For discussion
on 17 May 2024

Legislative Council Panel on Transport

Evaluation on the Effectiveness of Time-Varying Tolls at the Three Road Harbour Crossings

Purpose

Since 17 December 2023, the Government has implemented time-varying tolls at the three road harbour crossings (RHCs), namely the Western Harbour Crossing (WHC), the Cross-Harbour Tunnel (CHT) and the Eastern Harbour Crossing (EHC). This paper briefs Members on the effectiveness of time-varying tolls since the implementation and the progress of the related complementary measures.

Background

2. The Government has been adopting a multi-pronged strategy to alleviate cross-harbour traffic congestion, encompassing efforts to improve transport infrastructure, expanding and enhancing public transport services, and utilising technology to enhance the overall efficiency of the transport system. The Government has successfully implemented the HKeToll, a free-flow tolling service, at all government-tolled tunnels and control area[1] in 2023 to enhance the efficiency of toll collection and enable motorists to commute more safely and smoothly. The implementation of HKeToll also provides the necessary toll collection method and system for the Government to introduce time-varying tolls at the three RHCs in the same year, with a view to suppressing and diverting the cross-harbour traffic during peak hours, thereby further improving cross-harbour traffic.

3. Under time-varying tolls, the RHC tolls for private cars and

[1] Namely, the Tsing Sha Control Area (Eagle's Nest Tunnel, Sha Tin Heights Tunnel and Tai Wai Tunnel), Shing Mun Tunnels, Lion Rock Tunnel, CHT, WHC, EHC, Tate's Cairn Tunnel and Aberdeen Tunnel.

motorcycles vary according to the time slots. On Mondays to Saturdays (excluding public holidays), the tolls for private cars range from $20 to $60; for other vehicles, the tolls are uniform throughout the day, i.e. taxis continue to be charged at $25 for crossing the harbour while other commercial vehicles, including goods vehicles and buses, are charged at $50. The Transport Department (TD) has been closely monitoring the traffic condition following the implementation of the new tolls. With the co-operation of motorists and adjustments to their commuting patterns, the time-varying tolls have yielded positive results after several months of implementation and the overall traffic queues and congestion at the portals of CHT and EHC have been alleviated. Details are set out in paragraphs 6 and 7 below.

The latest cross-harbour traffic situation

4. With the further resumption of normalcy of social and economic activities, the weekday daily cross-harbour traffic flow at the three RHCs has rebounded to about 270 000 vehicles (two-way) in December 2023, which is comparable to the level before the pandemic (i.e. 2019). After the implementation of time-varying tolls, the weekday daily cross-harbour traffic flow in April 2024 was similar to the pre-implementation level. The distribution of traffic among the three RHCs is as follows: traffic flow at WHC increased by about 18% to about 103 000 vehicles (two-way), while that of CHT and EHC decreased by about 9% to about 95 000 vehicles (two-way) and by about 7% to about 73 000 vehicles (two-way) respectively. Details are at **Annex I**. In the past, the whole-day traffic (including during off-peak hours) at CHT and EHC maintained at a constantly high level, whereas the capacity of WHC was not fully utilised outside the peak hours. The above figures suggest that the new tolls have started to rationalise the unevenly distributed traffic among the three RHCs in the past.

5. To evaluate the effectiveness of time-varying tolls, the TD has analysed the overall cross-harbour traffic volume, queue length and vehicle speed during peak hours. Since the implementation of time-varying tolls in December 2023 up to April 2024, the overall cross-harbour traffic at the three RHCs during peak hours decreased by about 1 to 4% on a monthly average basis. About half an hour immediately before or after the peak hours, the overall cross-harbour traffic was up by about 3 to 6%[2] on average. Details are at **Annex II**. This reflects

[2] If only private cars and motorcycles, which are charged according to time slots, are taken into account, the overall cross-harbour traffic of these two types of vehicles during peak hours decreased by about 3% to 8%, while the traffic during the half-hour time span immediately before or after the

that some motorists have chosen to commute outside the peak hours, i.e. opting to cross the harbour at a lower toll level. The new tolls have helped divert traffic among different time slots.

