Method Statement for

Vibration Monitoring for

Demolition Works at

Central Police Station Compound at

No. 10, Hollywood Road

(Revision 1)

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15/F Kai Yue Comm. Bldg., 2C Argyle St., Hong Kong

YSK2

Demolition Works
Central Police Station Compound at No. 10, Hollywood Road
Method Statement for Vibration Monitoring

Method Statement

1. The Works Contractor should assign an experienced site staff to use the apparatus to carry out the vibration monitoring as shown in the location plan (Appendix 1).

2. The exact location of vibration monitoring shall be determined by the Engineer on site;

3. The vibration monitoring will be recorded in the following format of table:

Date	Time	Location of Check Points	Result (Max. Point) (mm/s)	Monitoring Duration (Mins)	Location of Demolition Work

Phases/Stages of Vibration Monitoring

4. There are five phases/stages of vibration monitoring to be carried out, namely Initial Reading Phase, Monitoring Stage 1, Monitoring Stage 2, Stage 3 and Stage 4.

The details are as follows.

Stage	Buildings / Structures to be demolished	Locations of Vibration Check Points to be Monitored
1	E, F, G, H, N, R, 8a, 18 Old Bailey Street Wall, Revetment Wall	VM1, VM4 ~ VM10
2	J, K, 16	VM1, VM11 ~ VM15
	B, C, D, L, M, P Spiral staircase	VM3, VM5, VM6, VM8, VM9, VM16~VM19
3	A	VM1 ~ VM2
4	5	VM1, VM16 ~ VM19

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Initial Reading Phase

5. A set of initial readings shall be recorded three days prior to commencement of each stage of demolition works as the example below:

Date	Time	Location of Check Points	Result (Max. Point) (mm/s)	Monitoring Duration (Mins)	Location of Demolition Work
20 Dec. 2011 (tentative)	Start at 10:00AM	VM4 VM5 VM6 VM7 VM8 VM9 VM10	? ? ? ? ? ? ?	5 mins. 5 mins. 5 mins. 5 mins. 5 mins. 5 mins. 5 mins.	Prior to any demolition

Monitoring Stage 1 Demolition

6. The vibration monitoring will be carried out daily for each check point at the following frequency during demolition of stage 1 buildings

Date	Time	Location of Check Points	Result (Max. Point) (mm/s)	Monitoring Duration (Mins)	Location of Demolition Work
Commencement Day 1	Start at 10:00AM	VM4 VM5 VM6 VM7 VM8 VM9 VM10	? ? ? ? ? ? ?	5 mins. 5 mins. 5 mins. 5 mins. 5 mins. 5 mins. 5 mins.	Stage 1 Demolition Area
Day 2	...	...	...	...	...
Day 3	...	...	...	...	...
.....	...	...	...	...	...
Sunday / Public Holiday / Non Working Day/ Day without demolition	N/A	N/A	N/A	N/A	N/A
Day n	Start at 10:00AM	VM4 VM5 VM6 VM7 VM8	? ? ? ? ?	5 mins. 5 mins. 5 mins. 5 mins. 5 mins.	Stage 1 Demolition Area

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		VM9 VM10	? ?	5 mins. 5 mins.	
Footnote: Vibration monitoring will only be carried out on the days with demolition works.					

Reporting:

7. The Works Contractor shall email the daily monitoring record to the Management Contractor wihin 24 hours after taking the daily readings.

8. The Alert, Action and Alarm (AAA) Levels are to be implemented during the vibration monitoring as follows:

Instrument Type	Item Monitored	Alert Level	Action Level	Alarm Level
Vibration Monitoring	Horizontal Movement	2.0 mm/s	2.5 mm/s	3.0 mm/s

Tasks to do by the Works Contractor	Notify Management Contractor	Notify AP/RSE	Cease Works and submit mitigation measures to AP/RSE

*Repeat the above steps for stages 2, 3 and 4 demolition works.

