



Sharif University of Technology

Department of Civil Engineering
Earthquake Engineering Research Center

COPY

Copyright © 2003 – 2007 [secty](#)electronics. Alle Rechte vorbehalten.

Evaluation of Recorded Data in Dynamic Vibration

Test of Secty Life Patron using Shaking Table

Project Director: Dr. Ali Bakhshi

Research Engineers: M.R. Moradi-Moghaddam and S. Eghbali

January 2006

INTRODUCTION:

Ground vibrations during an earthquake can severely damage structures and equipment housed in them. In spite of improved building security measures through earthquake resistant construction, thousands of people die in big earthquakes due to collapsing buildings and fire infernos caused by ruptured gas pipes and live high voltage wires. Therefore, if earthquake could be recognized a few second before its strong excitation, some of the disasters might be prevented.

Seismic waves are distinguished between primary waves and secondary waves. Since the body wave propagates faster, the primary wave reaches the location of the system a few seconds depending on distance. The secondary wave follows after a time delay. The period between the arrival of the primary and the secondary wave is the time available for an advance warning for the population and the environment. Secty life electronics, Ltd Co. claim that the device named Secty life patron is basically designed to detect the primary wave.

So security arrangements could be done in the period between the arrival of the primary and the secondary wave.

Copyright © 2003—2007 **secty**electronics. Alle Rechte vorbehalten.

It is well known that one of the best facilities for simulating ground vibration experimentally is shaking table. Therefore it can be used to evaluate Secty Life Patron performance during several real earthquakes. For fulfilling this purpose, Setare Sabze Kahkeshan company has requested providing some seismic tests on Secty Life Patron device, using shaking table of Sharif University of Technology¹. In this report, general feature of the tests, dynamic loading types and test result are demonstrated.

Photograph of Secty Life Patron device installed on the shaking table is shown in Figure-1:

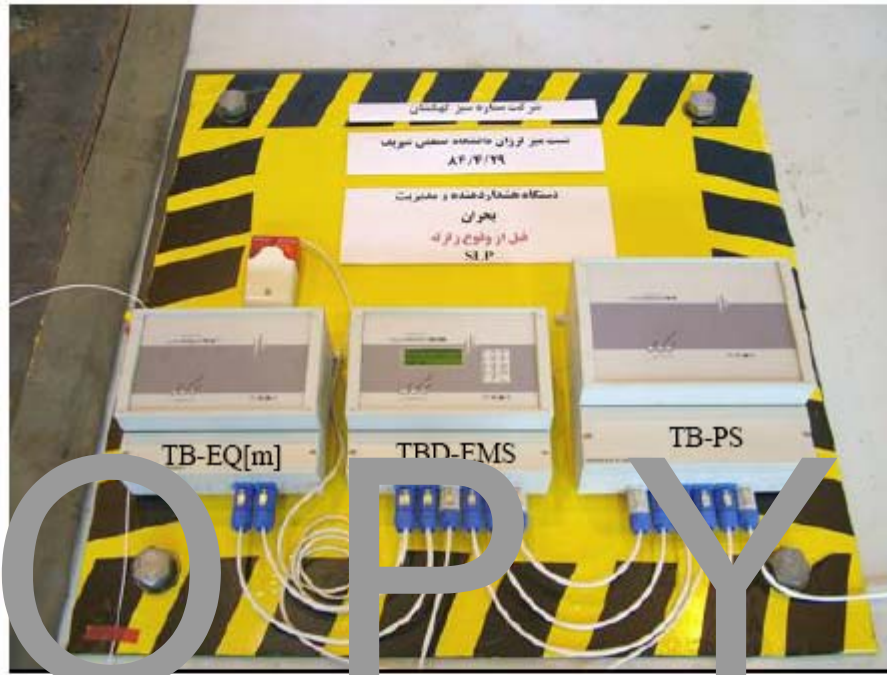


Figure-1: Secty Life Patron installed on shaking table of Sharif university of Technology

Copyright © 2003—2007. [sectyelectronics](#). Alle Rechte vorbehalten.

This equipment consists of the earthquake detector TB-EQ[m] interconnected to the “Energy Management System” TBD-EMS and the power supply unit TB-PS. The three components form the basic units of this system are shown in Figure 1.

Two high-sensitive sensors were used to record the time history acceleration responses of the main device (TB-EQ[m]) during earthquake simulation. Table-1 illustrates layout of the sensors and Figure-1 and 2 shows the location of each sensor on the main device of the Secty Life Patron.



