The Standard
Wednesday, June 24, 2020

Screengrab from video of Tai Po overflow, provided by Alex Mo from the 'Tai Po' Facebook group.

FLOOD MITIGATION ALL ABOUT GOING WITH FLOW

Nuts and bolts
Edmund Leung

Hong Kong saw its first black rain warning in three years this month, and following more than 100 millimeters of rainfall within a few hours, a lot of low-lying areas suffered floods.

Fortunately, apart from some property damage, there were no fatalities.

Floods have been with us since the beginning of civilization.

Humans have found it much more comfortable and convenient to live on flat land, so the cavemen moved down from hills to flat land near rivers or seas, where water is readily available and land fertile, making it easy to farm to feed their families.

But this came with the risk of occasional floods.

When rain falls on a hill, the water flows from a stream and a river into the sea, carrying with it large amounts of silt.

As it reaches sea level, the larger cross sections of these water paths slow the velocity of the water flow and with this, the amount of silt it can carry is reduced and becomes deposited on the ground.

Such silt deposits build up with time to become flood plains eventually.

Rightly or wrongly, flat and arable land attracts human settlements.

However, torrential rains will wash down a further amount of silt to cover the existing surfaces of low-lying land, causing floods and ruining lives and property.

To protect lives, we build dams and dikes to hold water in watercourses, but there is a limit as to how far we can go.

Eventually, they may not stand up to pressure and, invariably, disasters occur.

In human history, there have been too many cases of failed dams and dikes, causing sudden floods and damaging farmland and dwellings.

From the seaside, the rage of huge tidal waves and tsunamis also threatens the safety of dwellers in low-lying shore areas.

As people prefer dwelling in cities, land has become precious and houses are built with basements.

If the elevations of these houses are higher than sea level, floor drains should be able to lead away surface water.

For basements located below sea level, or far from main drainage systems, rainwater will be collected in sumps and pumped back to the nearest city drain.

This works well in theory, but leaves and debris often block drains, so when heavy rain occurs, the result is flooding.

Mechanical pumping systems can also fail, again resulting in flooding.

We have seen so many cases of floods in basement car parks and in subways.

They are designed to cater for a certain amount of heavy rain, normally "once-in-50-year" events, but Murphy's law dictates that once in a while, we have inclement weather that exceeds these conditions.

Together with neglect in clearing the drains, floods occur and cause damage.

An effective solution for combating floods is to build surge tanks.

In Happy Valley, Wing Lok Street in Sheung Wan and Tai Hang Tung in Mong Kok, our drainage services department has built huge underground tanks that can help mitigate the deluge during storms.

More effective storm-intercepting drainage systems with huge culverts and tunnels leading to the harbor also help to mitigate the effects of storms.

With effective design and frequent and effective maintenance, Hong Kong has generally been able to control the damage of floods.

Living in a city has many advantages, but we must equip it to protect us under all conceivable weather conditions, taking effective precautions to protect ourselves.

Veteran engineer Edmund Leung Kwong-ho casts an expert eye over Hong Kong's iconic infrastructure