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The information of the vibration monitoring apparatus to be used is as follows:

Apparatus Description	Vibration Monitor
Manufacturer	Instantel
Model No.	Blastmate III
Serial No.	BA 100992
Calibration Certificate No.	15143
Date of Calibration Test	2 September 2011

9. The Specification of the model Blastmate III is attached in Appendix 2.

10. The Calibration Certificate is attached in Appendix 3.

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Appendix 1

Location Plan

of Vibration Check Points

NOTES

1. ALL DEMOLITION WORK SHALL BE CARRIED OUT MANUALLY BY HAND HELD EQUIPMENT FROM TOP DOWN.
2. PRECAUTIONARY MEASURES SHALL FOLLOW THE HKCOP FOR DEMOLITION OF BUILDINGS 2004.
3. PROPPING SHALL BE PROVIDED UNDERNEATH ALL FOOT SLAB.

LEGEND

AREA TO BE DEMOLISHED (SINGLE STOREY CONCRETE BUILDING U.N.O.)

VM1 PROPOSED VIBRATION MONITORING STATION

NOTES

(1) VIBRATION READINGS SHALL BE TAKEN DAILY DURING DEMOLITION WORKS (IN THE VICINITY OF THE WORKS AREA ONLY)

(2) APPROPRIATE ACTIONS SHALL BE TAKEN WHEN VIBRATION REACHES THE FOLLOWING LEVELS

	ALERT LEVEL	ALARM LEVEL	ACTION LEVEL
VIBRATION	2.0mm/s	2.5mm/s	3.0mm/s

(3) ALL DEMOLITION WORKS SHALL CEASE IF THE VIBRATION REACHES THE ACTION LEVEL, AND SHALL NOT RESUME UNTIL MITIGATION MEASURES ARE PROPOSED AND ACCEPTED BY THE ARCHITECT / ENGINEER

A.I. No. F-WP101-004

EXISTING TIMBER ROOF TO BE DEMOLISHED

EXISTING SINGLE STOREY MASONRY BUILDING TO BE DEMOLISHED

EXISTING BRICK FENCE WALL TO BE DEMOLISHED DOWN TO GROUND LEVEL

EXISTING BRICK FENCE WALL TO BE DEMOLISHED DOWN TO +55.000 mPD

EXISTING STEEL ROOF & COLUMN TO BE DEMOLISHED

EXISTING CONCRETE DECK ON STEEL BEAM & COLUMN TO BE DEMOLISHED

EXISTING CONCRETE CANOPY & COLUMN TO BE DEMOLISHED

B.D. Ref. No. 屋宇署檔案編號: 22-1/3066/10 (M)

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Key Plan 索引圖

BD SUBMISSION

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Client 業主: 香港賽馬會慈善信託基金 The Hong Kong Jockey Club Charities Trust

Design Consultant: HERZOG & DE MEURON

Conservation Architect:

Architect / AP: ROCCO 許李

Structural Engineer / RSE: ARUP

E & M Engineer: JRP

Project 項目: CENTRAL POLICE STATION CONSERVATION AND REVITALISATION

Drawing Title 圖名: DEMOLITION SITE PLAN (OVERALL) VIBRATION MONITORING

Scale 比例	Drawn 製圖	Checked 核對
1:300@A1	P.C.	T.H.

