SM ART’s Flood Detection System

A sophisticated and modern Flood Detection System (FDS) provides real-time flood forecasting information. This enables the efficient and safe management at the operation of the tunnel. The SMART FDS Modeling System is comprised of hydrological and hydrodynamic models, a database and scheduler. The hydrologic rainfall-runoff model provides a warning time for tunnel opening using real-time rainfall information from upper catchments and the surrounding areas to predict stream flows. The hydrographs produced from the rainfall-runoff model are automatically input to the hydrodynamic model. The model is fully integrated using a scheduler program to extract all relevant data for input to the model and run the model in a seamless fashion. The time series manager database interacts with the SCADA system to achieve all data collected from the monitoring sites (refer to figure 2).

The SMART Tunnel will be one of the Technical Visits of the 37th IAHR World Congress in Kuala Lumpur!
Based on the predicted hydrograph from the hydrologic model and measured data such as water level, flows and control gate position from the field, the hydraulic modeling components of the FDS predicts flood level and discharges within the SMART system and the surrounding rivers, and also predicts SMART control gate and pump operation. The predictions provide information to aid the tunnel operators in decision making regarding the operation of the SMART system. One hydraulic model is used in the FDS which encompasses both the hindcast and forecast components of the hydraulic model. The model automatically switches from hindcast operation to forecast operation based on a trigger contained in a time-series file which is generated by the FDS. For hindcast operation the model uses measured flows and gate levels up to the “now” time. For forecasting the model uses the forecast flood hydrographs and the SMART gate and pump operation rules.

Event Statistics – 272 Diversion Events until December 2015

Since SMART establishment, there had been 272 heavy rainfall events and flood water diversion operations from July 2007 until December 2015. Five (5) of the events were major flood events and the system was operated under Mode IV of SMART’s Standard Operation Procedure.

SMART Has Successfully Performed Under Design Storm Situation

The largest storm event occurred on March 7, 2012. One of the gauging stations in the Ampang River catchment recorded very high rainfall, 227 mm in 4 hours which exceeds the 100 year Average Recurrence Interval (ARI). The Klang River catchment recorded rainfall of 111 mm which is close to the 100 year ARI. The average rainfall for the overall SMART’s catchment was 133 mm as shown in Figure 7.

The maximum Flow at the confluence of Klang River and Ampang River reached 475 m³/s when the flood water was diverted into the holding pond. A total volume of 3.3 Million cubic meters of floodwater was successfully diverted through the SMART structures. Klang River in the city center was overtopped by only 15 cm for 27 minutes during the major storm event.

SMART has successfully performed under design storm conditions and saved millions in flood damage costs, thus serving its purpose in reducing stormwater that flow through the city center. SMART is only one part of the Kuala Lumpur flood mitigation program and operates together with the other programs to reduce flood risk in Kuala Lumpur.

References:

Based on the predicted hydrograph from the hydrologic model and measured data such as water level, flows and control gate position from the field, the hydraulic modeling components of the FDS predicts flood level and discharges within the SMART system and the surrounding rivers, and also predicts SMART control gate and pump operation. The predictions provide information to aid the tunnel operators in decision making regarding the operation of the SMART system. One hydraulic model is used in the FDS which encompasses both the hindcast and forecast components of the hydraulic model. The model automatically switches from hindcast operation to forecast operation based on a trigger contained in a time-series file which is generated by the FDS. For hindcast operation the model uses measured flows and gate levels up to the “now” time. For forecasting the model uses the forecast flood hydrographs and the SMART gate and pump operation rules.

Event Statistics – 272 Diversion Events until December 2015

Since SMART establishment, there had been 272 heavy rainfall events and flood water diversion operations from July 2007 until December 2015. Five (5) of the events were major flood events and the system was operated under Mode IV of SMART’s Standard Operation Procedure.

SMART Has Successfully Performed Under Design Storm Situation

The largest storm event occurred on March 7, 2012. One of the gauging stations in the Ampang River catchment recorded very high rainfall, 227 mm in 4 hours which exceeds the 100 year Average Recurrence Interval (ARI). The Klang River catchment recorded rainfall of 111 mm which is close to the 100 year ARI. The average rainfall for the overall SMART’s catchment was 133 mm as shown in Figure 7.

The maximum Flow at the confluence of Klang River and Ampang River reached 475 m³/s when the flood water was diverted into the holding pond. A total volume of 3.3 Million cubic meters of floodwater was successfully diverted through the SMART structures. Klang River in the city center was overtopped by only 15 cm for 27 minutes during the major storm event.

