



Development of cloud-operating platform for detention facility design

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In the past 20 years, the population of Taiwan has accumulated in urban areas. The land development has changed the hydrological environment and resulted in the increase of surface runoff and shortened the time to peak discharge. The change of runoff characteristics increases the flood risk and reduces resilient ability of the city during flood. Considering that engineering measures may not be easy to implement in populated cities, detention facilities set on building basements have been proposed to compromise the increase of surface runoff resulting from development activities. In this study, a web-based operational platform has been developed to integrate the GIS technologies, hydrological analyses, as well as relevant regulations for the design of detention facilities. The design procedure embedded in the system includes a prior selection of type and size of the detention facility, integrated hydrological analysis for the developing site, and inspection of relevant regulations. After login the platform, designers can access the system database to retrieve road maps, land use coverages, and storm sewer information. Once the type, size, inlet, and outlet of the detention facility are assigned, the system can acquire the rainfall intensity-duration-frequency information from adjacent rain gauges to perform hydrological analyses for the developing site. The increase of the runoff volume due to the development and the reduction of the outflow peak through the construction of the detention facility can be estimated. The outflow peak at the target site is then checked with relevant regulations to confirm the suitability of the detention facility design. The proposed web-based platform can provide a concise layout of the detention facility and the drainageway of the developing site on a graphical interface. The design information can also be delivered directly through a web link to authorities for inspecting to simplify the complex administrative procedures.