



Test Report

Report No.: S619-DIZ-2014

Client Name: iStarUSA

Client Address: 727 Phillips Drive, City of Industry, CA 91748

Sample Name: Rack

Sample Type: WNE

Sample No.: WNE4212

Sample Quantity: 1 piece

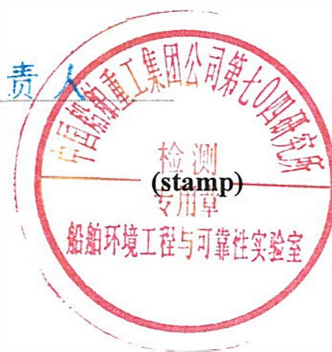
Manufacturer: iStarUSA

Test Item: Seismic Test

Approved by: 

Title: 质量负责人

Approved Date: 2015 Year 2 Month 10 Day



1. Test Basis

Entrusted by _____ iStarUSA _____ the seismic test of their Rack was conducted according to Zone 4 requirement of 5.4.1 “Earthquake Test Methods” in GR-63-CORE 2012 “NEBS™ Requirements: Physical Protection” standard. Through the test, we can ascertain the resonant frequency; examine strength and stiffness of the main frame; verify integrity of the sample.

2. Test Date and Site

Date: Jan 15th 2015、Jan 19th 2015

Site: Reliability Laboratory Mechanical lab building

3. Test Equipments

3.1 Name: ES-5 Vibration Table

Serial No.: 720-652

Period of validity: 2015.5.18

3.2 Name: Accelerometer

No.	Serial No.	Period of validity	Verification Unit
1	0920-636	2015-5-15	Shanghai Institute of Measurement and Testing Technology National Center Measurement and Test for East China
2	0920-637	2015-5-15	
3	0920-639	2015-5-15	
4	0920-640	2015-5-15	

检测工程

4. Test Methods

4.1 Mounting of sample

The sample was mounted on the vibration table by means of a fixture. Two accelerometers were arranged along the direction of vibration at the top of test sample, and 1 displacement sensor at the top of the sample. Mass blocks (600kg) were installed into the rack.



Fig 1 During the test (side-to-side) Fig 2 During the test (front and back)



Fig 3 during the test (vertical)

4.2 Sine sweep test

Perform a swept sine waveform along front-to-back, side-to-side, and vertical axis to ascertain the resonant frequencies of the sample along three axes. The acceleration amplitude is 0.2g, frequency range is 1Hz~50Hz, sweep rate is 1oct/min. The transfer function curves refer to fig 4~fig 6, the resonant frequencies

refer to Tab 1.

