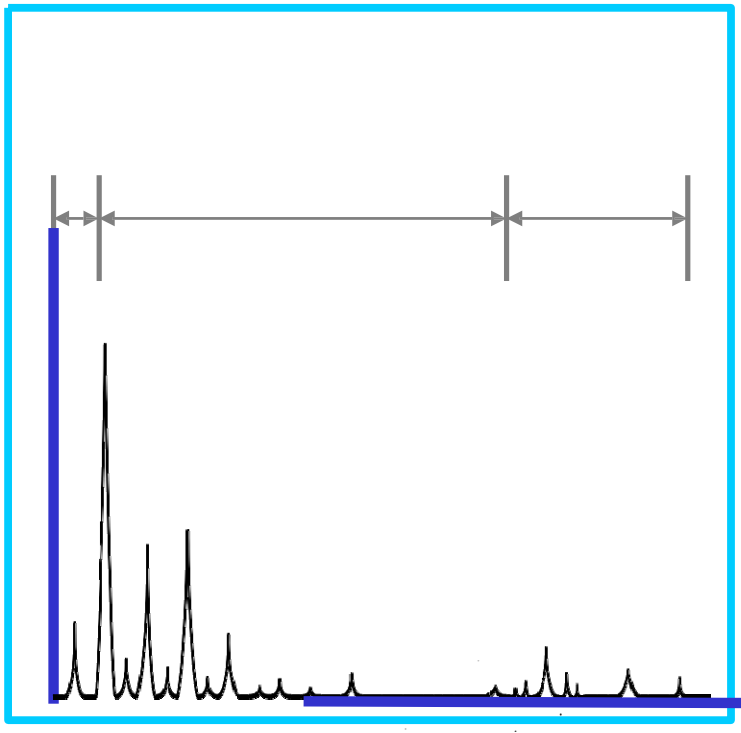
iAdept Marketing

Vibration Report

Customer Name	**: L.G ELECTRONICS**
Site	**: Greater Noida**
Date of Visit	**: 9th & 10th March 2016**
Report No.	**: U10316**



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REPORT PREPARED BY

Mr. Udit Sharma

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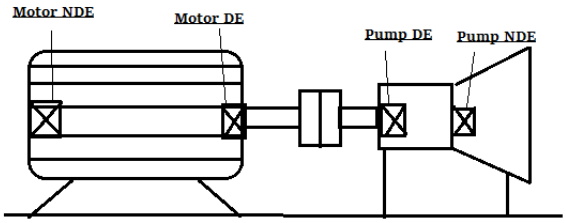
INRODUCTION

This report is prepared keeping in view the customer's requirement of monitoring the health of any individual equipment at any point of time, as well as the capability to monitor the trend.

This vibration report consists of Vibration values collected at different positions on all the equipment. Demonstrated below is the procedure they have been codified:



Location	Orientation	Type
1- Motor Non Drive End	H–Horizontal	v-Velocity
2- Motor Drive End	V–Vertical	a-Acceleration
3- (Fan/Pump) Drive End	A–Axial	d-Displacement
4- (Fan/Pump) NDE	R–Radial	
5- Input bearing		
6- Output bearing		

CATEGORY:

NORMAL–Those machines that are operating within the satisfactory limits of Vibration values as per ISO- 10816.

ALERT–Those machines that are operating above the satisfactory limits of Vibration values as per ISO- 10816.It is usually recommended to plan the maintenance action at the earliest available opportunity; this would help reducing the after effects of any failure as well as properly plan the activity.

ALARM – Those machines that are operating in most abnormal condition and it is usually recommended to immediately take maintenance action, so as to avoid any catastrophic failure.

Visited by: **Mr. Udit Sharma**

Explanatory Notes on Measurement Process and parameters

1. All measured data is in respect of vibrations Velocity (mm/sec), collected from FFT spectrum on each point for all equipment covered in the assignment. The Data collector used when set in FFT mode, provides data of Overall Values of vibration levels in RMS mode only. Therefore, the reference values are in Velocity (RMS). Therefore, this aspect and our note 2 below must be kept in mind for any theoretical comparison.