6. As regards traffic queues, during peak hours, the queues at CHT and EHC were generally reduced by more than 1 km and 0.5 km respectively. Outside the peak hours, which account for nearly 80% of the time of a day, the traffic at the three RHCs was smoother than before (including CHT which was often congested in the past). The non-cross-harbour traffic near the portals of the RHCs was also significantly improved[3]. The average longest traffic queues in the morning peak hours on weekdays are set out at **Annex III**.

7. On vehicle speed, southbound vehicles heading towards WHC could generally travel at a speed of about 30 to 50 km per hour in the morning peak. The slower traffic was mostly concentrated at the tunnel portal, causing minimal impact on non-cross-harbour traffic. As for CHT and EHC, the overall cross-harbour traffic became smoother, as a result of the improved traffic conditions and higher average vehicle speeds on the roads connecting to the tunnel entrances. The average vehicle speeds on the roads connecting to the three RHCs in the morning peak hours on weekdays are set out at **Annex IV**.

8. The above figures show that the new tolls have preliminarily achieved the policy objectives of rationalising cross-harbour traffic and better utilising the tunnel capacity, thus bringing benefits to motorists, the public transport trades, the commercial vehicle trades, cross-harbour bus passengers, and the community as a whole.

Improvement works for tunnel connecting roads

9. In view of the increase in traffic flow at WHC, to further improve the

peak hours was up by about 9% to 12%, showing the obvious diversion effect among different time slots.

[3] With the implementation of time-varying tolls, the longest traffic queue at CHT in the morning peak hours on weekdays was shortened, from the area near Prosperous Garden (about 2.6 km) to the vicinity of the Hong Kong Girl Guides Association Headquarters (about 1.5 km) now, thus reducing the impact on traffic near the Gascoigne Road. The queue at EHC was also shortened, from the area outside Kwun Tong Police Station/Kwun Tong Magistrates' Courts (about 1.7 km) to the vicinity of Sceneway Garden (about 1.2 km) now, thus reducing the impact on traffic along the Kwun Tong Road and Kwun Tong Bypass. As for WHC, with the downward adjustment of the toll levels, the traffic volume has increased as expected, with a traffic queue of about 1.6 km occasionally forming in the morning peak hours on weekdays, but mostly within the busiest one hour from 9 a.m. to 10 a.m. only.

traffic heading towards the Central and Western District from the Hong Kong Island portal of WHC, the TD has suitably adjusted the traffic signal timing at the junction of Connaught Road West and Eastern Street to ease the vehicle flow in the area during peak hours. Furthermore, the TD is planning to construct an additional vehicle lane at the Hong Kong Island portal of WHC in the direction of Central and Sheung Wan to increase the capacity of the road section, so as to smoothen the traffic flow at the tunnel portal and its surrounding areas. The TD has engaged the Highways Department (HyD) to conduct detailed design for the project and proceed with the road works according to established procedures. Preliminary assessment suggests that the related road works could commence in the second half of 2025 for completion within 2027.

Continuous monitoring of RHC traffic and tolls

10. Time-varying toll is a new toll arrangement, to which motorists still need time to adapt and cross-harbour traffic may still fluctuate. In fact, as we have just changed the tolls of the three RHCs and the tolls for different types of vehicles, motorists may need a longer period of time to adjust their habits in terms of commuting patterns, commuting times, route choices, etc.. These habits are also subject to interaction among motorists, and hence it will take some time for the patterns to gradually stabilise. As shown in **Annexes I to IV**, the traffic flow, traffic queues and vehicle speed at the three RHCs indeed fluctuated between January and April this year after the implementation of time-varying tolls. According to the TD's observations in the past, cross-harbour traffic condition varies in different seasons of the year. For example, different traffic volumes may emerge during summer vacation or other extended holidays. Therefore, the TD would need to collect cross-harbour traffic data for a one-year cycle to comprehensively analyse the impact of time-varying tolls on the traffic at the three RHCs, and then to review whether any adjustment of the current toll levels would be needed. We expect the review to be completed by mid-2025 at the earliest.