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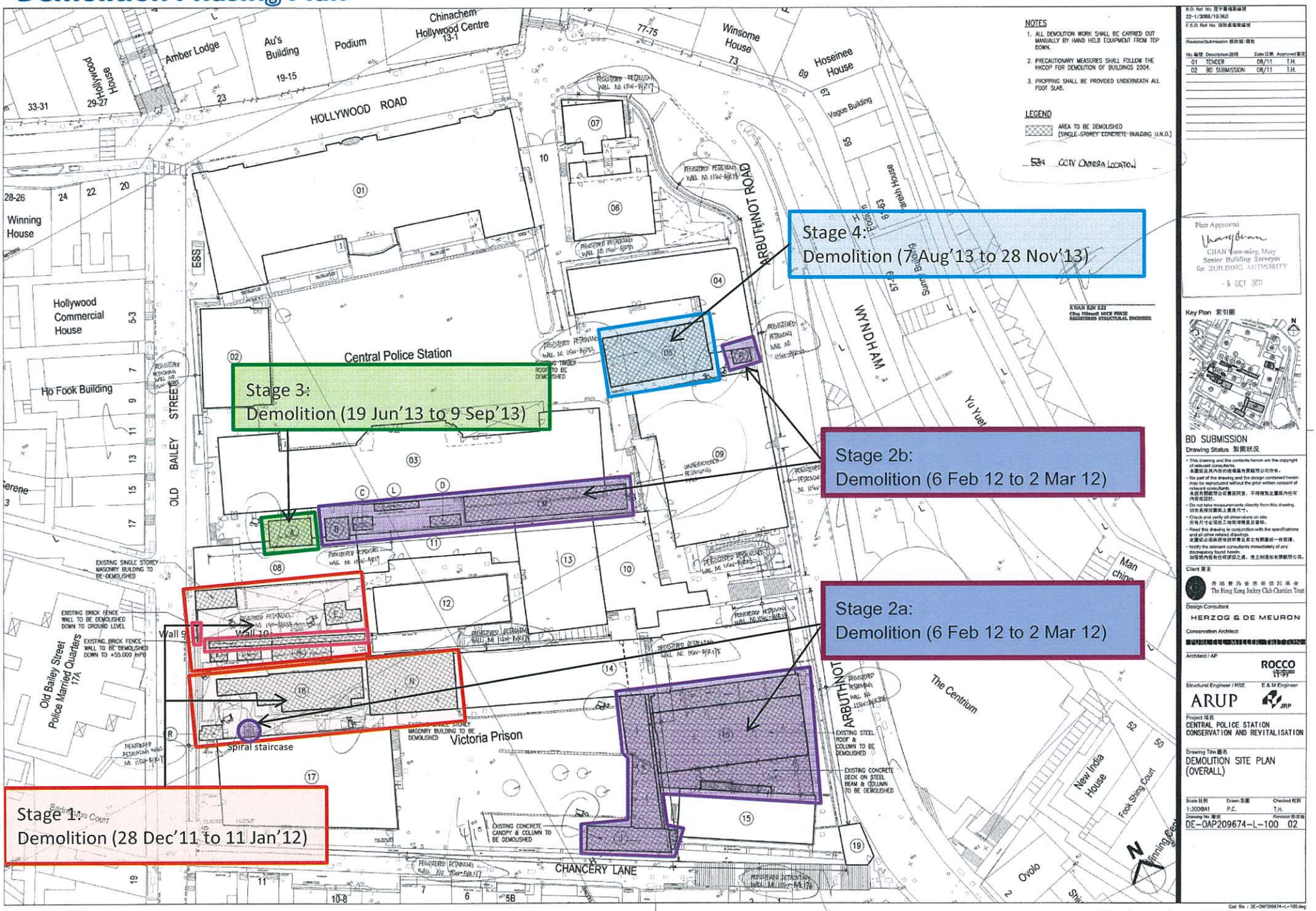
Demolition Phasing Plan



Updated on 23 Dec 2011

ALL STAGES

STAGE 1

HOLLYWOOD ROAD

ARBUTHNOT ROAD

BAILEY STREET

OLD BAILEY STREET

WYNDHAM

CHANCERY LANE

Central Police Station

Victoria Prison

Chinachem Hollywood Centre

Amber Lodge

Au's Building

Podium

Winsome House

Hoseinee House

Vogue Building

Parekh House

Sunny Building

Winning House

Hollywood Commercial House

Ho Fook Building

Police Married Quarters

The Centrum

New Henry House

Badminton Court

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EXISTING CONCRETE DECK ON STEEL BEAM & COLUMN TO BE DEMOLISHED

EXISTING CONCRETE CANOPY & COLUMN TO BE DEMOLISHED

VM1 VM2 VM3 VM4 VM5 VM6 VM7 VM8 VM9 VM10 VM11 VM12 VM13 VM14 VM15 VM16 VM17 VM18 VM19

NOTES

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3. PROPPING SHALL BE PROVIDED UNDERNEATH ALL FOOT SLAB.

LEGEND

AREA TO BE DEMOLISHED (SINGLE STOREY CONCRETE BUILDING U.N.O.)

VM1 PROPOSED VIBRATION MONITORING STATION

NOTES

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Client 業主: The Hong Kong Jockey Club Charities Trust 香港賽馬會慈善信託基金

Design Consultant: HERZOG & DE MEURON

Conservation Architect: [illegible]

Architect / AP: ROCCO

Structural Engineer / RSE: ARUP

E & M Engineer: JRP

Project 項目: CENTRAL POLICE STATION CONSERVATION AND REVITALISATION

Drawing Title 圖名: DEMOLITION SITE PLAN (OVERALL)

VIBRATION MONITORING

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LEGEND

AREA TO BE DEMOLISHED (SINGLE STOREY CONCRETE BUILDING U.N.O.)

