

LCQ20: Capability of seawalls and breakwaters to withstand winds and waves

Following is a question by the Hon Yung Hoi-yan and a written reply by the Secretary for Development, Mr Michael Wong, in the Legislative Council today (November 7):

Question:

During the onslaught of super typhoon Mangkhut in Hong Kong in September this year, the coastal areas (including Hong Kong Island East near Heng Fa Chuen, Shek O, South Horizons, Sha Tin, Tseung Kwan O, Sai Kung and Sha Tau Kok) suffered severe flooding and quite a number of facilities (including roads, piers and bridges) there were damaged. Such situations have given rise to doubts over the capability of existing seawalls and breakwaters to withstand winds and waves. In this connection, will the Government inform this Council:

(1) whether it has assessed the correlation between the serious damage to the facilities along the seafront of Tseung Kwan O South during the onslaught of Mangkhut and the capability of the seawall there to withstand winds and waves; if so, of the outcome and follow-up measures; if not, the reasons for that;

(2) of the design standards adopted for the existing seawalls and breakwaters; when such standards were formulated, and the date on which such standards were last updated; and

(3) whether it will conduct a comprehensive review of the design standards for the construction of seawalls and breakwaters so as to strengthen the capability of such facilities to withstand winds and waves; if so, of the details and timetable; if not, the reasons for that?

Reply:

President,

The geographical position of Hong Kong makes it susceptible to weather-related threats such as tropical cyclone, rainstorm and storm surge. In particular, some low-lying coastal or windy locations are vulnerable to seawater inundation caused by extreme storm surges or huge waves, and consequential damage to facilities situated near the seaside. As climate change goes drastic, threats induced by extreme weather are expected to be more frequent and severe. Attaching great importance to climate change, the Government established in April 2016 the Steering Committee on Climate Change under the chairmanship of the Chief Secretary for Administration. Besides,

the Civil Engineering and Development Department (CEDD) has established the Climate Change Working Group on Infrastructure to co-ordinate the work among various works departments on tackling climate change, actively conduct relevant studies, align design standards, and uplift the resilience of major public infrastructures.

Having consulted relevant departments, I provide below a consolidated reply to the three parts of the Hon Yung's question:

(1) During the passage of a typhoon, waves approaching shores may overtop seawalls. On September 16 this year, the maximum sustained winds near the centre of Mangkhut was 195 kilometres per hour (km/h), higher than the same of 1962's Wanda, 1971's Rose and last year's Hato (which were all 185 km/h), thus intensifying the severity of overtopping waves. As a result, some low-lying coastal or windy locations were exposed to threats of seawater inundation, causing different levels of damage to seaside facilities.

As far as the southern seaside of Tseung Kwan O is concerned, during the passage of Mangkhut, huge waves rolled up by strong winds overtopped the seawall, inundated the promenade and waterfront park, and caused damage to some facilities at the seaside. Nevertheless, the structural integrity of the seawalls were not severely affected by the wave attack of Mangkhut. The relevant seawall structure comply with the design standards set out in the Port Works Design Manual published between 2002 and 2004 by the Civil Engineering Department (CED) .

(2) The CED published the Port Works Manual in 1992 to provide general technical and application guidance for professionals engaging in the design, construction and maintenance of port structures in Hong Kong. In 2002 to 2004, the CED published the Port Works Design Manual. The manual is divided into five sections, namely General Design Considerations for Marine Works; Guide to Design of Piers and Dolphins; Guide to Design of Reclamation; Guide to Design of Seawalls and Breakwaters; and Guide to Design of Beaches. In view of the potential impact on marine works in Hong Kong due to climate change, the CEDD (note: the former Civil Engineering Department and the former Territory Development Department merged into the Civil Engineering and Development Department in 2004) updated the Port Works Design Manual in January this year, incorporating projections of rise in mean sea levels and increase in wind speed due to climate change. The CEDD will continue to make reference to the latest climate change projections, and to collect updated weather data. In collaboration with the Hong Kong Observatory in monitoring the latest situation, the CEDD will review and update design standards set out in the Port Works Design Manual in a timely manner in order to enhance the resilience of marine works against wave impacts.

(3) The CEDD will commission a consultancy study for a period of 18 to 24 months to conduct a comprehensive review on low-lying coastal and windy locations, and carry out relevant investigations on storm surge and wave, so as to assess the impacts of extreme weather. Based on the findings of the study, the Government will review if it is necessary to update relevant design standards set out in the Port Works Design Manual, and formulate

appropriate protection measures including options of improvement works and management measures to strengthen the resilience to wave impacts at the coastal areas. The Government will carry out a multi-pronged assessment on the suggestions of flood prevention strategy to identify long-term solutions to problems caused by huge waves.