

CALIBRATION OF THE REEF HORIZONTAL SEISMOGRAPH

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DIGEST

A new horizontal seismograph, having high magnification and excellent initiation of phases, was recently invented by Brother Nicholas Reeff, S.J.

Since the instrument had not been calibrated, only the arrival times of the various seismic phases and the direction of initial motion could be determined from the seismograms. Neither the displacement, velocity, acceleration, and momentum of a particle at the seismograph station, nor the magnitude, energy, and azimuth of an earthquake could be determined.

The Reeff Horizontal Seismograph consists of an inverted pendulum, an electrodynamic, generating system, and galvanometric registration. Because the mass of the pendulum is less than seven kilograms, the reaction of the galvanometer upon the motion of the seismometer must be considered to obtain a meaningful calibration.

The necessity of considering reaction in the calibration procedure of electromagnetic seismographs having a pendulum mass of less than seven kilograms has resulted in the majority of such instruments remaining uncalibrated. Fortunately, the recent work of Eaton* has developed the theory of the calibration

*Eaton, J.P., "Theory of the Electromagnetic Seismograph, Bulletin of the Seismological Society of America, in press.

procedures for three adjustments of an electromagnetic seismograph considering galvanometer reaction.

Therefore, the present work has:

1. Modified the first adjustment suggested by Eaton to provide a procedure for calibrating the Reef Horizontal Seismograph.
2. Applied the developed calibration procedure to a specific instrument. The maximum magnification for the seismograph which had the free periods of the seismometer and galvanometer equal to 1.92 seconds was found to be 5050 for seismic waves having a period of 1.90 seconds.

Since this is a completely new style of seismograph, the history, construction and theory of the instrument have been briefly developed also.