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PROMOTE GIS TECHNOLOGY AS A CONTEMPORARY STRATEGY ON DISASTER RESILIENCE ON TRANSPORTATION INFRASTRUCTURE PLANNING AND DEVELOPMENT

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Road and railway infrastructure are frequently damaged or destroyed by the natural disasters such as floods, landslides, cyclones, tsunamis, tornadoes, volcanic eruptions and earthquakes. Wash-off, inundation, embankment damages, debris falls, mud-slides, pothole creation and overwhelm the structures are frequent damages experienced by transportation infrastructure due to natural disasters. Many of the developing countries like Sri Lanka utilize traditional disaster resilience methods such as re-construction, and repairing works that are more reactive in nature, while it is possible to use modern technological tools such as GIS, RS, during the planning and construction stages of the road and railway developments so that proactive approach could be taken. Usually the post disaster resilience practices are used by the developing countries, while the pre resilience practices are tested by the developed countries. Therefore, the GIS technology should be impressed with the planning stage of roads and railways in the developing countries, as a technological disaster resilience strategy, in addition to the traditional "post resilience" practices.

This research is an effort, to determine the suitable hazardless sites and traces of transport infrastructure using GIS tools during planning stages. By using ArcGIS software the feature layers of field attributes, i.e. terrain, morphology, flood and landslide data, land use and other feature layers, are gathered to prepare a Geo database. Then, using the spatial analysis and 3D analysis extension tools of ArcGIS, the feature layers are reclassified into a common scale and superimposed, and surface analysis is carried out to identify the disaster prone areas. Finally, the feature layers are weighted depending on the significance of the consequences to obtain the minimum hazards area and hazardless road / railway routes, as a pre disaster resilience practice on transportation infrastructures.

A case study was carried out to determine the minimum hazardous areas and minimum hazardous rail route, between Ingiriya and Ratnapura for the proposed Kelani Valley railway extension. Minimum hazardous sites were determined within the section under consideration. Three alternative routes were identified, representing different criteria, giving priority to flooding, landslides and Eco-friendliness.

Length of the three alternatives identified is 31.1 km, 30.7 km and 33.3 km respectively, while the crow flying distance is 27.5 km between Ingiriya and Ratnapura. It is proposed to identify the best alternative from the above by considering these as alternatives, in order to consider for detailed feasibility and environmental assessments.

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