11. The Government appreciates that there are voices from the community that there is a need to review the tolls for individual vehicle types using the RHCs. We consider that the review should be science-based, based on objective data and having regard to actual circumstances of the society, with a view to arriving at comprehensive and reliable findings. Taking commercial vehicles as an example, according to the current data, the overall traffic flow of medium and heavy goods vehicles is roughly the same as that before the implementation of time-varying tolls. The toll reduction of WHC has obviously attracted goods

vehicles to switch from CHT to WHC, while the traffic flow of goods vehicles at EHC has remained more or less the same. We note that some in the logistics industry have indicated that as the congestion at CHT has been substantially alleviated during daytime, and that as the uniform toll of the three RHCs has allowed them more autonomy in choosing the most direct tunnel route according to their actual operational needs, this has resulted in a smoother and more efficient delivery of goods, which is conducive to their operation. As regards cross-harbour minibuses, upon the implementation of time-varying tolls, the total cross-harbour minibus flow during weekdays in April 2024 did not change significantly from before. Only a portion of the minibus flow was diverted to WHC, leading to more evenly distributed traffic usage among the RHCs. However, as mentioned in paragraph 10, cross-harbour traffic situation is still subject to change as motorists take time to adapt. We will continue to gather data and conduct reviews.

Progress of complementary measures

12. To tie in with the implementation of time-varying tolls, the TD has set up additional bus-only lane[4] and designated bus gate[5] at the Kowloon portal of WHC (i.e. southbound on West Kowloon Highway) and the Hong Kong portal of EHC (i.e. eastbound on Island Eastern Corridor) respectively, with a view to reducing the bus journey time (please see photos at **Annex V**). The TD will continue to consider setting up more bus-only lanes/designated bus gates at suitable locations according to service demand and actual road circumstances.

13. As regards franchised bus services, preliminary figures indicate that the passenger demand for cross-harbour bus services was largely comparable to the pre-implementation level, and that the current service level can generally meet the passenger demand. The TD and the franchised bus companies will closely monitor the demand for cross-harbour bus services and enhance their services to meet passenger needs as necessary.

14. At present, there are 24 car parks in Hong Kong providing a total of nearly 9 700 park-and-ride (PnR) parking spaces. In taking forward individual

[4] Bus-only lane is a traffic lane designated for use by "franchised buses" or "franchised and non-franchised buses" only. Other vehicles have to make use of other traffic lanes next to the bus-only lane or other alternative routes.

[5] Designated bus gate generally refers to a short section of bus-only lane that, while the road capacity is normally not affected, facilitates buses' access to destinations or their changing to other travelling routes more directly.

railway and new development projects, the Government will consider introducing PnR facilities at suitable locations. The TD is discussing with the Lands Department with a view to implementing PnR schemes at suitable short-term tenancy (STT) fee-paying public car parks. The targeted locations include STT car parks near Tsuen Wan West Station, Tsing Yi Station and Heng On Station. On public parking spaces, the TD will continue to adhere to the "single site, multiple use" principle to provide additional public car parking spaces in suitable "Government, Institution or Community" facilities and public open space projects, and will continue to closely monitor the demands, and explore and examine the introduction of PnR facilities at suitable locations to facilitate commuters' use of the mass transit system. The Government is also examining the provision of PnR facilities at suitable transport interchange hubs under the Traffic and Transport Strategy Study to further encourage motorists to make use of public transport services and reduce the traffic flow to areas with heavy traffic.

Implementation of HKeToll

15. HKeToll, which is indispensable for the implementation of time-varying tolls, has been implemented for almost a year and has become widely used and familiarised by motorists. As at April 2024, the Government had issued more than 810 000 vehicle tags, accounting for over 99% of all licensed vehicles in the territory. About 91% of the vehicles had opened an HKeToll account and around 76% of the vehicles had set up automatic payment means. Most of the vehicles can now make instant automatic toll payment, hence saving time and enjoying convenience. For vehicles which have yet to set up automatic payment means, the registered car owner can pay the outstanding toll by various payment means within 14 working days after using the tunnel concerned.

