

INTISARI

Bandara baru *Yogyakarta International Airport* (YIA) menjadi salah satu proyek strategis nasional dan berpotensi mendukung pengembangan kawasan Aerotropolis disekitar bandara. Berlokasi di pesisir pantai selatan D.I. Yogyakarta disertai keberadaan sungai dan sistem drainase di hulu bandara, banjir menjadi ancaman bagi kawasan Aerotropolis dan *Yogyakarta International Airport*. Penelitian ini bertujuan menginvestigasi dan memodelkan kinerja sistem pengendalian banjir eksisting dan opsi pengendalian banjir di kawasan Aerotropolis.

Investigasi penyebab genangan banjir dilakukan melalui studi literatur dan survei lapangan. Survei bertujuan untuk mengamati saluran eksisting dan mengumpulkan informasi terkait kejadian banjir. HEC-RAS 4.1 digunakan untuk memodelkan hidraulika banjir. Pemodelan dilakukan secara tak permanen (*unsteady*) dan dilengkapi dengan bangunan melintang saluran. Pengendalian banjir disesuaikan dengan tingkat kerentanan banjir masing-masing saluran.

Hasil simulasi menunjukkan bahwa penyebab utama banjir di sistem drainase kawasan Aerotropolis YIA adalah pengaruh muka air Sungai Serang dan Sungai Bogowonto, kondisi alur saluran, dan beban aliran drainase. Tinggi genangan banjir di kawasan ini adalah 0.5-1 m dan durasi genangan rerata adalah 1 hari. Upaya pengendalian banjir yang disimulasikan dalam penelitian ini adalah normalisasi dan penempatan tanggul. Normalisasi diimplementasikan di saluran yang meluap. Tanggul ditambahkan di bagian-bagian tertentu. Tinggi muka air banjir sebelum dan sesudah normalisasi dan pemberian tanggul tidak menurun secara signifikan akibat *backwater* dari hilir. Saluran yang tetap meluap setelah dinormalisasi dan pemberian tanggul memerlukan penanganan lain seperti kolam retensi maupun *long storage*. Beberapa bagian bangunan melintang saluran memerlukan rehabilitasi agar dapat berfungsi secara optimal.

Kata kunci: Aerotropolis, banjir, drainase, pemodelan, hidraulika, HEC-RAS

ABSTRACT

The New Yogyakarta International Airport has become one of Indonesia's National strategic projects and potentially supports the development of the Aerotropolis area around the airport. Located on the southern coast of Yogyakarta with rivers and drainage systems at the airport's upstream, flooding can be a threat to the Aerotropolis area and the Yogyakarta International Airport. This research aims to investigate and model the flood review of the existing design of the flood control system of the Aerotropolis area and find out the possible option of flood control in the area.

The flood inundation investigation was carried out through a literature study from previous studies and a field survey. The survey aims to identify the existing conditions and gain information related to flood events. The one-dimensional HEC-RAS was used to simulate the flood hydraulics and its control. It was modelled using unsteady flow analysis and equipped with inline structures. Alternative flood control at each flood-prone area was adjusted to the level of flooding risk in the area.

Based on the simulation results, the dominant cause of flooding in the Yogyakarta International Airport Aerotropolis area drainage system is the effect of the water surface level at the Serang River and the Bogowonto river, the channel conditions, and drainage flow discharge. The inundation height occurred about 0.5-1 m, while the average inundation duration was a day. Flood control applied in this research divided into the normalization and implementation of a levee. Normalization was implemented on an overflow channel, while a levee was put on certain parts where needed. The surface water level before and after normalization and use of a levee did not decrease significantly due to backwater from downstream. Channels that overflow after flood handling require other treatments, such as retarding basin or long-storage. Some parts of inline structures require rehabilitation to function optimally.

Keywords: Aerotropolis, flood, drainage, modelling, hydraulic, HEC-RAS