Finite Fault Source Model for Ground Motion near Fault Zone

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Abstract

Ground motion is categorized into near fault zone and across fault zone where impulsive component is included. The impulsive component usually causes larger damage than that by far-fault ground motion. To build a Benchmark model platform for cable-stayed bridges across-fault region for comparative analysis, the paper proposes a way combining the finite fault source model. In the paper, the finite fault source model was conducted based on the site Qiongshan earthquake. After the geological structural parameters were determined, forward modeling of near site earthquake was carried out, and the observation points were obtained using numerical simulation. Then, the analysis results were compared with the pulse characteristic parameters of similar grade of recording ground motion. Additionally, the ground motion near-fault region was analyzed to validate the finite fault source model.

Keywords: finite fault source model; impulsive component; structural parameters; forward modelling; ground motion.

1 Introduction

The earthquake poses a huge threat to bridge safety. During Jiji Earthquake in Taiwan, Beifeng Bridge with three spans across the fault collapsed, and Wuxi Bridge with two spans across the fault collapsed [1]. During Arifiye Earthquake in Kocaeli, Turkey, falling off girders occurred for bridges across the surface fault zone [2]. In the seismic design code for bridges in China, it is required that the site selection of bridges should avoid the main fault zones as far as possible with a long distance [3]. However, the layout of China transportation network will be located in the dense areas of fault

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