16. The overall traffic flows at the tunnels before and after the implementation of HKeToll are more or less the same, details of which are at **Annex VI**.

17. With the implementation of HKeToll, the HyD is in the process of dismantling all the toll booths and toll islands and adjusting the arrangement of vehicle lanes at the tunnels. Demolition of toll booths and toll islands and lane adjustments at Tsing Sha Control Area (Eagle's Nest Tunnel Toll Plaza) and Lion Rock Tunnel have now been completed. Similar works for the other tunnels are expected to be completed in phases between the second quarter of 2024 and mid-2025. Spaces released after the implementation of HKeToll can be used

for improving public transport facilities (such as adding or upgrading bus stops) and easing traffic flow at tunnel portals. In the long run, the released spaces can complement the development of the neighbouring areas. The Government will take this into consideration in the relevant planning process.

Advice sought

18. Members are invited to note the content of this report.

Transport and Logistics Bureau
Transport Department
May 2024

Annex I

Average Daily Traffic Flow (two-way)
of the Three RHCs on Weekdays (in vehicles)

		WHC	CHT	EHC	Total
Before time-varying tolls implemented[1]		87 300	104 900	79 200	271 500
After time-varying tolls implemented	December 2023 [2]	102 100 [+17%]	93 500 [-11%]	74 600 [-6%]	270 100 [-1%]
	January 2024 [3]	99 500 [+14%]	94 600 [-10%]	73 000 [-8%]	267 100 [-2%]
	February 2024 [3]	100 900 [+16%]	94 800 [-10%]	74 300 [-6%]	270 000 [-1%]
	March 2024 [3]	103 700 [+19%]	96 900 [-8%]	73 700 [-7%]	274 200 [+1%]
	April 2024 [3]	102 700 [+18%]	95 100 [-9%]	73 400 [-7%]	271 200 [-0.1%]

Notes:

1. From 4 to 8 December 2023
2. From 18 to 21 December 2023
3. The data show the average traffic flow from Mondays to Fridays of the month excluding public holidays and the days affected by public holidays (e.g. 2 to 5 January, Lunar New Year's Eve, from the fifth to seventh day into the Lunar New Year, 29 March, 1 to 5 April, etc.).
4. Due to rounding, breakdowns may not add up to the total.
5. Traffic queues at the tunnels during peak hours (if any) are not included in the traffic flows.
6. [ ] % change before and after implementation of time-varying tolls

Annex II

Average Traffic Flow (two-way)
of the Three RHCs in the Peak Hours[1] on Weekdays (in vehicles)

		WHC	CHT	EHC	Total
Before time-varying tolls implemented[2]		37 500	32 900	31 700	102 000
After time-varying tolls implemented	December 2023 [3]	39 100 [+4%]	30 200 [-8%]	28 700 [-9%]	98 000 [-4%]
	January 2024 [4]	38 900 [+4%]	31 400 [-5%]	29 300 [-8%]	99 700 [-2%]
	February 2024 [4]	38 800 [+3%]	31 200 [-5%]	29 400 [-7%]	99 400 [-3%]
	March 2024 [4]	39 800 [+6%]	31 700 [-4%]	29 400 [-7%]	100 900 [-1%]
	April 2024 [4]	39 600 [+6%]	31 300 [-5%]	29 400 [-7%]	100 300 [-2%]

Notes:

1. "Peak hours" refers to 07:30 to 10:30 hrs and 16:30 to 19:30 hrs (six hours in total)
2. From 4 to 8 December 2023
3. From 18 to 21 December 2023
4. The data show the average traffic flow from Mondays to Fridays of the month excluding public holidays and the days affected by public holidays (e.g. 2 to 5 January, Lunar New Year's Eve, from the fifth to seventh day into the Lunar New Year, 29 March, 1 to 5 April, etc.).
5. Due to rounding, breakdowns may not add up to the total.
6. Traffic queues at the tunnels during peak hours (if any) are not included in the traffic flows.
7. [ ] % change before and after implementation of time-varying tolls

