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The Framework and Application of Vulnerability Assessment of Reclaimed Land to Typhoon Storm Surge Inundation

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The Framework and Application of Vulnerability Assessment of Reclaimed Land to Typhoon Storm Surge Inundation

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Abstract: The coastal area has naturally attractive to population and industry due to its convenient geographical location and abundant resources. While the coastal area provides geographical advantages and resources for urban development, it also experiencing a dramatically growing vulnerability to natural hazards. For coastal mega-cities like Shanghai, typhoon storm surge presents a significant threat to both infrastructure and populations with relatively high vulnerability. Another fact about Shanghai coastal area is that the reclamation land has grown substantially due to the huge demand of land for further urban development. On the one hand, the reclamation land can alleviate the continuous growth of cities in the process of the rapid expansion of cities. The other side of this is that such extensive reclamation activities require a good sustainable land use plan under climate change scenario, otherwise, it may result in the increasing of vulnerability or even leads to some catastrophic damage. Therefore, this research presents a new method for reclamation planning based on vulnerability assessment to typhoon storm surge inundation. First, typhoon events in the past were simulated to generate the inundation scenarios. Then, the vulnerability of different land use types with a set of hazard-proxies to these inundations was assessed and verified by a new stage-damage curve system. Moreover, the model was run under climate change scenarios to predict the vulnerability to extreme typhoon event in the future. Based on the above vulnerability assessment, this research will provide a planning tool for reclamation.

Keywords: Typhoon Storm Surge, Vulnerability Assessment, Reclaimed Land