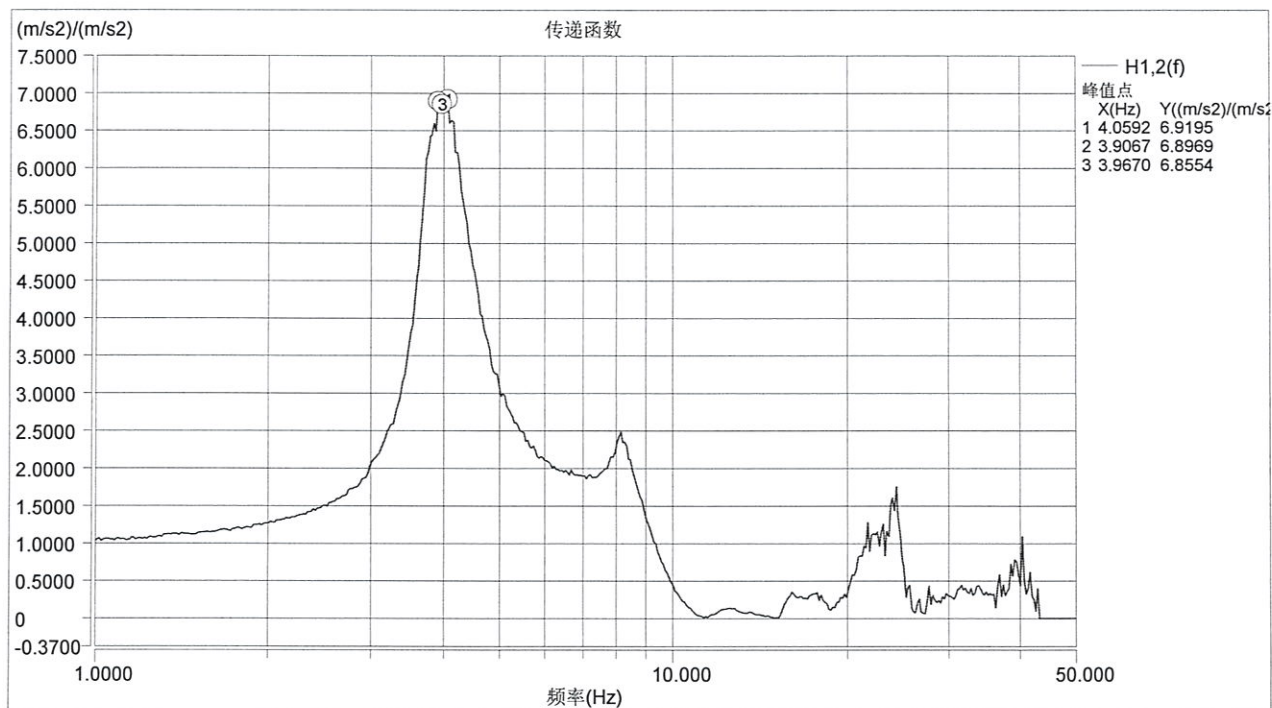


Fig 4 Transfer function curve at side-to-side direction

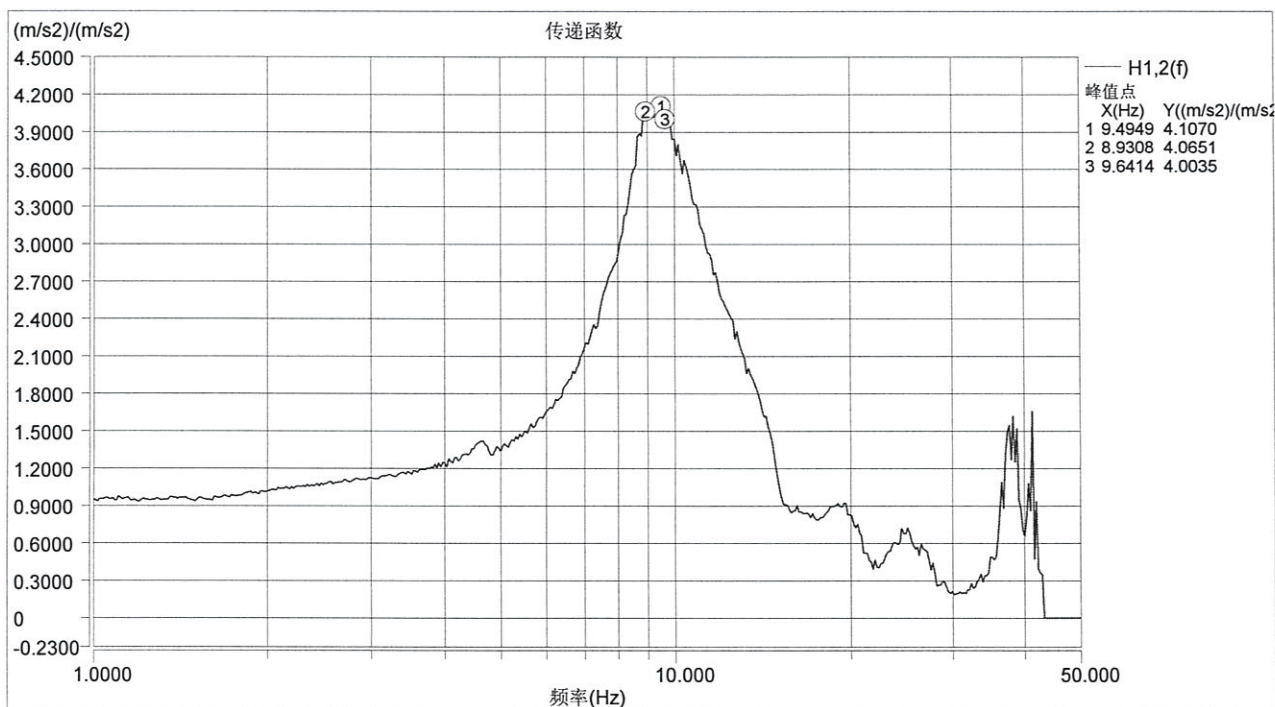


Fig 5 Transfer function curve at front-to-back direction

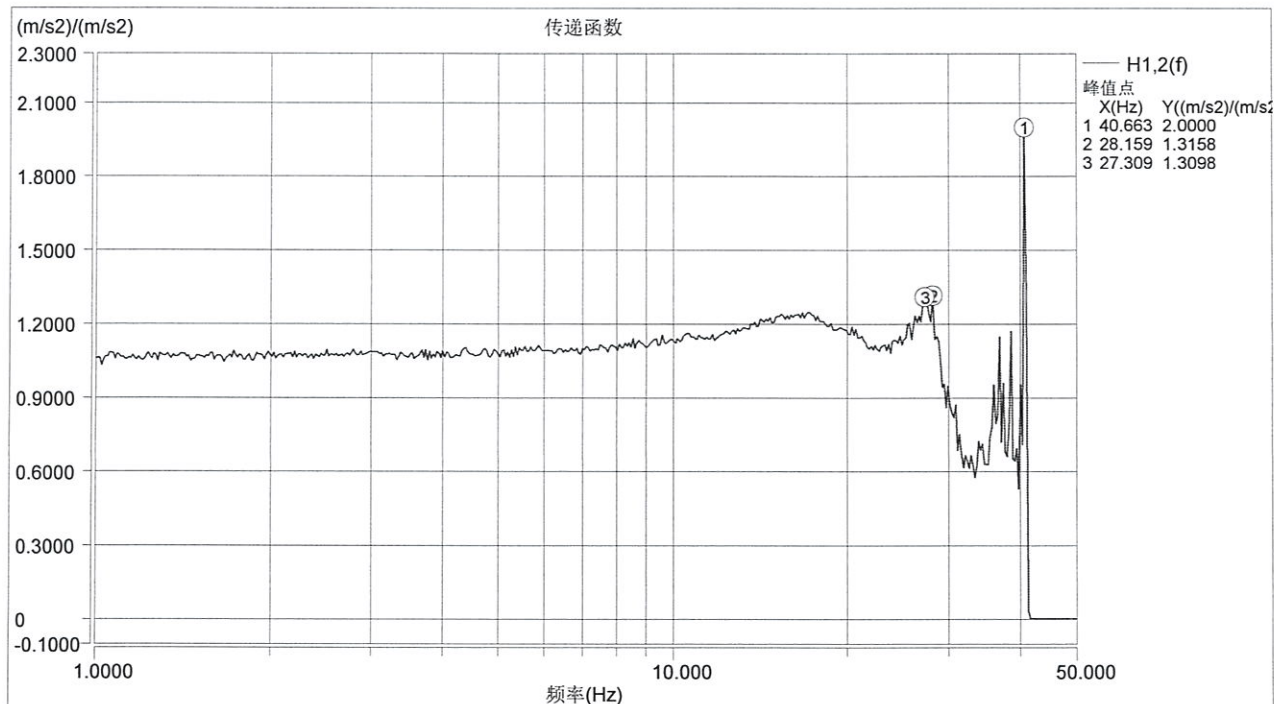


Fig 6 Transfer function curve at vertical direction

Tab 1 Resonant frequencies at each direction of test sample

Axis	1 st Resonant frequency (Hz)
Side-to-side	4.1
Front-to-back	9.5
Vertical	40.7

4.3 Earthquake test

The sample is subjected to earthquake test along 3 axes according to the RRS and waveform of Zone 4 requirement in GR-63-CORE standard. The values of Zone 4 RRS refer to Tab 2. The time history of earthquake lasting for 30s, frequency range is 0.3Hz~50Hz, damping ratio is 2%. The acceleration and displacement waveforms of each measuring points should be recorded. After test of each axis check the integrality of the sample. The response function, waveform of earthquake

test and values of measuring points refer to fig 7~fig 15.

Tab 2 Required Response Spectrum of Earthquake

No.	Frequency (Hz)	Acceleration (g)
1	0.3	0.2
2	0.6	2.0
3	2.0	5.0
4	5.0	5.0
5	15.0	1.6
6	50.0	1.6