2. Application of ISO 10816 however requires very accurate identification of machine category and is dependent on various operating parameters like height of the machine from ground, power consumption, flow parameters, load and RPM etc. This feature if used without proper identification may provide diametrically different interpretations and endanger machines.

3. Equipment used for Vibration Measurement and Analysis was Impaq Elite. Its accuracy is +5% and calibration is within validity.

Velocity Severity	Velocity Range Limits and Machine Classes ISO Standard			
			Large Machines	
mm/s RMS	Small Machine class I	Medium Machine Class II	Rigid Supports Class III	Less Rigid Supports ClassIII
0.28	Good	Good	Good	Good
0.45				
0.71				
1.12	Satisfactory			
1.80		Satisfactory		
2.80	Unsatisfactory (Alert)		Satisfactory	
4.50		Unsatisfactory (Alert)		Satisfactory
7.10	Unacceptable(Alarm)		Unsatisfactory (Alert)	
11.20		Unacceptable(Alarm)		Unsatisfactory(Alert)
18.00			Unacceptable(Alarm)	
28.00				Unacceptable(alarm)
45.00				

MACHINE CLASSIFICATION IN ACCORDANCE WITH ISO 10816-1

Class 1: Individual parts of engines and machines, integrally connected with the complete machine in its normal operating condition. (Production electrical motors of up to 15 Kw are typical examples of machines in this category)

Class 2: Medium-sized machines, (Typically Electrical Motors with 15 to 75 Kw output) without special foundations, rigidly mounted engines or machines (up to 300 Kw) on special foundations.

Class 3: Large prime movers and other large machines with rotating masses mounted on rigid and heavy foundation which are relatively stiff in the direction of vibration measurement.

Class 4: Large prime movers and other large machines with rotating masses mounted on rigid and heavy foundation which are relatively soft in the direction of vibration measurement. (for ex. Turbo generator sets, especially those with light weight substructures).

Class 5: Machines and mechanical drives system with unbalance able inertia effects (due to reciprocating parts), mounted on foundations which are relatively stiff in the direction of vibration measurement.

In making our remarks we have applied the Vibration limits based on velocity (mm/sec) RMS values and these are:

Class-2(Rigid mounting)
0-2.8 mm/sec - Normal
2.8-7.1mm/sec – Alert
more than 7.1mm/sec – Alarm

Class-2(Flex. Mounting)
0-7.2 mm/sec - Normal
7.2-11.5mm/sec - Alert
more than 11.5mm/sec – Alar

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MACHINE SURVEILLANCE REPORT

Total Machines observed	58
No of machines in Alarm Zone	3
No of machines in Alert Zone	15
No of machines in Normal Zone	40
Plant Efficiency	69%

S.NO	Machine Name	Area/Train	Machine Type	Condition Status	Observations	Recommendations
W-Building						
1	20 Hp Motor	Trimming Press-2	Hydraulic pump's motor	Alarm	Inadequate rigidity/looseness in base fixing location, Structural resonance is also possible	Ensure proper & uniform tightness in motor base fixing location, inspect and clean the motor cooling fan to recess the unbalance
2	60 Hp Motor	Trimming Press-2	Hydraulic pump's motor	Normal	Vibration is normal	Need to trend for future
3	3 Hp Motor	Trimming Press-2	Hydraulic pump's motor	Normal	Vibration is normal	Need to trend for future
4	Vacuum pump-1	Vacuum Foaming-2	Vacuum pump's motor	Normal	Vibration is normal	Need to trend for future
5	Vacuum pump-2	Vacuum Foaming-2	Vacuum pump's motor	Alert	Minor Indication of looseness found in the fixing location	Ensure proper & uniform tightness in motor base fixing location
6	Vacuum pump-3	Vacuum Foaming-2	Vacuum pump's motor	Alert	It could be the indication of electrical excitation with rubbing of rotor bars	Inspect the motor for any electrical damage
7	Hydraulic pump vertical	Vacuum Foaming-2	Hydraulic pump's motor	Normal	Vibration is normal	Need to trend for future
8	Hydraulic pump Horizontal	Vacuum Foaming-2	Hydraulic pump's motor	Alert	Inadequate rigidity/looseness in base fixing location	Ensure proper & uniform tightness in motor base fixing location
9	Vacuum pump-2	Vacuum Foaming-1	Vacuum pump's motor	Normal	Vibration is normal	Need to trend for future

