Towards an Outcome-Based Policy Framework: Linking Construction Implementation Factors to Disaster Resilience of DPWH Road Projects in Dinagat, Island, Philippines

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Abstract

This study investigates the construction implementation factors that influence the disaster resilience of road infrastructure projects in the Province of Dinagat Islands, Philippines, a geographically vulnerable area frequently exposed to typhoons, heavy rainfall, flooding, landslides, and other climate-related hazards. Recognizing the critical role of resilient transportation networks in ensuring public safety, economic continuity, and post-disaster recovery, the study examines key construction implementation variables, including the quality of construction materials, adherence to construction standards and regulatory requirements, contractor and workforce performance, schedule adherence and project management efficiency, and the integration of technology and innovation in infrastructure development. These factors were analyzed in relation to disaster resilience outcomes such as structural integrity, operational continuity, recovery efficiency, accessibility and mobility, community connectivity, and long-term infrastructure sustainability. The study employed a descriptive-correlational research design to determine the relationships between construction implementation factors and disaster resilience outcomes. Data were gathered from engineers, contractors, project managers, local government officials, and other stakeholders involved in Department of Public Works and Highways (DPWH) road infrastructure projects in Dinagat Islands through a structured survey questionnaire. Descriptive and inferential statistical tools were utilized to assess the extent of implementation and determine the significance of the relationships among the study variables. Findings reveal that the use of high-quality construction materials, strict compliance with engineering standards and government regulations, competent contractor and workforce performance, effective project scheduling, and the adoption of innovative technologies significantly contribute to improving the disaster resilience of road infrastructure projects. These factors enhance structural durability, reduce infrastructure vulnerability, facilitate faster recovery following disaster events, and strengthen the capacity of road networks to withstand environmental stresses. Moreover, the results underscore the importance of integrating resilience considerations throughout the construction process to achieve sustainable infrastructure development. Based on the findings, the study proposes an outcome-based policy framework that promotes resilient construction practices, institutional accountability, technological advancement, and climate-adaptive infrastructure planning. The framework aims to guide policymakers, infrastructure agencies, and project implementers in strengthening disaster-resilient road networks that support economic growth, social connectivity, environmental sustainability, and community resilience in disaster-prone regions.

Keywords: disaster-resilient infrastructure, construction implementation, road infrastructure resilience, climate-adaptive development, outcome-based policy framework.