VM1 PROPOSED VIBRATION MONITORING STATION

ALL STAGES

STAGE 2

STAGE 2

STAGE 2

STAGE 2

EXISTING TIMBER ROOF TO BE DEMOLISHED

EXISTING SINGLE STOREY MASONRY BUILDING TO BE DEMOLISHED

EXISTING BRICK FENCE WALL TO BE DEMOLISHED DOWN TO GROUND LEVEL

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ALL STAGES

STAGE 3

HOLLYWOOD ROAD

ARBUTHNOT ROAD

WYNDHAM STREET

BAILEY STREET

OLD BAILEY STREET

CHANCERY LANE

Central Police Station

Victoria Prison

Hollywood Commercial House

Ho Fook Building

Winning House

Amber Lodge

Au's Building

Podium

Chinachem Hollywood Centre

Hollywood House

Winsome House

Hossinee House

Vogue Building

Parekh House

Sunny Building

The Centrum

New Henry House

Fook Shing Court

Ovolo

Police Married Quarters

Badminton Court

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AREA TO BE DEMOLISHED (SINGLE STOREY CONCRETE BUILDING U.N.O.)

VM1 PROPOSED VIBRATION MONITORING STATION

ALL STAGES

STAGE 4

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Client 業主

The Hong Kong Jockey Club Charities Trust

Design Consultant

HERZOG & DE MEURON

Conservation Architect

Architect / AP

ROCCO

Structural Engineer / RSE

ARUP

E & M Engineer

JRP

Project 項目

CENTRAL POLICE STATION CONSERVATION AND REVITALISATION

Drawing Title 圖名

DEMOLITION SITE PLAN (OVERALL)

VIBRATION MONITORING

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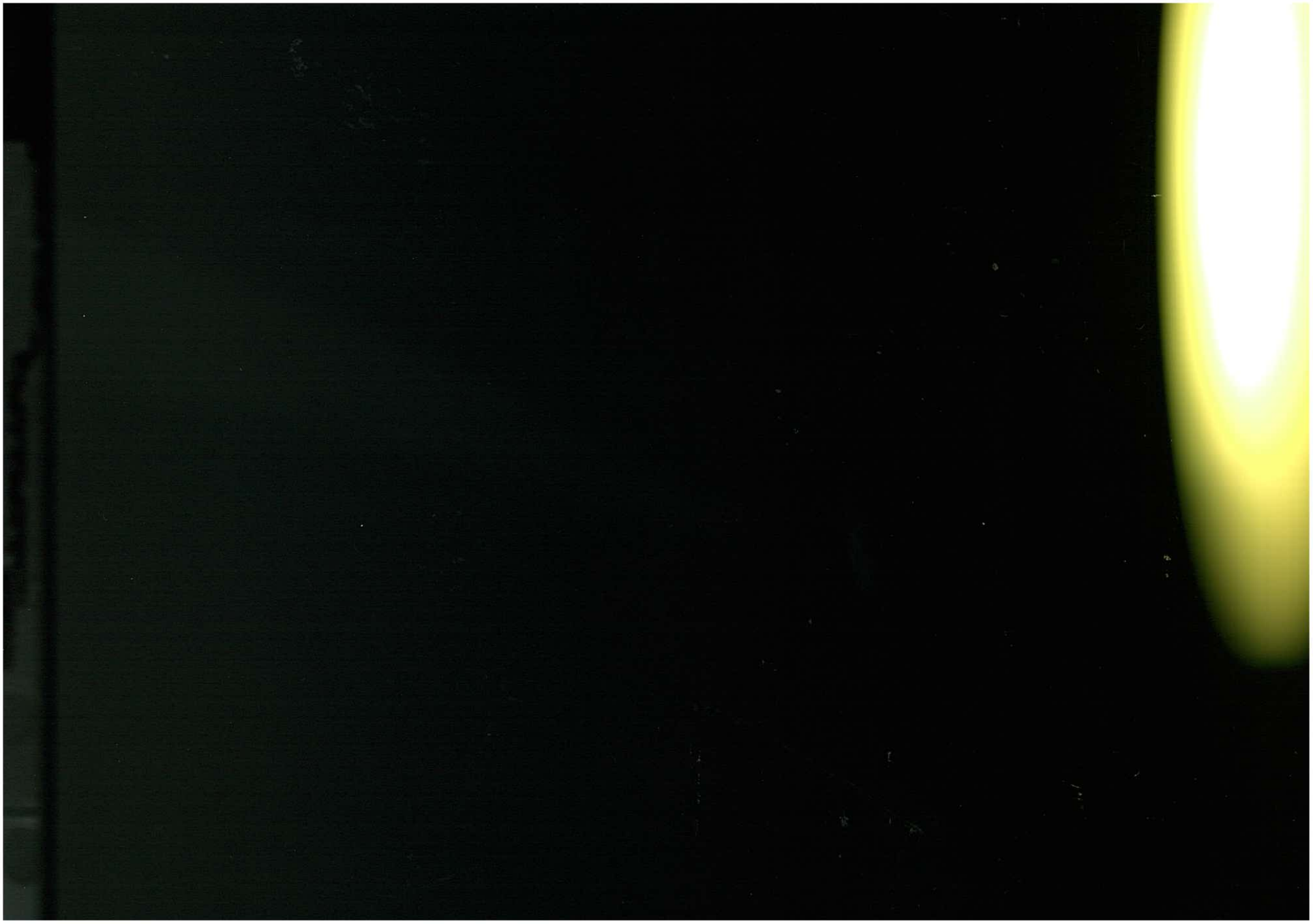

