THESIS

MODELING THE PERFORMANCE OF SURFACE DRAIN UNDER HIGH RAINFALL CONDITION

TAYYBA SEEMAB
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ABSTARCT

Surface drains are provided to evacuate rainfall excess. If the excess water does not flow out of the area it will cause ponding, posing threat to life and property. Normally drains are designed for capacity enough to handle runoff resulting from average rainfall and thus to reduce frequent occurring damages. However drains may not provide full protection against large flows and damages for rare rainfall events. This study was conducted with the objective to find inundation of the drain for a 25-year frequency rainstorm for a selected drain (Paharang Main Drain).

The hydrologic and hydraulic performance of the main drain was evaluated by using HEC-HMS and HEC-RAS models. Flow hydrographs were generated for all the inlets along the drain and for all drain reaches, inlets and tributary drains by HEC-HMS model. The drain flows were simulated for 5-year and 25-year rainfall storms. The peak flows of 700 and 3400 cusecs were found for 5-year and 25-year frequency rainstorms respectively. Performance of the drain was analyzed in terms of water surface levels and inundation depth (above N.S.L) at different points of the drain for present designed cross sections. It was observed that drain will remain inundated for 3 days and the areas adjacent to the drain will be under water up to 3 ft depth. This long time inundation will cause problem for the people and damages to their lives, properties as well as for agricultural crops. Sensitive crops will be completely damaged causing the farmers a big loss.

From the results of the study it was concluded that large part of the area adjacent to paharang main drain is likely to become inundated under severe rainfall of 25 ± years or higher return periods. The duration of inundation may be up to 3 days.