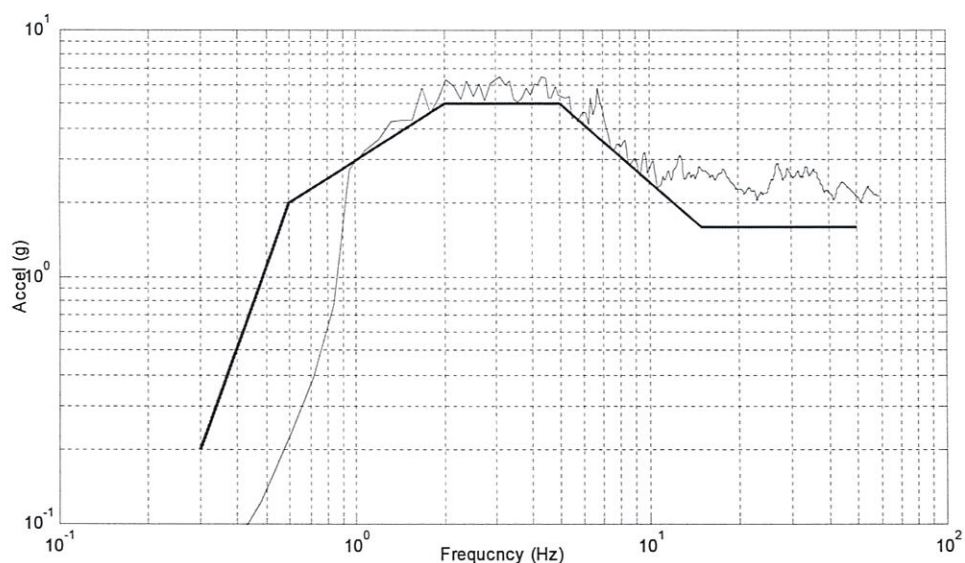


Fig7 TRS Curve of side-to-side Axis

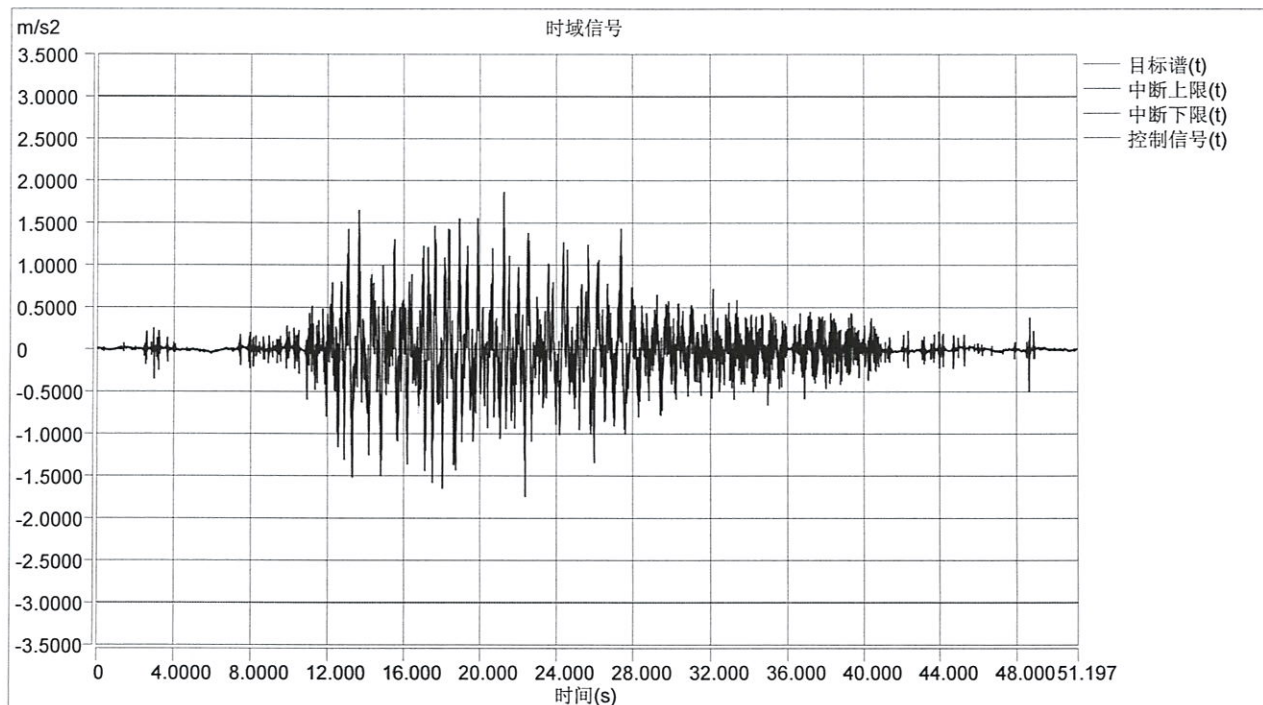


Fig8 Acceleration Waveform of side-to-side Axis

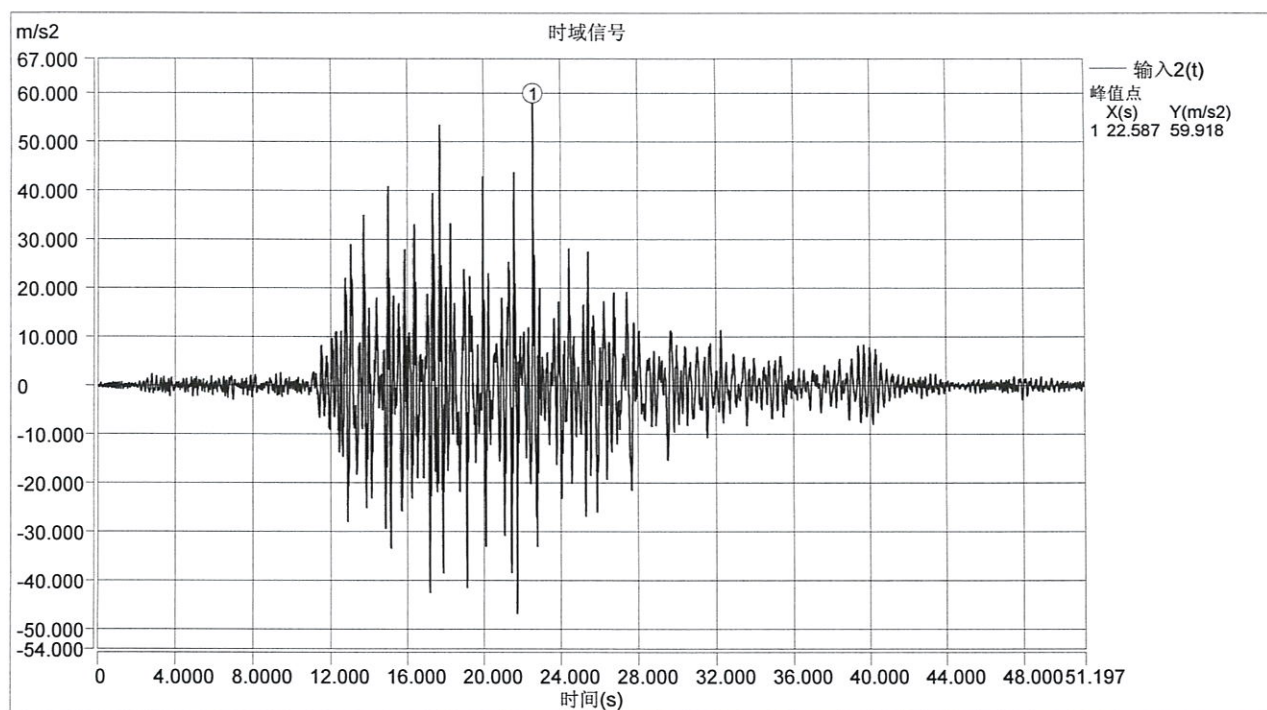


Fig 9 Acceleration Waveform along side-to-side Axis at the top of Framework

