

Handling Damage to the Glendeng Bridge Abutment in Tuban Regency

Authors : Alfanditya Ghazanfar

Abstract : The damage to the Glendeng Bridge on November 3, 2020, involved a landslide on the retaining wall of the approach road in the Tuban Regency area, suspected to be caused by erosion of the Bengawan Solo River. Subsequently, the bridge pillars experienced shifts, leading to the settlement of the bridge's superstructure (steel frame). This study aims to evaluate and identify the causes of abutment damage to develop a protection system to prevent future abutment failures. The methodology for this case study includes inventorying secondary data such as cone penetration test data, machine boring data, topographic measurements, and water surface elevation data, followed by data interpretation to analyze the damage. The interpretation activities include soil data, water surface elevation data, and slope stability analysis using PLAXIS software to obtain the Factor of Safety (FoS) values in evaluating the damage to the existing abutment. Based on the analysis of slope stability using PLAXIS software, it was found that in 2020, under pre-flood conditions (Low Water Level - LWL), the operational load stage yielded a minimum FoS of 1.184. After the flood, during the operational load stage, the condition was classified as "Structural Failure." The cause was soil infiltration during water levels reaching the LWL; soil submerged in floodwater experienced landslides as it became saturated upon water recession. In 2021, reinforcement efforts produced a minimum FoS of 1.097 during the construction stage due to the inability of the retaining wall foundation, placed in soft soil, to support the embankment load. The 2022 reinforcement evaluation yielded a minimum FoS of 1.8, categorized as "safe" due to rehabilitation measures, including extending the span and installing 48-meter-deep foundations to reach hard soil layers.

Keywords : slope stability, abutment damage, bridge abutment, bridge

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