10	Vacuum pump-3	Vacuum Foaming-1	Vacuum pump's motor	Normal	Vibration Is normal but bearing defect frequency found with respect to minor defects in raceways of motor NDE	Inspect Bearing for proper lubrication and appropriate clearance
11	Hydraulic pump	Vacuum Foaming-1	Hydraulic pump's motor	Normal	Vibration Is normal but bearing defect frequency found with respect to minor defects in raceways of motor NDE	Inspect Bearing for proper lubrication and appropriate clearance
12	Chiller pump	Vacuum Foaming-1	Chiller pump's motor	Normal	Vibration is normal	Need to trend for future
13	60 Hp Motor	Trimming Press-1	Hydraulic pump's motor	Alert	Inadequate rigidity/looseness in base fixing location, Unbalance for if also observed	Ensure proper & uniform tightness in motor base fixing location, inspect and clean the motor cooling fan to recess the un balance
14	20 Hp Motor	Trimming Press-1	Hydraulic pump's motor	Normal	Vibration is normal	Need to trend for future
15	3 Hp Motor	Trimming Press-1	Hydraulic pump's motor	Normal	Vibration is normal	Need to trend for future
W-Building Chemical Loading Bulk Storage						
16	Pump-1	Polyol Tank-3	Pump & Motor	Alert	Inadequate rigidity/looseness in base fixing location	Ensure proper & uniform tightness in motor base fixing location
17	Pump-1	Polyol Tank-2	Pump & Motor	Normal	Vibration is normal	Need to trend for future
A-Building Ref Line- R-1						
18	Press Vessel pump	Case Foaming Head-1	Pump's Motor	Normal	Vibration is normal	Need to trend for future
19	Press Vessel pump	Case Foaming Head-2	Pump's Motor	Normal	Vibration is normal	Need to trend for future
20	Back Side Motor	Case Foaming Head-1	Motor	Normal	Vibration is normal	Need to trend for future
21	Back Side Motor	Case Foaming Head-2	Motor	Normal	Vibration is normal	Need to trend for future

22	Chiller pump-1	Case Foaming ISO Chiller	Chiller pump's motor	Alert	Minor Indication of loose in motor base fixing location	Ensure proper & uniform tightness in motor base fixing location
23	Standby Chiller pump-1	Case Foaming ISO Chiller	Chiller pump's motor	Normal	Vibration is normal	Need to trend for future
24	Hydraulic Pump	Case Foaming Head-1	Hydraulic pump's motor	Alert	Inadequate rigidity/looseness in base fixing location, Structural resonance is also possible	Ensure proper & uniform tightness in motor base fixing location
25	Hydraulic Pump	Case Foaming Head-2	Hydraulic pump's motor	Normal	Vibration is normal	Need to trend for future
26	Pre Heating Blower	Case Foaming	Blower's Motor	Alert	Unbalance force found in both DE & NDE ends of motor	Inspect and clean the fan to recess the unbalance/ need dynamic fan balancing
27	Main Heating Blower	Case Foaming	Blower & Motor	Normal	Vibration is normal	Need to trend for future
28	Return Line Heating Blower	Case Foaming	Blower & Motor	Normal	Vibration is normal	Need to trend for future
29	LZ Blender Hydraulic Pump	CRF	Hydraulic pump's motor	Alert	Inadequate rigidity/looseness in base fixing location, Structural resonance is also possible	Ensure proper & uniform tightness in motor base fixing location
30	Notching Pump	CRF	Pump & Motor	Normal	Vibration is normal	Need to trend for future
31	Hydraulic Pump Dry	Door Foaming	Pump & Motor	Alert	Inadequate rigidity/looseness in base fixing location, Structural resonance is also possible	Ensure proper & uniform tightness in motor base fixing location
32	Hydraulic Pump Wet Head-2	Door Foaming	Pump & Motor	Alarm	Inadequate rigidity/looseness in base fixing location, Unbalance force is also observed, Structural resonance is also possible	Ensure proper & uniform tightness in motor base fixing location, inspect and clean the motor cooling fan to recess the un balance

