

RD1109 - Application of Weather Forecast and Local Rainfall Data in Optimizing the Control Philosophy of Shuen Wan Drainage Improvement Works

Executive Summary

In order to allow more ingress of seawater into Wai Ha River during high tide and sunny weather, a study was carried out to review the control levels of penstock at estuary of Wai Ha River and to explore the feasibility of optimizing its daily operation. The original penstock operation depends solely on tide levels, disregarding the weather conditions. An optimization scheme is proposed to incorporate weather forecast and real-time rainfall measurement in determining an appropriate operation mode.

Since there would be much less rainfall intensity and volume under dry season, the required flood storage capacity can be lessened and the penstock is allowed to close at a higher tide level without causing flooding to nearby villages. The optimization scheme is proposed to be operated under two different seasonal modes, namely Winter Mode (from December to February) and Normal Mode (from March to November).

The Winter Mode is designed to be independent of weather condition and the penstocks would be triggered by a higher tide level.

Regarding the Normal Mode to be in force from March to November in each year, the penstock would be operated in accordance with three pre-defined sub-modes, namely Normal Sunny, Normal Rainy (Dry), and Normal Rainy (Wet) under different weather conditions. The weather condition would be defined by the weather forecasting elements (i.e. Weather Warning Signals and SWIRLS Nowcasting System) and real-time rainfall measurement and the penstock would be closed at the respective water level based on the pre-defined sub-modes.

Site trial and hydraulic model simulation were conducted to assess and verify the potential flood risk caused by the proposed optimization scheme. Based on the findings, the appropriate combination of penstock trigger levels and stop log levels under the recommended operation mode could safeguard Tung Tsz Road from flooding.

The proposed management and maintenance schedule for the ancillary facilities of the proposed optimization scheme was also discussed. The management and maintenance responsibilities of the existing stop log and penstock system at the estuary of Wai Ha River remained unchanged.