Appendix 2

Specification of the model Blastmate III

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Blastmate III™

Full-Featured, Advanced Vibration and Overpressure Monitor

Range of Applications:

- Blast-monitoring for compliance
- Near-field blast analysis
- Pile driving
- Construction activity
- Demolition activity
- Heavy transportation
- Bridge monitoring
- Structural analysis
- Underwater blast monitoring
- 4 or 8 channel data aquisition
- Remote monitoring - Auto Call Home™

Consultants, engineers and contractors the world over recognize the **Instantel® Blastmate III™** vibration and overpressure monitor as the most versatile and most reliable full featured monitor available. It provides all of the industry-leading features of the **Instantel Minimate Plus™** monitor, conveniently packaged with a full keyboard and a high-resolution printer. This allows you to setup, add notes and print complete event reports in the field, without a computer.

Versatile

With standard features like the **Instantel Histogram Combo™** monitoring mode, zero dead-time between events, and flexible sample rates up to 65,536 S/s, the **Blastmate III** system provides you with control and confidence to monitor reliably in any situation. For added versatility, you have the option to add 4 more channels and extra memory, providing two complete standard monitors in a single package.

For more demanding monitoring applications, the **Instantel Blastware® Advanced Module** software provides the capability to monitor a broad selection of vibration and overpressure sensors, as well as sensors for related structural and environmental measurements. Monitor vibration, ambient environmental conditions, and the movement of structural cracks, all at the same time, all using the same **Blastmate III** monitor.

Easy to use

The features and versatility of the **Blastmate III** monitor set it apart, but the fact that it is also easy to use makes it truly revolutionary. The dedicated single use function keys, backlit LCD and simple menu-driven operation make setup and operation quick and easy, even for inexperienced personnel.

Tough

The **Blastmate III** monitor has been built to survive, with a fully sealed top panel, non-corrosive industrial grade connectors and sealed electronics, all packed in a rugged, water-resistant case.

Blastmate III - Reliability and versatility for any monitoring application.

Key Features

- Fast high-resolution thermal printer for event reports in the field without the need for a computer.
- Full keyboard simplifies entry of job-specific notes and information.
- Dedicated function keys and intuitive menu-driven operation enable quick and easy setup.
- **Histogram Combo** mode allows capture of full waveform records while recording in histogram mode.
- Sample rates from 1,024 to 16,384 S/s per channel - up to 65,536 S/s available on a single channel.
- Available 8-channel option allows for 2 standard triaxial geophones and 2 microphones to be used on a single **Blastmate III** monitor.
- Continuous monitoring means zero dead time, even while the unit is processing.
- Any channel can be matched to a wide variety of sensors - geophones, accelerometers, or hydrophones.