SMART has successfully performed under design storm conditions and saved millions in flood damage costs, thus serving its purpose in reducing stormwater that flow through the city center. SMART is only one part of the Kuala Lumpur flood mitigation program and operates together with the other programs to reduce flood risk in Kuala Lumpur.

References:

Based on the predicted hydrograph from the hydrologic model and measured data such as water level, flows and control gate position from the field, the hydraulic modeling components of the FDS predicts flood level and discharges within the SMART system and the surrounding rivers, and also predicts SMART control gate and pump operation. The predictions provide information to aid the tunnel operators in decision making regarding the operation of the SMART system. One hydraulic model is used in the FDS which encompasses both the hindcast and forecast components of the hydraulic model. The model automatically switches from hindcast operation to forecast operation based on a trigger contained in a time-series file which is generated by the FDS. For hindcast operation the model uses measured flows and gate levels up to the “now” time. For forecasting the model uses the forecast flood hydrographs and the SMART gate and pump operation rules.

Event Statistics – 272 Diversion Events until December 2015

Since SMART establishment, there had been 272 heavy rainfall events and flood water diversion operations from July 2007 until December 2015. Five (5) of the events were major flood events and the system was operated under Mode IV of SMART’s Standard Operation Procedure.

SMART Has Successfully Performed Under Design Storm Situation

The largest storm event occurred on March 7, 2012. One of the gauging stations in the Ampang River catchment recorded very high rainfall, 227 mm in 4 hours which exceeds the 100 year Average Recurrence Interval (ARI). The Klang River catchment recorded rainfall of 111 mm which is close to the 100 year ARI. The average rainfall for the overall SMART’s catchment was 133 mm as shown in Figure 7.

The maximum Flow at the confluence of Klang River and Ampang River reached 475 m³/s when the flood water was diverted into the holding pond. A total volume of 3.3 Million cubic meters of floodwater was successfully diverted through the SMART structures. Klang River in the city center was overtopped by only 15 cm for 27 minutes during the major storm event.

SMART has successfully performed under design storm conditions and saved millions in flood damage costs, thus serving its purpose in reducing stormwater that flow through the city center. SMART is only one part of the Kuala Lumpur flood mitigation program and operates together with the other programs to reduce flood risk in Kuala Lumpur.

References:

Based on the predicted hydrograph from the hydrologic model and measured data such as water level, flows and control gate position from the field, the hydraulic modeling components of the FDS predicts flood level and discharges within the SMART system and the surrounding rivers, and also predicts SMART control gate and pump operation. The predictions provide information to aid the tunnel operators in decision making regarding the operation of the SMART system. One hydraulic model is used in the FDS which encompasses both the hindcast and forecast components of the hydraulic model. The model automatically switches from hindcast operation to forecast operation based on a trigger contained in a time-series file which is generated by the FDS. For hindcast operation the model uses measured flows and gate levels up to the “now” time. For forecasting the model uses the forecast flood hydrographs and the SMART gate and pump operation rules.

Event Statistics – 272 Diversion Events until December 2015

Since SMART establishment, there had been 272 heavy rainfall events and flood water diversion operations from July 2007 until December 2015. Five (5) of the events were major flood events and the system was operated under Mode IV of SMART’s Standard Operation Procedure.

SMART Has Successfully Performed Under Design Storm Situation

The largest storm event occurred on March 7, 2012. One of the gauging stations in the Ampang River catchment recorded very high rainfall, 227 mm in 4 hours which exceeds the 100 year Average Recurrence Interval (ARI). The Klang River catchment recorded rainfall of 111 mm which is close to the 100 year ARI. The average rainfall for the overall SMART’s catchment was 133 mm as shown in Figure 7.

The maximum Flow at the confluence of Klang River and Ampang River reached 475 m³/s when the flood water was diverted into the holding pond. A total volume of 3.3 Million cubic meters of floodwater was successfully diverted through the SMART structures. Klang River in the city center was overtopped by only 15 cm for 27 minutes during the major storm event.

SMART has successfully performed under design storm conditions and saved millions in flood damage costs, thus serving its purpose in reducing stormwater that flow through the city center. SMART is only one part of the Kuala Lumpur flood mitigation program and operates together with the other programs to reduce flood risk in Kuala Lumpur.

References:
Advance Fluid Measurement
Provide a complete solution to the deep research of fluid mechanics

Large area surface flow field measurement system

- **Sky Canopy**
  Super large scale measurement based on Internet of Things technology
- **Sky Eye**
  Rapid surface measurement with unmanned aerial vehicle

@ADV
The first wireless Velocimeter Created in China
Wireless transmission
Sufficient battery life
Multiple point synchronous measurement

📞 +86-10-62988330  🌐 www.sinfotek.com  🌐 sinfotek@126.com