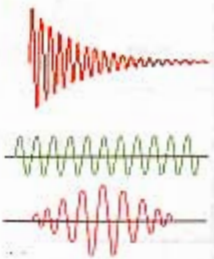
Alstom Australia Limited

Vibration Testing of an Elsteel Techno Modular Switchboard System

Seismic Vibration



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Vipac Engineers & Scientists Ltd
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SEISMIC VIBRATION

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EXECUTIVE SUMMARY

Vipac Engineers and Scientists Ltd were commissioned by Alstom Australia Limited to conduct seismic vibration testing on a modular switchboard system to IEC 68-3-3 (1991-02). At the completion of the testing, no signs of damage or wear were evident on the Techno Module

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1. INTRODUCTION

Vipac Engineers and Scientists Ltd were engaged by Alstom Australia Limited to conduct seismic vibration testing on a modular switchboard system to IEC 68-3-3 (1991-02).

2. ITEM UNDER TEST

The equipment under test was an Elsteel modular switchboard system ("Techno Module") having the following description:

Manufacturer:	Elsteel Limited. Spur Road 1 E.P.Z. Katunayake Sri Lanka.
Exclusive Agent:	Alstom Limited. 25 Princess Road Regents Park Sydney, NSW 2143.
Size:	1050mm wide x 1925mm high x 650mm deep (see Appendix A).
Sections:	Unit section, 600mm wide x 1800mm high x 400mm deep. Cable section, 400mm wide x 1800mm high x 400mm deep. Busbar section, Vertical/Horizontal, 200mm deep.
Units:	Typical form 2 and form 4 components based on mounting plates, separation plates and fixed type compartments, one with arc vent.
Busbars:	Vertical, 2 # 10mm x 30mm cu/phase. Horizontal, 2 # 10mm x 30mm cu/phase. Supports, Type tested 800A – 5000A. 600mm wide vertical and 400mm wide horizontal.
Components:	All non-Elsteel parts that have been installed within the Techno Module are NOT under test. These parts have only been added in order to simulate the mass of the components typically mounted with the various sections of the Techno Module.
Connections:	Main incoming unit connected to the busbars "as installed".

Figure 1: Techno Module

3. EXPERIMENTAL SETUP

3.1 EQUIPMENT

The following equipment and instrumentation was employed for testing:

- Ling Dynamic Systems Digital Sine Controller (DSC 8, S/N 178).
- MB Power Amplifier (type 2250MB).
- MB Shaker (type C60, S/N 125).
- PCB Voltage Amplifier (model 482B11, S/N 191).
- Vipac Portable Voltage Amplifier.
- PCB Accelerometer (model 303A02, S/N6922).
- Wilcoxon Accelerometer (model 784A, S/N4665).
- Ono Sokki CF-5220 FFT Analyser.

The acceleration channels were checked/calibrated end-to-end using a Bruel & Kjaer Accelerometer calibrator, model 4291, S/N 440185.

3.2 CONFIGURATION

The experimental equipment was configured as shown in Figure 2. The arrows in the figure represent both physical connection and flow of data.

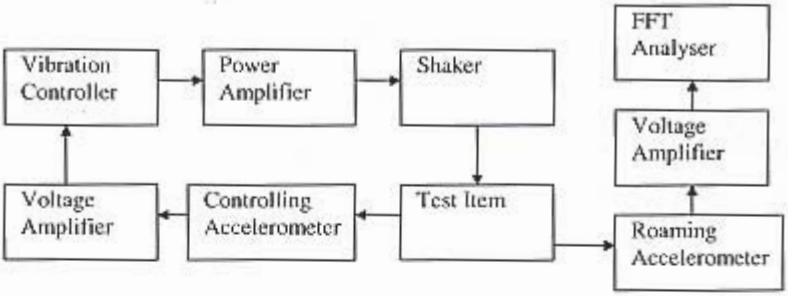

Figure 2: Test Equipment and Data Acquisition Configuration

The control accelerometer was magnetically mounted at the base mounting point of the Techno Module. Was mounted on the shaker as shown in Figure 3. Vibration testing was then carried out in the three mutually perpendicular axes.

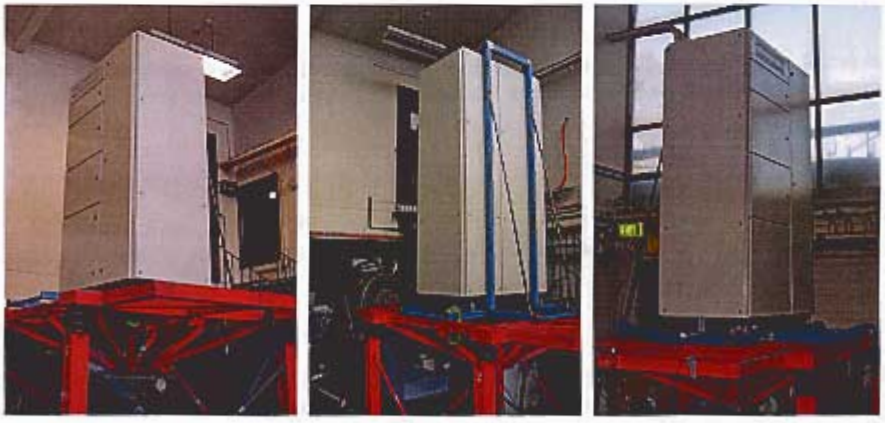

Figure 3: Techno Module mounting

4. METHOD

The Techno Module was subjected to the following test:

4.1 GENERAL SEISMIC CLASS VIBRATION

Using the sinusoidal vibration controller a resonance search was carried according to IEC 68-3-3 (1991-02), Test Fc. Details of the test parameters were as follows:

Table 1: General Seismic Class Vibration Specification.

Parameter	*Vertical*	*Lateral*	*Longitudinal*
Frequency range (Hz)		1 – 35	
Floor acceleration (m/s^2)	7.5	15	15
Wave factor		0.55	
Geometric factor		1.5	
Vibration level (g)	0.64	1.25	1.25
Sweep rate (Octaves / minute)		1	

5. RESULTS

5.1 VERTICAL SEISMIC VIBRATION

On completion of the seismic vibration testing an inspection of the Techno Module found no loose components or screws. There was no evidence of any damage or wear on the module.

5.2 LATERAL SEISMIC VIBRATION

On completion of the seismic vibration testing an inspection of the Techno Module found no loose components or screws. There was no evidence of any damage or wear on the module.

5.3 LONGITUDINAL SEISMIC VIBRATION

On completion of the seismic vibration testing an inspection of the Techno Module found no loose components or screws. There was no evidence of any damage or wear on the module.

6. CONCLUSIONS

The Techno Module successfully completed seismic vibration testing to IEC 68-3-3 (1991-02). There were no faults or damage caused during the test that would result in the modular switchboard system being inoperable.