

UPGRADING NEW ORLEANS TO A SPONGE CITY TO REDUCE FLOOD RISK USING REMOTE SENSING ASSESSMENT

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Abstract: Sponge city is a new concept has been aroused to solve the increasingly serious flooding issues in recent years. Sponge city means the ecosystem acts like a sponge, storing rain water during the rainy season and releasing in the dry season. To achieve this, one method is to replace the traditional impervious pavement with permeable pavement. Instead of the original soil surface, many cities in the urban construction, used cement, asphalt, concrete and other closed surface. Rain infiltrates from the permeable pavement to the ground, can refill groundwater resources, reduce runoff coefficient of surface and reduce peak flow and burden of rainwater drain system. Impervious surfaces area such as asphalt and concrete were identified in the city of New Orleans, using remote sensing satellite images. It led to estimate the area of impervious surfaces which were possibly changeable to permeable surfaces. Theoretically replacement of impervious surfaces with permeable surfaces (considering 30, 60 and 100 percent of total selected area) changed the runoff coefficient. Moreover, using precipitation data with the return period of 20 and 100 years, flood models were run for highly vulnerable flood-prone area. The obtained flood models were compared to the recorded flood data with the same return period. All findings showed that optimization design of pavement based on the concept of sponge city can reduce runoff coefficient, reduce runoff and effectively improve the pavement safety.

Key Words: sponge city, flood, remote sensing, permeable pavement