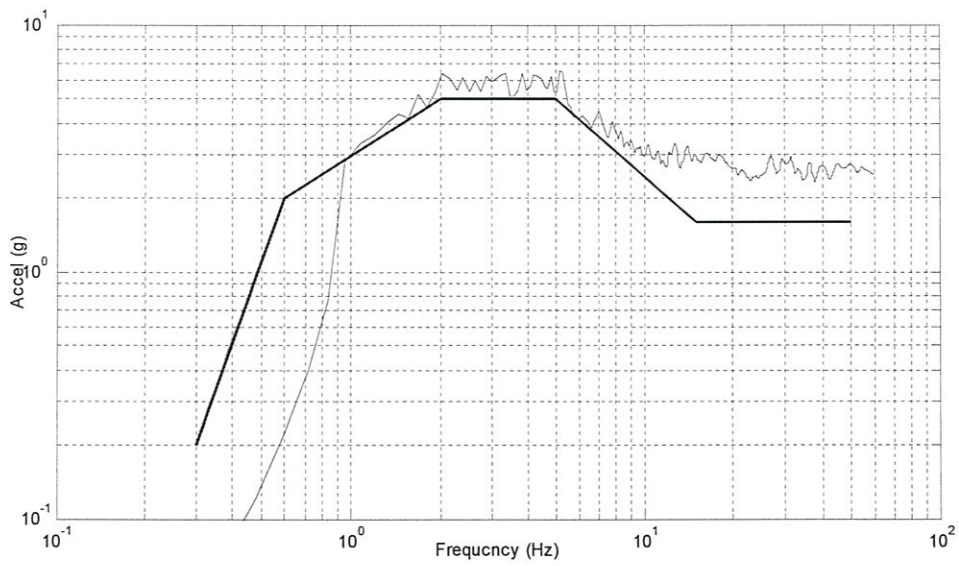


Fig 10 TRS Curve of front-to-back Axis

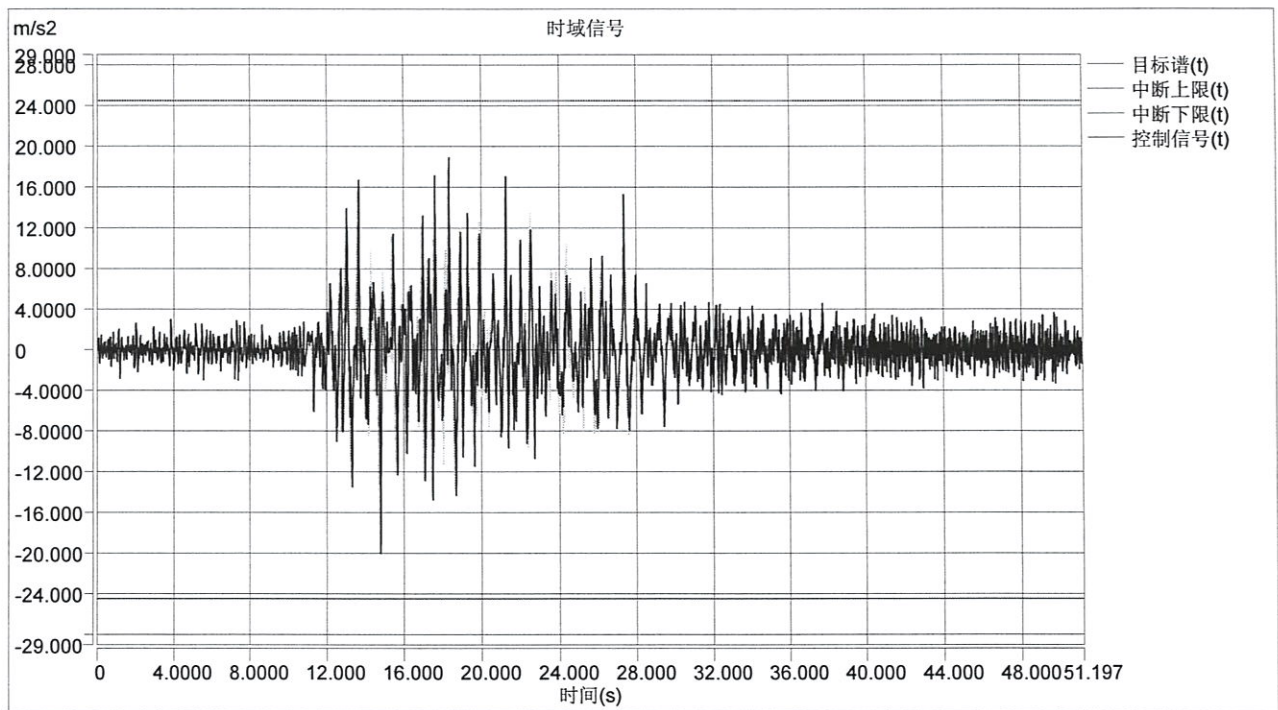


Fig 11 Acceleration Waveform of front-to-back Axis

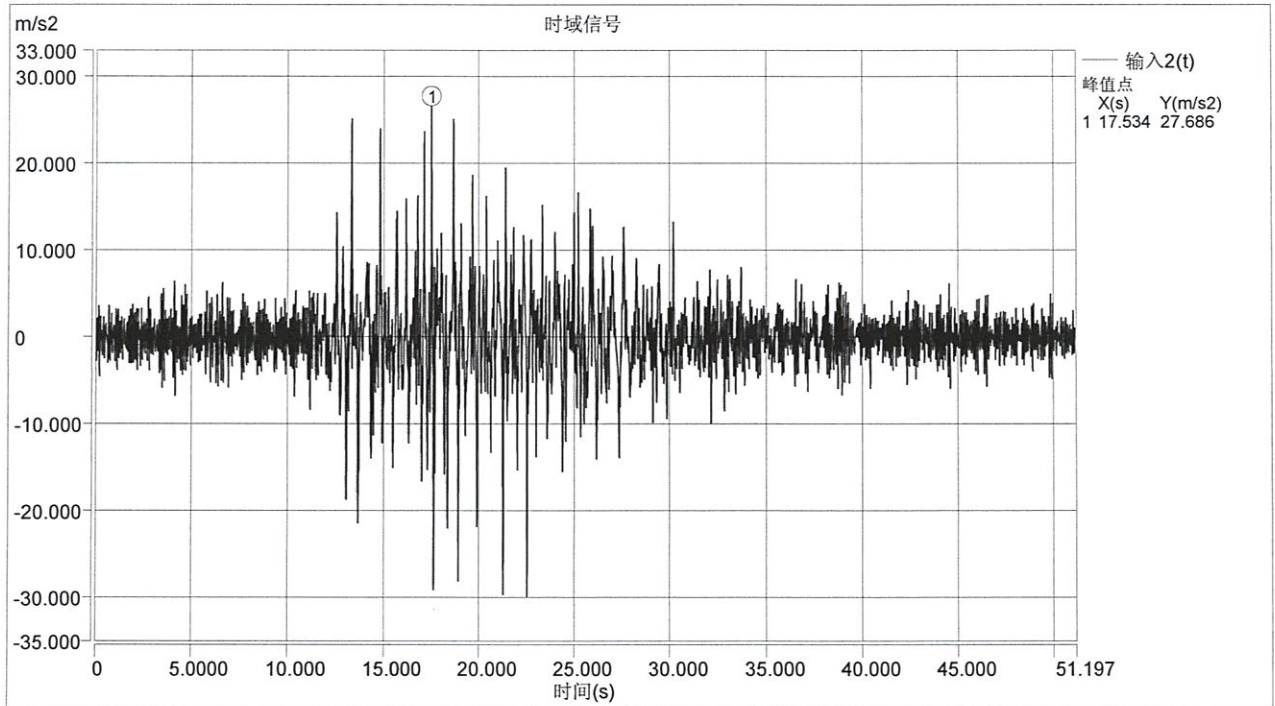