33	Hydraulic Pump Wet Head-1	Door Foaming	Pump & Motor	Normal	Vibration is normal	Need to trend for future
34	Iso Chiller H-1	Door Foaming	Chiller pump's motor	Normal	Vibration is normal	Need to trend for future
35	Iso Chiller H-2	Door Foaming	Chiller pump's motor	Normal	Vibration is normal	Need to trend for future
36	ISO H-1 Pump	Door Foaming	Pump's Motor	Normal	Vibration is normal	Need to trend for future
37	ISO H-2 Pump	Door Foaming	Pump's Motor	Normal	Vibration is normal	Need to trend for future
38	Polyol H-1 Pump	Door Foaming	Pump's Motor	Alert	Inadequate rigidity/looseness in base fixing location, Structural resonance is also possible	Ensure proper & uniform tightness in motor base fixing location
39	Polyol H-2 Pump	Door Foaming	Pump's Motor	Normal	Vibration is normal	Need to trend for future
40	Polyol Chiller H-1	Door Foaming	Pump's Motor	Normal	Vibration is normal	Need to trend for future
41	Polyol Chiller H-2	Door Foaming	Pump's Motor	Normal	Vibration is normal	Need to trend for future
A-Building Ref Line- R-2						
42	ISO Pump A side	Case Foaming	Pump's Motor	Alert	Inadequate rigidity/looseness in base fixing location, Unbalance for if also observed, Structural resonance is also possible	Ensure proper & uniform tightness in motor base fixing location, inspect and clean the motor cooling fan to recess the un balance
43	ISO Pump B side	Case Foaming	Pump's Motor	Normal	Vibration is normal	Need to trend for future
44	Polyol Pump A Side	Case Foaming	Pump's Motor	Normal	Vibration is normal	Need to trend for future
45	Polyol Pump B Side	Case Foaming	Pump's Motor	Normal	Vibration is normal	Need to trend for future
46	ISO Chiller H-2	Case Foaming	Chiller pump's motor	Alert	Inadequate rigidity/looseness in base fixing location, Bend shaft also can be possible	Ensure proper & uniform tightness in motor base fixing location, inspect the shaft runout & alignment

