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Analysis of the Offshore Rigid Frame's Collapse Resistance - Continuous Girder Bridge Based on Time-Varying Fragility

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Introduction

With the increasing severity of earthquake resistance and disaster reduction of offshore bridges, more scholars are paying attention to the impact of ground motion on reinforced concrete structures, particularly the impact of the failure of some components in the original system on the remaining components and the stability of the remaining new system under earthquake which has gradually become an important part of the seismic analysis and evaluation of the bridge structure.

Based on theoretical fragility,investigated the impact of chloride erosion on the seismic performance of an offshore reinforced concrete bridge and obtained the influence of climate change on the durability of an offshore reinforced concrete bridge based on reliability theory, taking into account the acceleration of chloride penetration caused by temperature rise. Slip for the bond.

Based on the bond - slide effect between steel fibre reinforced concrete and corroded steel bar through the central pull-out test in the original state, studied the bond - slip effect of reinforced concrete structure in offshore bridge In terms of collapse analysis, the robustness of a frame structure is determined by the presence of load routes, which are measured in terms of complexity. This reflected the fact that load redistribution should act in the structure in such a way that damage does not result in collapse. Based on, measured the robustness of a frame structure by incorporating deterministic and reliability-based indices, and a code complying RC frame structure was used to demonstrate the applicability of the newly proposed approaches. The majority of current collapse resistance research focuses on the frame structure under static action, whereas the theory and method of collapse resistance analysis of bridge structures has not been thoroughly described in the field of bridge engineering, over the whole life cycle. There are few studies on the impact of time-varying material durability damage and timevarying bond-slip effect on bridge collapse resistance, and how to develop a set of analysis methods and quantitative criteria for bridge collapse resistance under earthquake has become one of the hot topics in bridge engineering seismic research.

To summarise, by considering the coupled effects of time and space, a set of new optimised collapse resistance analysis methods and the quantitative method of collapse resistance robustness index of bridge structures are proposed using a 4-span offshore rigid frame - continuous girder bridge as an example. -variable material durability damage and time -slip impact - changing bond. Seismic damage to a beam bridge is primarily concentrated on the pier and beam bearing; if the beam does not fall, it is rarely damaged, and the likelihood of plastic deformation of the superstructure during an earthquake is low; and the superstructure is typically designed as an elastic component in the seismic design of the bridge.

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