Instantel

Blastmate III™

General Specifications	Blastmate III
Channels	Microphone and Triaxial Geophone or 4 independent user-configurable channels (two Microphones and two Triaxial Geophones or 8 independent channels with optional 8-channel upgrade)
Vibration Monitoring (with Standard Triaxial Geophone)	
Range	Up to 254 mm/s (10 in/s)
Resolution	0.127 mm/s (0.005 in/s) or 0.0159 mm/s (0.000625 in/s) with built-in preamp
Accuracy (ISEE / DIN)	+/- 5% or 0.5 mm/s (0.02 in/s), whichever is larger, between 4 and 125 Hz / DIN 45669-1 standard
Transducer Density	2.13 g/cc (133 lbs/ft^3)
Frequency Range (ISEE / DIN)	2 to 250 Hz, within zero to -3 dB of an ideal flat response / 1 to 315 Hz
Maximum Cable Length (ISEE / DIN)	75 m (250 ft) / 1,000 m (3,280 ft)
Air Overpressure Monitoring	
Weighting Scales	Linear or A-weight
Linear Range	88 to 148 dB (500 Pa (0.072 PSI) Peak)
Linear Resolution	0.25 Pa (0.0000363 PSI)
Linear Accuracy	+/- 10% or +/- 1 dB, whichever is larger, between 4 and 125 Hz
Linear Frequency Response	2 to 250 Hz between -3 dB roll off points
A-weight Range	50 to 110 dBA
A-weight Resolution	0.1 dBA
Waveform Recording	
Record Modes	Manual, Single-shot, Continuous
Seismic Trigger	0.125 to 254 mm/s (0.005 to 10 in/s)
Acoustic Triggers	
Linear	100 to 148 dB
A-weight	55 to 110 dBA
Sample Rate	1,024 to 16,384 S/s per channel (independent of record time), up to 65,536 S/s in single-channel mode with advanced software (maximum 8,192 S/s per channel for 8 channels)
Record Stop Mode	Fixed record time, **Instantel® AutoRecord™** record stop mode
Record Time	1 to 100 seconds (programmable in one-second steps) or 500 seconds plus 0.25 seconds pre-trigger
AutoRecord Time	Auto window programmable from 1 to 9 seconds, plus a 0.25 second pre-trigger. Event is recorded until activity remains below trigger level for duration of auto window, or until available memory is filled.
Cycle Time	Recording uninterrupted by event processing - No dead time
Storage Capacity	
Full Waveform Events	300 one-second events at 1,024 S/s sample rate (1,500 event capacity with optional memory upgrade)
Event Summaries	1,750 (8,750 event capacity with optional memory upgrade)
Histogram Recording	
Record Modes	Histogram and **Instantel Histogram Combo™** (monitor captures triggered waveforms while recording in Histogram mode)
Recording Interval	2, 5 or 15 seconds; 1, 5 or 15 minutes
Storage Capacity	46,656 intervals - 3 days at 5-second intervals or 102 days at 15 minute intervals (with memory upgrade - 15 days at 5-second intervals or 540 days at 15 minute intervals)
Physical Specifications	
Dimensions	269 x 355 x 165 mm (10.6 x 14.0 x 6.5 in)
Weight	6.4 kg (14 lbs)
Battery	Rechargeable 6 V sealed gel cell - capacity for 30 days of continuous monitoring
User Interface	63 domed tactile keys including full keyboard and dedicated keys for common functions
Display	4-line x 20 character, high contrast, backlit LCD with online help
Printer	High resolution thermal plotter
PC Interface	RS-232
Auxillary Inputs and Outputs	External Trigger, Remote Alarm, coordinate download from GPS
Environmental	
Printer/LCD Operating Temperature	-10 to 50°C (14 to 122°F)
Electronics Operating Temperature	-20 to 60°C (-4 to 140°F)
Remote Communications	Compatible with Telephone, GSM, Cellular, RF, Satellite, Short-haul modems, and Ethernet® device servers. Automatically transfers events when they occur through **Instantel Auto Call Home™** feature.
Additional Features	Monitor start/stop timer

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Instantel

714B0053 Rev 07 – Prodcuct Specifications are Subject to Change

The World's Most Trusted Vibration Monitors

Appendix 3

Calibration Certificate of Blastmate III

T/ 27892376 F/ 27892207 email/ info@ysk2.com

Hong Kong Calibration Ltd.
香港校正有限公司

Calibration Certificate

Certificate No. 15143

Customer : YSK2 Engineering Co. Ltd.

Address : 15/F., Kai Yue Comm. Building 2C Argyle Street, Kowloon.

