

A Comprehensive Urban Stormwater Management Approach in Combating Flood in Malaysia – An Indispensable Link for a Safer, Greener and More Liveable Urban Environment

Datuk Ir. Ahmad Husaini bin Sulaiman

Director-General

Department of Irrigation and Drainage, Malaysia

Low Koon Sing

Director, Stormwater Management Division

Department of Irrigation and Drainage, Malaysia

Flooding has always been the number one major natural disaster that hits the nation from time to time. The first recorded major flooding event was reported in 1926, but the 1971 event was probably the most widespread in record where many states were inundated. This flood inflicted substantial damage and casualties with an estimated damage cost of more than 200 million ringgit Malaysia (RM) and sixty one victims perished.

In the recent past, in December 2006 state of Johore was impounded with an unprecedented widespread torrential tropical monsoon rain lasting more than 10 days, where one of the stations recorded a maximum 4 day rainfall of 782mm. Almost two third of the state were badly flooded. The event resulted in the displacement of more than 100 thousand people from their home and that 16 casualties were reported. Unbelievably, the state was again hit by the second wave of stormy event of comparable size and scale in mid Jan 2007. Flood damage cost was estimated at RM 1.5 billion, the costliest in the nation's history. According to the 2003 study total average annual flood damage cost in Malaysia was close to RM 1 billion.

Like many other emerging economy Malaysia has been experiencing an enormous urban population growth in the past two decades. In 1990 her urban population was about 9 million, now according to 2010 population census it rose to 20.5 million, accounting for 72.2% of total population, and it continues to be in the upward trend. In tandem with this trend, development of urban housing and commercial areas as well as infrastructures has been expanding at a very fast pace and uncontrolled manner. Much of the greens and permeable areas were gone. This scenario brings about another dimension of issues associated with rapid increase in stormwater runoff – escalating frequency and magnitude of urban flash flood and pollution of river water and subsequent habitat deterioration.

A case in point, for Klang River at the city center analysis in year 2000 revealed that the mean annual flood flow of post mid-1980's period has increase by three folds as compared to the period prior to mid-1980's, i.e. from 148 cumecs to 440 cumecs, and it is escalating with time. Consequently two mega infrastructures – SMART Diversion Tunnel and the Batu-Jinjang Ponds coupled with Gombak and Keroh Diversion Flood Control Scheme – had to be put in place in 2007 to contain this huge increase in flood flow so that folks in Kuala Lumpur city center can be spared from suffering significant flash flood of up to 3 times within a year.

In fact to mitigate (structural measure) all the major flooded areas, due to river over topping, which have been identified to date the Malaysian government would have to fork out a total allocation of more RM 30 billion. In addition, a recent study has revealed that a total sum of

more than 9 billion is needed to improve the urban drainage system to address the major local flash flood problem. To meet such financial obligation and with present rate of allocation it is going to be a long battle fighting flood.

The conventional drainage engineering practice with 'rapid disposal' approach up to year 2001 in Malaysia has resulted in the constant need of upgrading the rivers and major drainage system, and it is costly and could be disruptive. Since 2001, the government through Department of Irrigation and Drainage (DID) has put forth a new paradigm in dealing with the flooding issue - that is implementing Environment Friendly Drainage Design Manual (MSMA in Malaysia language) which advocate 'control at source' concept or zero increase in flood peak flow in the receiving river and it also deal with water quality issue to a certain extent. With MSMA, the 'demand management' approach has now being turned around and becomes 'supply management' of excess flood flow due to urbanisation process. However, it must be acknowledged that effective implementation of MSMA on the ground remains a big challenge for the government.

Due to enormously high cost required to implement structural flood mitigation projects and limited annual budget availability, other non-structural initiatives like improving flood warning and forecasting facilities, public outreach program and flood proofing options are being propagated in parallel. There are also R&D efforts being carried out related to this aspect to improve the understanding and enhancement of drainage engineering practices in dealing with flood, in particular some of the elements advocated in MSMA.

It has been an increasing trend that urban community is demanding for a more conducive urban environment and living condition, solving urban flash flood alone is a big help but not enough. In short, there is a growing trend and expectation that land-water features, including drainage infrastructures such as rivers or major drains and detention ponds, parks, landscape and other recreational facilities have to be blended into the urban planning and development to enhance its ecstatic value and providing more liveable environment, such as being witnessed in Cheong-gye-Cheon River of Korea and Kallang River of Singapore. Malaysia now is actively pursuing a similar ambition for Klang River in Kuala Lumpur down town with the "River of Life (RoL) project under the Greater KL NKEA." This is a bigger challenge.