47	Polyol Chiller SEC. Pump-2	Case Foaming	Chiller pump's motor	Normal	Vibration Is normal but signal of looseness is found	Ensure proper & uniform tightness in motor base fixing location
48	Polyol Chiller SEC. Pump-1	Case Foaming	Chiller pump's motor	Normal	Vibration is normal	Need to trend for future
49	RZ Blender Hydraulic Pump	CRF	Hydraulic pump's motor	Alert	Signal of looseness in base fixing location is found, Unbalance for if also observed	Ensure proper & uniform tightness in motor base fixing location, inspect and clean the motor cooling fan to recess the un balance
50	Hydraulic Notching Pump-1	CRF	Hydraulic pump's motor	Normal	Inadequate rigidity/looseness in base fixing location	Ensure proper & uniform tightness in motor base fixing location
51	Hydraulic Notching Pump-2	CRF	Hydraulic pump's motor	Normal	Vibration is normal	Need to trend for future
52	Roll Forming Drive	CRF	Motor & Gear box	Alert	Inadequate rigidity/looseness in base fixing location	Ensure proper & uniform tightness in motor base fixing location
53	Polyol Chiller H-1	Door Foaming	Chiller pump's motor	Normal	Vibration is normal	Need to trend for future
54	Polyol Chemical Pump	Door Foaming	Pump's Motor	Normal	Vibration is normal	Need to trend for future
55	ISO Chiller H-1	Door Foaming	Chiller pump's motor	Normal	Vibration is normal	Need to trend for future
56	ISO Chemical Pump	Door Foaming	Pump's Motor	Normal	Vibration is normal	Need to trend for future
57	single Hydraulic Pump	Door Foaming	Pump's Motor	Normal	Vibration is normal	Need to trend for future
58	Dry Part Hydraulic Pump	Door Foaming	Pump & Motor	Alarm	Inadequate rigidity/looseness in base fixing location, Structural resonance is also possible	Ensure proper & uniform tightness in motor base fixing location

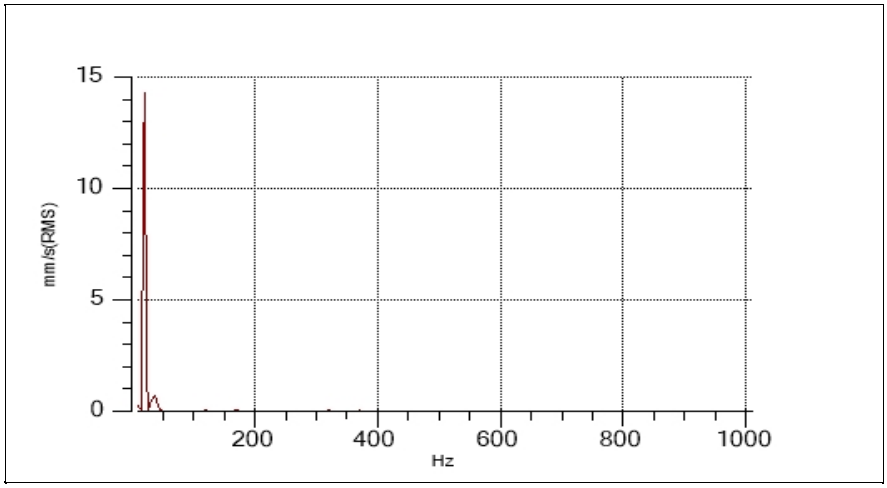
L.G Electronics

Velocity with Power Spectrum

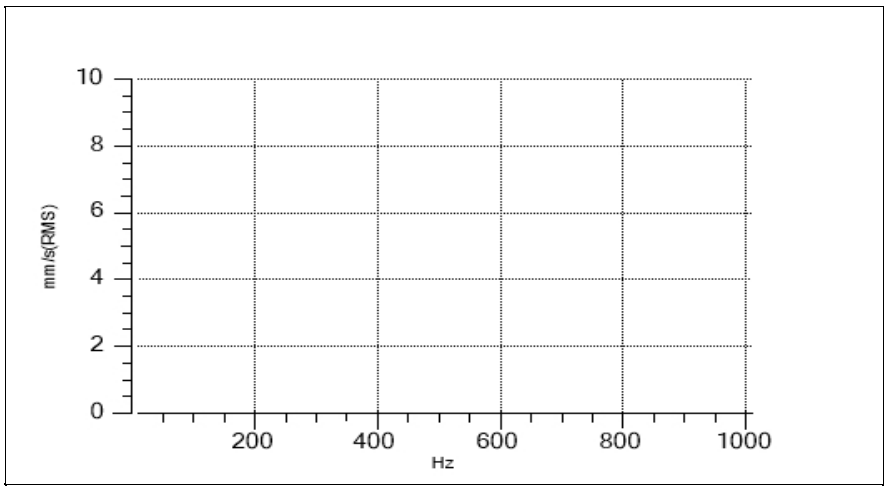
Factory Name	Area Name	Train Name	Machine Name	Point Name
LG-Electronic1	Area	Train	Machine1	Point1