Order No. : Q12110 **Date of receipt :** 29-Aug-11

Item Tested

Description : Vibration Monitor
Manufacturer : Instantel
Model : Blastmate III **Serial No.** : BA100992

Test Conditions

Date of Test : 2-Sep-11 **Supply Voltage** : --
Ambient Temperature : (23 ± 3)°C **Relative Humidity :** (50 ± 25) %

Test Specifications

Calibration check.
Ref. Document/Procedure: M41.

Test Results

All results were within the manufacturer's specification.
The results are shown in the attached page(s).

Main Test equipment used:

Equipment No.	Description	Cert. No.	Traceable to
S012	Function Generator	07280	SCL-HKSAR
S187A	Std. Vibration Meter	07446	NIM-PRC
S187B	Std. Accelerometer	07447	NIST-USA

The test equipment used for calibration are traceable to International System of Units (SI).
The test results apply to the above Unit-Under-Test only

Calibrated by : Steve Kwan

Approved by : Dorothy Cheuk

Date: 5-Sep-11

This Certificate is issued by:
Hong Kong Calibration Ltd

Calibration Certificate

Results :

1. CH1 (Transversal)

1.1 Vibration Accuracy (15 Hz, Peak)

Applied Value (mm/s)	UUT Reading (mm/s)	Mfr's Spec.
5.00	5.10	± 5 % or 0.5 mm/s, whichever is greater, (4 ~ 125 Hz) (DIN 45669-1)
10.00	10.1	
15.00	15.1	
20.00	20.1	
25.00	25.0	

1.2 Frequency Response

Frequency (Hz)	UUT Reading (mm/s)	Variation (mm/s)	Mfr's Spec.
3	10.8	+0.8	0 to – 3 dB
5	9.9	-0.1	± 5 % or ± 0.5 mm/s, whichever is greater. (4 ~ 125 Hz)
10 (Ref.)	10.0 (Ref.)	--	
20	9.8	-0.2	
50	9.3	-0.7	

2. CH2 (Vertical)

2.1 Vibration Accuracy (15 Hz, Peak)

Applied Value (mm/s)	UUT Reading (mm/s)	Mfr's Spec.
5.00	5.05	± 5 % or 0.5 mm/s, whichever is greater, between (4 ~ 125 Hz) (DIN 45669-1)
10.00	10.0	
15.00	15.1	
20.00	20.1	
25.00	25.1	

2.2 Frequency Response

Frequency (Hz)	UUT Reading (mm/s)	Variation (mm/s)	Mfr's Spec.
3	10.0	0.0	0 to – 3 dB
5	9.7	-0.3	± 5 % or ± 0.5 mm/s, whichever is greater. (4 ~ 125 Hz)
10 (Ref.)	10.0 (Ref.)	--	
20	10.1	+0.1	
50	9.7	-0.3	

Calibration Certificate

3. CH3 (Longitudinal)

3.1 Vibration Accuracy (15 Hz, Peak)

Applied Value (mm/s)	UUT Reading (mm/s)	Mfr's Spec.
5.00	5.08	± 5 % or ± 0.5 mm/s, whichever is greater. (4 ~ 125 Hz) (DIN 45669-1)
10.00	10.1	
15.00	15.1	
20.00	20.1	
25.00	25.2	

3.2 Frequency Response

Frequency (Hz)	UUT Reading (mm/s)	Variation (mm/s)	Mfr's Spec.
3	10.9	+0.9	0 to – 3 dB
5	10.0	0.0	± 5 % or ± 0.5 mm/s, whichever is greater. (4 ~ 125 Hz)
10 (Ref.)	10.0 (Ref.)	--	
20	10.0	0.0	
50	9.6	-0.4	

4. Calculated Parameters Accuracy Check

4.1 Acceleration (Peak) (15Hz)

Applied Value = 1.962 m/s^2
= 0.20 g
UUT Reading = 0.21 g

4.2 Displacement (Peak) (15Hz)

Applied Value = 0.36 mm
UUT Reading = 0.36 mm

Remark : 1. UUT : Unit-Under-Test
2. Uncertainty : ± 2 %, for a confidence probability of not less than 95%.
3. UUT was equipped with Transducer S/N: BG 10183
4. The -3 dB Frequency Response covers the bandwidth of 2~250 Hz.

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