Fig 12 Acceleration Waveform along front-to-back Axis at the top of Framework

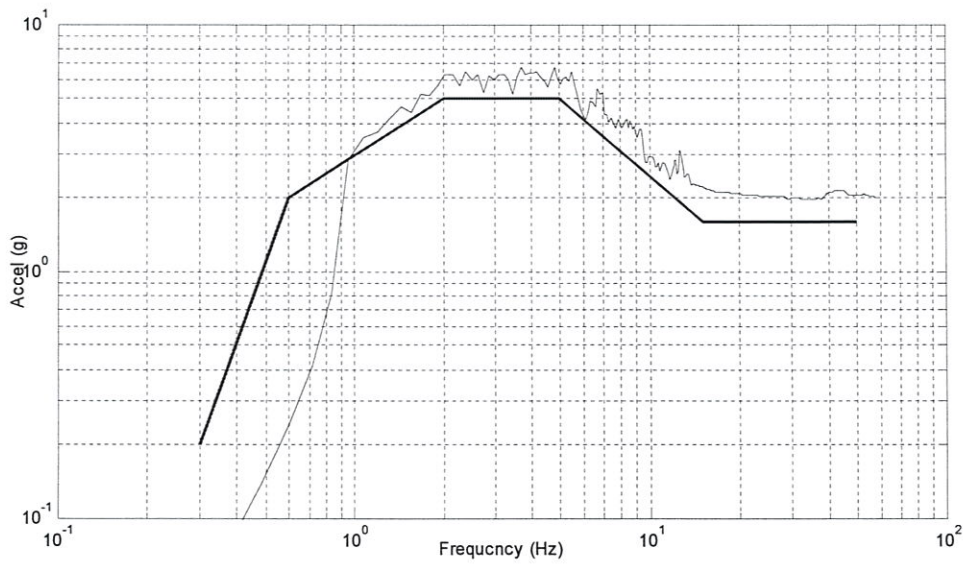


Fig 13 Acceleration Waveform of vertical Axis

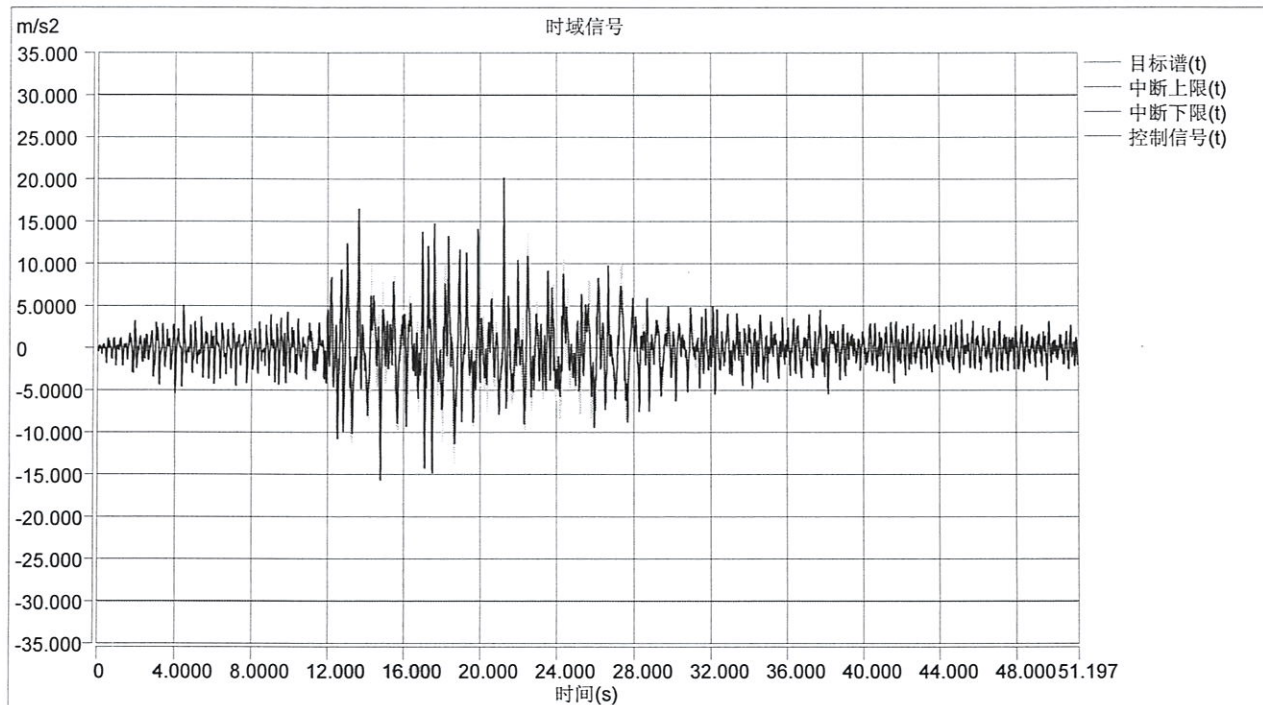


Fig 14 Acceleration Waveform of vertical Axis

