LCQ1: Parapets along highways
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Following is a question by the Hon Miriam Lau and a reply by the Secretary for Transport and Housing, Ms Eva Cheng, at the Legislative Council meeting today (November 10):

Question:

Last month, a frightening traffic accident occurred at the Hong Kong International Airport in which a tourist coach travelling along the flyover next to the air passenger terminal building and heading for the carriageway at grade ran out of control and crashed through a parapet; it then fell off the 16-metre-tall bridge and crushed two taxis, and fortunately no severe casualty was caused. An engineer has described that the structure of the parapets at the incident spot is very frail and can merely withstand the impact by private cars. The incident has thus roused public concern about the safety of parapets of vehicular bridges and freeways in Hong Kong. In this connection, will the Government inform this Council:

(a) of the containment level of the parapets at the road section at which the aforesaid accident occurred, including information such as the height and material of the parapets, as well as the energy of impact by different types of vehicles, such as private cars and buses, that they can withstand;

(b) of the major vehicular bridges and freeways in Hong Kong which use the aforesaid type of parapet at present, as well as the total length of such road sections; and

(c) given that following the 2003 tragic incident at Tuen Mun Road where a double-decked bus plunged into a valley, the Tuen Mun Road Traffic Incident Independent Expert Panel (the Expert Panel) listed 39 spots which are in priority need for upgrading the containment level of parapets, of the progress of such improvement works to date; given that the Expert Panel's report has also recommended that the authorities should continue to monitor in the international scene the development of multiple containment parapet, which is capable of retaining both light and heavy vehicles, and develop workable parapet designs for the Hong Kong situation, whether the authorities have developed new models of parapet in this connection, and whether such parapets will be put to use throughout Hong Kong; if they have, of the details; if

not, the reasons for that?

Reply:

President,

The purpose of installing parapets along highways is to reduce the severity of accidents. In line with international standards, parapets and barriers are generally designed for a containment level pertaining to the vehicle type most commonly involved in traffic accidents along the road sections concerned. A stronger parapet can withstand penetration of a heavy vehicle by stopping it or deflecting it away, but a light vehicle may suffer severe damage after hitting strong parapets as the body of a light vehicle is not as strong as that of a heavy vehicle. It is therefore important for the works departments to strike a balance between the risk of vehicle penetration and the containment level of parapets in the course of working out the design.

The existing containment levels and parapet standards were formulated in end 2005 by the Highways Department (HyD) after a comprehensive study of the recommendations put forward in 2003 by the Tuen Mun Road Traffic Incident Independent Expert Panel (IEP) in the Report on Enhancement of Highway Safety (IEP's Report). The study was jointly conducted by the HyD and the Hong Kong University of Science and Technology. Having examined similar standards adopted elsewhere around the world and conducted actual impact tests and computer simulation, the HyD changed the classification of containment capacity of parapets from three levels to four levels, namely L1, L2, L3 and L4, and developed new design standards for each level. A scoring system was also introduced to determine whether parapets of higher containment levels should be installed.

Containment levels L1 to L4 refer to the different strengths of parapets in withstanding the impact force of errant vehicles impacting at various speeds and 20-degree angle. Containment levels L1 and L2 are designed for withstanding the impact force equivalent to a small vehicle at 1.5 tonnes or below impacting at 80 kilometres/hour (kph) and 113 kph respectively; containment level L3 is designed for withstanding the impact force equivalent to a double-decked bus impacting at 50 kph; while containment level L4 is designed for withstanding the impact force equivalent to a heavy goods vehicle impacting at 64 kph.

I now respond to Hon Miriam Lau's question, as follows:

(a) The road section where the accident occurred (including its parapet), which was completed in 1998, was designed, constructed and managed by the Hong Kong Airport Authority (AA), and was approved by relevant government departments. The design of the parapet was based on the appropriate standards of the HyD at the time, which is equivalent to the existing containment level L2. The 1-metre high parapet is capable of withstanding the impact force equivalent to a 1.5-tonne vehicle impacting at 113 kph and 20-degree angle. The road section in question is not a sharp bend nor is its gradient steep; the maximum travelling speed allowed is 50 kph and vehicles are not running at a high speed; and the proportion of heavy vehicles, namely buses and coaches, using the road section is not high. According to the HyD's current standards, the containment level is appropriate to the road and traffic conditions of the road section concerned.

The Police are still investigating into the traffic accident, and the AA has provided the Police with the necessary assistance and information. Moreover, AA completed the repair works to the parapet along the road section concerned on November 1 subsequent to completion of evidence taking by the Police.

(b)&(c) According to the IEP's Report released in 2003 mentioned above, it was recommended that a detailed study be conducted on 39 priority locations along 16 road sections where vehicle penetration of the parapet might result in catastrophic consequence, with a view to formulating road safety improvement measures. The HyD completed the works to strengthen bridge parapets and roadside barriers at these locations in 2006.

Other than the 39 locations mentioned above, over the years, the HyD has also been carrying out necessary parapet replacement works during routine maintenance for the flyovers and highways within its purview, adopting the latest design as the construction standards. Replacement works have been completed for parapets at all major flyovers and expressways.

In addition, the HyD conducts annual review on the containment levels of parapets at flyovers and highways, and installs suitable parapets at road sections requiring higher containment levels.

In accordance with the recommendation of the IEP's Report, the HyD has also been monitoring the latest development of multiple containment parapets in the

international scene. The HyD agrees that apart from withstanding the impact of heavy vehicles, such parapets can also reduce the impact force of light vehicles to an appropriate extent such that excessive damage could be avoided. In this connection, the HyD has completed the literature review and data collection on the containment levels of such parapets, and commissioned a consultant in 2008 to undertake the design and testing of parapets with a view to completing the design and formulating relevant guidelines by early 2011. Meanwhile, the HyD has installed an additional row of three-beam barrier, which can provide cushioning effect, in front of the parapet at relevant road sections, which is also effective in reducing the damage to impacting light vehicles.

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