honor for the event. In addition to distributing more Road Master Test Kits and reaching out further to more elderly pedestrians, TP will be utilizing the test kits in future engagements and education efforts.

5.11 Anti-Drink Drive Campaign

The annual Anti-Drink Drive (ADD) Campaign is usually held in the up-coming year end festive season, and drinking is likely to be a part of the celebrations. As alcohol greatly impairs a driver’s judgment, reflexes and overall ability to drive safely thereby posing a danger to themselves and other road users, it is imperative that Police remind the public on the dangers of drink-driving/riding.

The ADD campaign aims to remind our motoring community of their responsibility of keeping sober on the roads and the dangers and consequences of drink driving behavior. In addition, the campaign also draws greater attention towards the role that family members and friends can play

towards eschewing drink driving behavior.

TP would continue working with entertainment outlet operators to spread the anti-drink driving message and to provide services such as arranging for taxis to take drunken patrons home. TP also urges such operators to help screen their patrons who drink beyond the legal limit, and advise them not to drive.

TP collaborated with SGCarMart⁽³⁾ and SRSC, as well as partners like Carlsberg and Harley Davidson, to organize the ADD campaign on December 1, 2016 at Zouk, Singapore. The event called upon motorists to use other options like public transport and car jockey or valet services to get home, etc., if motorists have consumed alcohol when they are outside (e.g. attending parties etc.), instead of driving home, etc. The event also saw the announcement of the review of existing penalties for drink-driving related offences that resulted in death or injury to others.

5.12 Collaboration with Vehicle Associations

TP also works closely with the various vehicle associations and public transport companies. Officers from TP’s Road Safety Branch hold regular dialogue sessions with public transport companies to share with them on accident statistics, better driving behavior and other road safety messages. TP also works with owners and drivers from the Heavy Vehicles Association and dispatch companies. The Automobile Association of Singapore (AAS) is yet another close partner of TP with whom TP works to roll out road safety initiatives and enhance road safety. For example, in 2008, the AAS, together with TP and our equivalent counterparts from Malaysia, produced a brochure to educate the public on the accident hotspots and the do’s & don’ts of driving in Malaysia. AAS has provided great support to the various road safety programs and activities organized by TP and SRSC.

5.13 Collaboration with Insurance Associations

The General Insurance Association (GIA) is a close working partner of TP. The main area of collaboration is the investigation of non-injury accidents. Since May 1999, Traffic Police has ceased to investigate into accidents where no parties sustained any form of injuries. For such accidents, the relevant insurance companies of the affected motorists would investigate and settle any claims arising from the accident. The exceptions are accidents involving a government vehicle or structure, a pedestrian, a foreign vehicle, injury accidents and any hit and run accidents. For such accidents, even if no parties were injured, a police report needs to be lodged and TP will investigate accordingly. Such a working relationship with the GIA has reduced the workload of TP officers substantially over the years since the scheme first started.

5.14 Engaging the public through the media

Local TV/Print media has been found to be an effective

channel to reach out to the public to educate them on TP's road safety initiatives, information and messages. TP has been capitalizing on the power of media to reach out to the masses. For instance, good arrests and rejection of bribes by TP officers are often highlighted in the media. TP also uses TV programs such as the Crimewatch TV program monthly which to feature some of our traffic operations. Road safety commercials are also frequently aired over television or radio to put across specific road safety messages. In 2016, TP worked closely with the SPF Public Affairs Department to engage multiple media representatives, such as The Straits Times, The New Paper, Lianhe Zaobao, Lianhe Wanbao, Channel 8 News, and Channel NewsAsia, to publicise TP's initiatives and road safety operations such as Anti Drink Drive Operations.

Over the past six years working with creative vendors, TP has developed an online internet-based game to educate the public on the consequences of drink-driving and partner with SRSC to have Heavy Vehicles Education Campaign at the various roadshows for the school children.

With the prevalence of social media, TP recognized the importance of reaching out to the public through various online platforms. Together with SPF's main Facebook and Twitter pages, TP established its own Facebook page, under the "Use Your Road Sense" branding in 2016. With these platforms, TP continues to engage netizens on road safety matters through educational and sometimes, engaging posts. To date, the Facebook page has garnered about 29 000 likes or followers.

5.15 Road safety talks and exhibitions

Road safety training, talks and exhibitions conducted by road safety officers and instructors from the Driving Centers remain a key engagement tool for TP to engage and educate the public on road safety on a day-to-day basis. In 2016, TP continued to conduct road safety talks and exhibitions to various groups of road users such as students, heavy vehicle drivers, dispatch riders, cyclists, and the elderly.

6 Education

The regulation of training, testing and licensing of motorcar drivers and motorcyclists is an integral part of road user education. Not only does TP need to ensure that national standards for motorcar driver and motorcyclist training and testing are upheld (and will continue to be so in the future), but it also needs to inculcate safe road-use behavior among drivers and motorcyclists. This is achieved with a rigorous training, testing and licensing regime, which TP continually seeks to enhance by reviewing its policies and legislation, strengthening existing capabilities (as well as developing new ones) and streamlining processes through leveraging more on technology.

The regime is designed to equip motorcar drivers and

motorcyclists with the required skills and competency, and knowledge of road traffic rules and signs, to operate motor vehicles safely on our roads. While part of the regime focuses largely on learner motorists, another part of the regime also helps existing qualified motorists to improve on their skills and knowledge to become better drivers and motorcyclists.

The regime also needs to adequately prepare road users for an increasingly dynamic motoring landscape in the future. TP is already taking necessary steps to transform the regime, in phases, into a Next-Generation regime in order to keep pace with developments such as the introduction of autonomous vehicles and the prevalence of personal mobility devices.

