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A high resolution measurement of foreshocks for the prediction of earthquakes

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An accurate prediction of the earthquake will minimize the loss of life, severe injuries and disruption of important services. Generally, before any earthquake, there are foreshocks with hidden signatures of velocity and acceleration which consist of very high frequency spikes super imposed over low frequency waves. It has extremely high instantaneous amplitude variations. Thus, the instantaneous velocity and acceleration become high. The existing low resolution accelerometers and seismometers are unable to register the insight of signatures of these sharp spikes of foreshocks.

In the proposed method a high speed, rotating magnetic field (RMF) is used to sense the variation in the speed of the RMF due to the vibrations. For this purpose, a seismic transducer/accelerometer is coupled with a rotor of synchro transmitter. When there is any vibration, the seismic transducer gives back and forth motion to the rotor of synchro. The RMF generates an output signal at very high frequency in the rotor circuit. Consequently, for every instantaneous movement of rotor (or vibrations), pulses of different width are generated using linear and logic circuits. For this purpose, to simulate the vibrations of ground motions, a microprocessor based controller circuit is used to generate back and forth movements to rotor of synchro, resembling the foreshocks. The output of the measuring circuit gives a broad spectrum of pulses of different width, corresponding to foreshocks, andis recorded by DSO. The proposed technique gives a deep insight of the seismic vibration signature, thus helping in an accurate prediction of large earthquakes

Biography

Syed Javed Arif is pursuing his PhD from Aligarh Muslim University, India. He has published more than 20 papers in reputed journals and conferences, including 5 patents and one paper in IEEE transaction on Instrumentation and Measurement.

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