Annex III

Average Longest Traffic Queues (km) of the Three RHCs in the Morning Peak Hours on Weekdays

		WHC	CHT	EHC [6]
Before toll adjustments for RHCs[1]		0.1	2.6 [4]	1.7
After "633" fixed toll implemented[2]		0.7	2.2 [4]	1.7
Before time-varying tolls implemented[3]		1.2	3.0 [4]	1.7
After time-varying tolls implemented[3]	December 2023	0.6	0.9 [4]	0.3
	January 2024	1.0	1.2 [5]	0.6
	February 2024	1.3	1.5 [5]	1.1
	March 2024	1.2	1.8 [5]	0.9
	April 2024	1.6	1.8 [5]	1.2

Notes:
1. During November 2021 (i.e. before the toll adjustments for the three RHCs by the Government)
2. During September 2023
3. During December 2023
4. Longest traffic queue forming at Gascoigne Road
5. Longest traffic queue forming at Princess Margaret Road
6. Traffic queue at Kwun Tong Bypass was used for comparison

Annex IV

Average Vehicle Speeds (km/hour) at the Kowloon Connecting Roads (southbound) of the Three RHCs During Weekday Morning Peak Hours[1,2]

			WHC	CHT	EHC
Before time-varying toll plan[3]	Morning peak hours[4]		56	14	33
	Busiest one hour within morning peak hours[4]		34	15	24
After time-varying toll plan[5]	Morning peak hours	December 2023[6]	69	32	56
		January 2024	52	25	42
		February 2024	53	24	40
		March 2024	50	22	36
		April 2024	47	20	34
	Busiest one hour within morning peak hours[4]	December 2023[6]	65	27	49
		January 2024	34	20	38
		February 2024	32	18	36
		March 2024	32	15	33
		April 2024	30	14	32

Notes:

1. "Morning peak hours" refers to 07:30 to 10:30 hrs on weekdays (three hours in total)
2. Average vehicle speeds from the end of the longest traffic queues to the tunnel entrances
3. From 4 to 8 December 2023

4. Busiest one hour being 09:00 to 10:00 hrs for WHC and 08:30 to 09:30 hrs for CHT and EHC
5. Unless otherwise specified, the data show the average vehicle speeds from Mondays to Fridays in the month, excluding public holidays and days affected by public holidays (e.g. 2 to 5 January, Lunar New Year's Eve, from the fifth to seventh day into the Lunar New Year, 29 March, 1 to 5 April, etc.).
6. From 18 to 21 December 2023

Annex V

Additional Bus-only Lane and Designated Bus Gate after Implementation of Time-varying Tolls

Additional bus-only lane at the Kowloon entrance of WHC (i.e. southbound on West Kowloon Highway)

Additional designated bus gate at the Hong Kong entrance of EHC (i.e. eastbound on Island Eastern Corridor)


Annex VI

Change in Traffic Flow before and after Implementation of HKeToll

Tunnel/ Control Area	HKeToll implementation date	Average daily traffic flow		Change
		30 days before HKeToll implementation	30 days after HKeToll implementation	
Tsing Sha Control Area	7/5/2023	57 311	58 624	+1 313 (+2.3%)
Shing Mun Tunnels	21/5/2023	50 722	49 209	-1 513 (-3.0%)
Lion Rock Tunnel	28/5/2023	87 637	87 120	- 517 (-0.6%)
Cross-Harbour Tunnel	23/7/2023	105 736	104 560*	- 1 176 (-1.1%)
Western Harbour Crossing	6/8/2023	63 038*	69 459	+6 421 (+10.2%)
Eastern Harbour Crossing	27/8/2023	72 928*	69 574	- 3 354 (-4.6%)
Tate's Cairn Tunnel	26/11/2023	59 324	60 560	+1 236 (+2.1%)
Aberdeen Tunnel	24/12/2023	62 939	59 410	-3 529 (-5.6%)
Total	--	559 635	558 516	-1 119 (-0.2%)

* "633" fixed toll plan implemented on 2 August 2023.