6.1 SRS action plan education initiatives

Road safety education and driver licensing initiatives aim to equip road users with the relevant road safety knowledge and the competency to operate vehicles safely. Some of these initiatives, including those under the SRS Action Plan, have been implemented by TP since 2015 to enhance the competency of foreign vocational drivers and to give motorists more opportunities to improve their own driving knowledge and behavior. Together with TP's enforcement and engagement initiatives, the slew of education initiatives targeting different groups of road users provides a holistic approach towards achieving safer roads for all road users.

TP will continue to promote the development of a safer road use mindset over time among vulnerable road users such as motorcyclists, as well as children and elderly pedestrians, through basic and continuous education efforts and strengthening its ongoing partnership with the community.

6.2 Regular reviews in driver licensing regime

TP regularly reviews various driver licensing regimes under its purview to ensure that they stay relevant and up-to-date. For instance, from January 1, 2016, the upper age limit of heavy vehicle license holders was extended to the age of 75 years. With the revision, heavy vehicle drivers who are between 70 to 74 years of age can retain their licenses, if they pass an annual enhanced medical examination and enhanced proficiency driving test. The age limit extension would allow older heavy vehicle drivers to continue being gainfully employed and contributing to the economy, in light of the changing demographics of Singapore and in line with the Government's push towards encouraging more people to work beyond their retirement age. On the other hand, the enhanced medical examination and competency test help to ensure that only those who are certified to be fit and able to operate heavy vehicles safely can continue to hold their licenses, for their safety and the safety of other road users.

In a similar vein, from January 1, 2017, the upper age limit for driving instructors was also raised from 70 to 75 years. Driving instructors who are aged 70 years and above

can continue to conduct driving lessons until they turn 75 years old, if they pass their annual enhanced medical examination. Following the implementation of the new policy, TP will continue to monitor and obtain feedback from the industry, heavy vehicle drivers and driving instructors, and review the upper age limit as necessary. TP will carefully weigh the benefits of allowing aged driving instructors to continue conducting driving lessons against any potential road safety risks.

6.3 Simulation training

Currently, defensive driving/riding techniques, which enable motorists to drive/ride in such a way that they consciously reduce the dangers associated with driving/riding, are taught through classroom-based lessons. It is not practical to train drivers/riders to apply such techniques under real road conditions (e.g. inclement weather) and the risk of injury is high. On the other hand, research has shown that the use of driving simulators helps to reduce accidents among inexperienced drivers. In countries such as Japan and Korea, driving/riding simulators are being used in driving schools nationwide; similar technology is also used in Australia, USA, Germany and Sweden.

As part of TP's ongoing efforts to enhance road safety training methodology, TP studied the feasibility of implementing advanced riding and driving simulation technologies to enable learner motorists to experience handling vehicles under high-risk situations without the risk of sustaining actual injuries. Simulation training can enable them to acquire defensive riding and driving skills, and to know how to react appropriately under a range of scenarios, so as to reduce the likelihood of them getting seriously injured in an accident.

In 2019, TP plans to introduce mandatory training with driving/riding simulators to overcome these constraints by allowing learner motorists to put their knowledge of defensive driving/riding into practice under controlled simulation scenarios without risking actual injury. Trials will commence at all three driving schools to allow Class 2B, 2A, 3 and 3A learner motorists to undergo simulation training by the first quarter of 2018.

6.4 Online learning portal

TP will also leverage on technologies to better reach out to existing motorists and road users to ensure that they are kept informed about the latest changes in road traffic rules and signs.

On July 1, 2017, TP launched a new Online Learning Portal to allow easy access to traffic rules and useful information for new learner motorists and existing license holders. The TP Online Learning Portal, accessible via <http://www.police.gov.sg/> and on the Police@SG mobile app, will provide free digital copies of the Basic and Final Theory Driving handbooks in English, Mandarin, Malay and Tamil. By 2018, the Online Learning Portal will also

provide the following resources: 1) online mock-tests for Basic Theory Test (BTT), Final Theory Test (FTT) and Riding Theory Test (RTT); 2) animated videos on Major Causes of Fatal and Injury Accidents; and 3) updates on new traffic policies, rules and signs.

The public can access the portal to understand the traffic rules and learn how to improve their road safety awareness. In future, there are plans to include in the handbooks some advisories to enable road users to interact safely with autonomous vehicles and users of personal mobility devices. Existing motorists and road users will be able to download bite-sized updates via the portal that they can easily access from their computers and mobile devices such as smart phones.

6.5 Extended E-Provisional Driving License

By the fourth quarter of 2017, the validity period for Provisional Driving Licenses (PDLs) will be extended from six months to two years. This will allow more time for learner motorists to attain their driving or riding licenses. At the same time, learner motorists will be able to apply or renew their PDL online via <http://www.police.gov.sg/> or through the Police@SG mobile application.

7 Conclusion

Through the SRS Action Plan that builds on the three-pronged strategy of Enforcement, Engagement and Education, TP has been able to maintain a commendable accident fatality rate. Going forward, TP together with the Singapore Road Safety Council will continue to search for ways to improve our existing systems and processes to make our roads even safer as well as promoting more road safety education programs and messages.

(1) <http://www.singstat.gov.sg>, data as at mid-year 2016.

(2) The partners for SRS 2016 were Ministry of Education, Ministry of Transport, Land Transport Authority, People's Association, and Automobile Association of Singapore.

(3) SGCarMart of Singapore Press Holdings (SPH) is the title-sponsor for the campaign for the fifth year running. SPH previously used "STCars", and then "AsiaOne" as the title of the campaign.

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