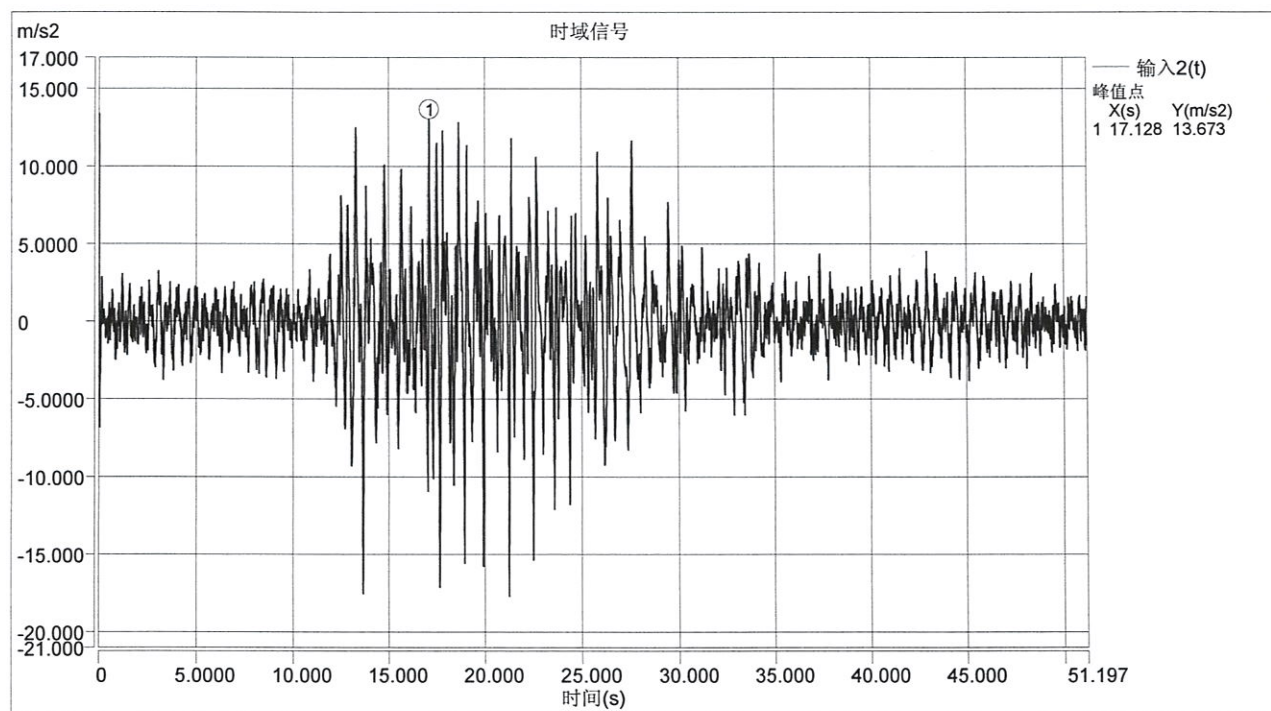


Fig 15 Acceleration Waveform along vertical Axis at the top of Framework

6. Test Results

During the earthquake test, the maximum acceleration at the top of framework along side-to-side axis is 6.0g; along front-to-back axis is 3.0g; along vertical axis is 1.7g. The maximum deflection along side-to-side axis is 35.4mm; along front-to-back axis is 30.6mm, accords with the requirement of less than 75mm in test criteria.

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