

INTISARI

Indonesia merupakan negara kepulauan yang sebagian besar wilayahnya adalah perairan. Selain laut, Indonesia juga memiliki banyak sungai yang melintasi berbagai daerah, salah satu sungai besar di Pulau Jawa adalah Sungai Bogowonto. Sungai Bogowonto memiliki muara sungai menuju Samudera Hindia yang terletak di Desa Jangkaran, Kecamatan Temon, Kabupaten Kulon Progo, Daerah Istimewa Yogyakarta.

Sejak dibangunnya *Yogyakarta International Airport* atau Bandara YIA, kondisi fisik, morfologi, dan kapasitas pada Sungai Bogowonto mendapatkan dampak yang besar. Khususnya masalah kenaikan muka air banjir pada Sungai Bogowonto yang menyebabkan banjir pada Sungai Carik dan daerah sekitarnya. Untuk menyelesaikan permasalahan tersebut, maka dibangunlah *Jetty* Pengaman Muara Sungai Bogowonto.

Pembangunan *Jetty* Pengaman Muara Sungai Bogowonto berfungsi sebagai pengendali banjir di KSN YIA. Selain dibangun *jetty*, dibangun pula tanggul muara sungai sisi Timur sepanjang 258,5 meter. Saat pelaksanaan pembangunan tanggul, terdapat permasalahan yaitu tergulingnya blok beton penyusun badan tanggul. Hal ini disebabkan oleh metode konstruksi yang tidak sesuai desain awal, yaitu tidak memasang kaki tanggul blok beton yang seharusnya dapat menahan badan tanggul dari gerusan. Selain karena metode konstruksi yang tidak sesuai dan terjadi gerusan pada dasar sungai, faktor lain yang menyebabkan keruntuhan yaitu berat sendiri blok beton sebesar 10 Ton/meter STA, serta beban *Crawler Crane* yang melintas sebesar 42,46 kN/m². Atas permasalahan yang terjadi, maka dilakukan re-desain. Maka selanjutnya dilakukan analisis stabilitas tanah saat kondisi eksisting dan pada saat dilakukan redesain menggunakan turap CCSP (*Corrugated Concrete Sheet Pile*). Analisis yang dilakukan yaitu dengan memperhitungkan stabilitas tanah menggunakan software Plaxis V.21 pada kondisi perencanaan eksisting dan kondisi setelah perubahan desain, kemudian hasil dari nilai *safety factor* dari dua kondisi dilakukan perbandingan nilai *safety factor* nya. Nilai *safety factor* pada kondisi eksisting yaitu 0,722 dikategorikan terjadi runtuh karena nilai $SF < 1$, dan pada kondisi re desain dengan nilai SF 2,026 yang dikategorikan aman karena nilai $SF > 1$. Setelah dilakukan analisis stabilitas kemudian hasil permodelan gulingan divisualisasi secara 3 Dimensi menggunakan software *SketchUp* dan di render menggunakan *Lumion 11.5*.

Kata kunci : Tanggul Muara Sungai, Keruntuhan, Stabilitas Tanah, *Corrugated Concrete Sheet Pile (CCSP)*, *Building Information Modelling (BIM)*.

ABSTRACT

Indonesia is an archipelagic country where most of its territory is water. Apart from the sea, Indonesia also has many rivers that cross various regions, one of the major rivers on the island of Java is the Bogowonto River. The Bogowonto River has an estuary to the Indian Ocean which is located in Jangkaran Village, Temon District, Kulon Progo Regency, Special Region of Yogyakarta.

Since the construction of Yogyakarta International Airport or YIA Airport, the physical condition, morphology and capacity of the Bogowonto River have had a major impact. In particular, the problem of rising flood water levels on the Bogowonto River which causes flooding on the Carik River and the surrounding area. To solve this problem, the Bogowonto River Estuary Safety Jetty was built.

Construction of the Bogowonto River Estuary Safety Jetty to function as flood control at KSN YIA. In addition to the construction of the jetty, an embankment on the east side of the river was also built which was 258.5 meters long. During the construction of the embankment, there was a problem, namely the overturning of the concrete blocks that make up the body of the embankment. This was caused by the construction method that was not in accordance with the initial design, namely not installing concrete block foot embankments that should be able to withstand the body of the embankment from being scoured. Apart from the inappropriate construction method and scour on the river bed, other factors that caused the collapse were the concrete block's own weight of 10 tons/meter STA, and the load of the crawler crane that passed by 42.46 kN/m². For the problems that occur, a re-design is carried out. Then the analysis of soil stability was carried out when the existing conditions were carried out and when redesigned using CCSP (Corrugated Concrete Sheet Pile) sheet piles. The analysis was carried out by taking into account soil stability using Plaxis V.21 software in the existing planning conditions and conditions after design changes, then the results of the safety factor values of the two conditions were compared to the safety factor values. The safety factor value in the existing condition is 0.722 which is categorized as a collapse because the SF value <1, and in the re-design condition with an SF value of 2.026 which is categorized as safe because the value of SF > 1. After the stability analysis was carried out, the roll modeling results were visualized in 3 dimensions using the SketchUp software and rendered using Lumion 11.5.

Keywords : River Estuary Embankment, Collapse, Soil Stabily, Corrugated Concrete Sheet Pile (CCSP), Building Information Modelling (BIM).