

DRONE-ASSISTED INFRASTRUCTURE MONITORING FOR ROAD AND BRIDGE PLANNING OF BINALBAGAN-BAGACAY BRIDGE IN HINIGARAN, NEGROS OCCIDENTAL

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ABSTRACT

The growing demand for accurate and efficient infrastructure assessment has accelerated the adoption of drone-assisted surveying in transportation planning. This study evaluated the application of drone-assisted LiDAR technology in assessing the proposed Binalbagan–Bagacay Bridge in Hinigaran, Negros Occidental. Specifically, it assessed the bridge's physical condition and surrounding land-use characteristics, identified infrastructure vulnerabilities and spatial constraints, and developed planning recommendations using drone-derived geospatial data. A qualitative case study approach was employed through interviews and focus group discussions with geodetic and civil engineers involved in the survey. Spatial data were acquired using a DJI M350 LiDAR drone and processed using DJI Terra, CloudCompare, and AutoCAD Civil 3D. Results showed that the bridge's deteriorated steel truss members have significantly reduced its structural serviceability, while the surrounding terrain, riverbanks, and connecting roadway remain suitable for bridge replacement. The study also identified limitations of drone-assisted LiDAR in assessing submerged riverbeds and concealed structural components, indicating the need for complementary engineering investigations. Overall, the findings demonstrate that drone-assisted LiDAR provides accurate and timely geospatial information that supports evidence-based infrastructure assessment, planning, and decision-making for the development of safe, resilient, and sustainable road and bridge projects.

Keywords: Drone-assisted LiDAR; UAV; Bridge Assessment; Infrastructure Planning; Geospatial Analysis; Road and Bridge Planning.