Figure-2: Sensor location on the Secty Life Patron

Copyright © 2003—2007. [sectyelectronics](#). Alle Rechte vorbehalten.

Equipment	Equipment Sensitivity	Input	Output
Secty Life Patron	6	35% Manjil	Input X

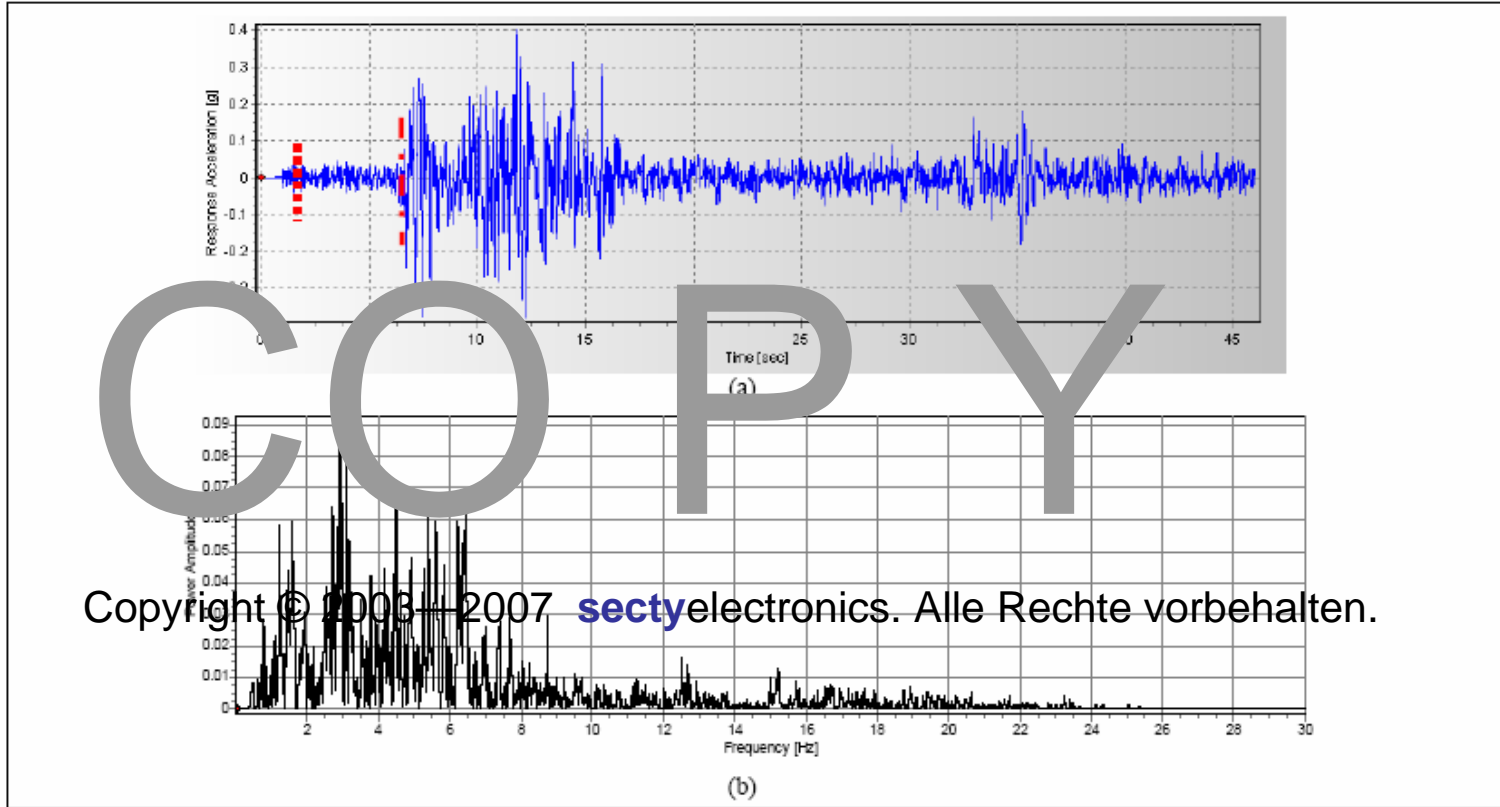


Figure-3: 35 % Manjil earthquake in X direction exerted on SLP with sensitivity equal to 6
(a) Acceleration Response, (b) Power Spectrum