Advance Researches in Civil Engineering
ISSN: 2645-7229, Vol.2, No.2, pages: 56-64

Using the Piano Keys Sound as Artificial Accelerations

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(Date of received: 02/04/2020, Date of accepted: 15/05/2020)

ABSTRACT

Today, one of the most important issues in designing of structures is their reliability and functional design. In order to obtain reliability, different parameters of the earthquake history are considered as probabilistic and that their effects on the reliability of the structures. In fact, it is necessary to consider all possible scenarios in the earthquake event in the probability of failure of the structure, which is recorded using natural ground motions. In response to this engineering requirements, the use of simulated artificial earthquake records is one alternative. Therefore the most important point in using artificial records is to use a model that can more effectively capture the effective parameters in earthquake production. In this case, by obtaining uncertainties regarding the efficient parameters in that model, it is possible to produce an accidental earthquake production. In this study, the use of piano keys was applied as an artificial record. To achieve this goal, 6 pieces of a piano-sounded that has an initial landing, up and then secondary landing are selected. To compare the results, the 6 ground motion records of near field with pulse effect and 6 ground motion records of far field for soil type II was extracted from the PEER site . In order to compare the records, the response spectrum and their correlation were used. The results showed that the correlation between the selected artificial records for the far field of faults is more than near field.

Keywords:

Piano keys sound, Artificial acceleration, Response spectrum, Frequency content, Correlation coefficient.