Value	Date & Time	Parameter with Direction
1.14826	01-Jan-00 12:05:25 AM	Velocity Horizontal

Power Horizontal



Power Vertical



Factory Name	Area Name	Train Name	Machine Name	Point Name
LG-Electronic1	Area	Train	Machine1	Point2

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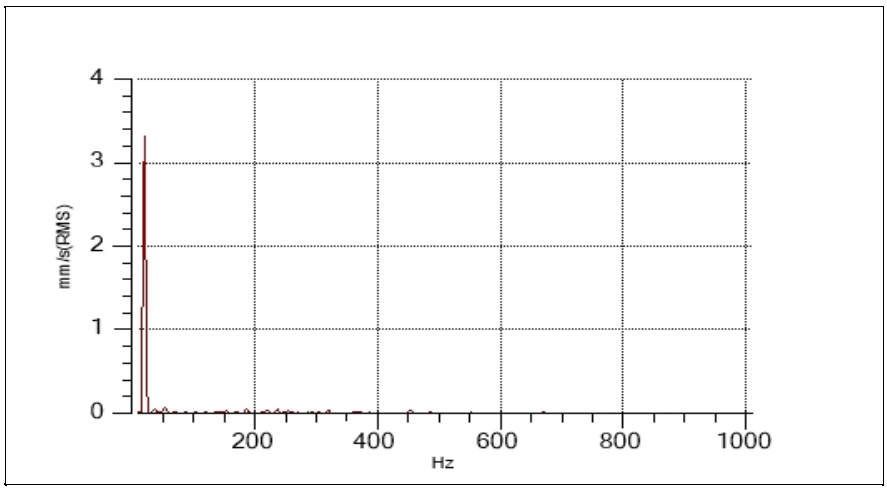
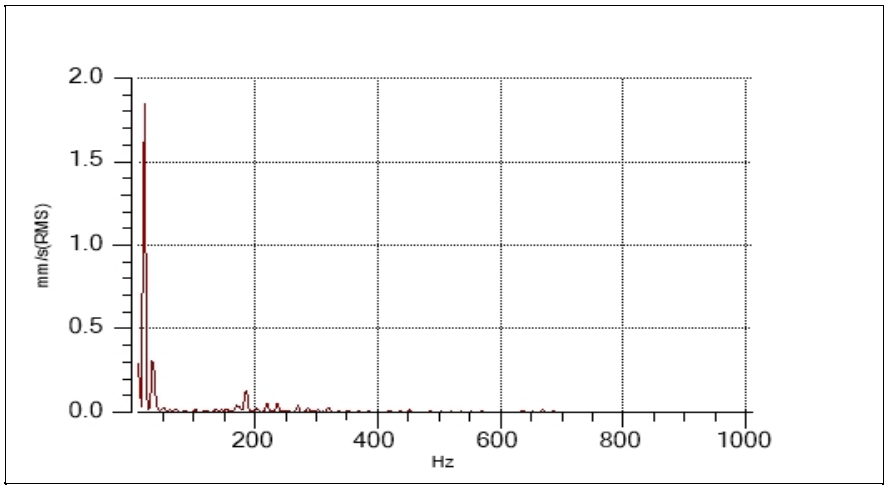
Velocity with Power Spectrum

Value	Date & Time	Parameter with Direction
0.50335	01-Jan-00 12:08:27 AM	Velocity Vertical
0.793999	01-Jan-00 12:08:53 AM	Velocity Axial
29.5702	01-Jan-00 12:08:53 AM	Velocity Horizontal

Power Vertical



Power Axial



Power Horizontal

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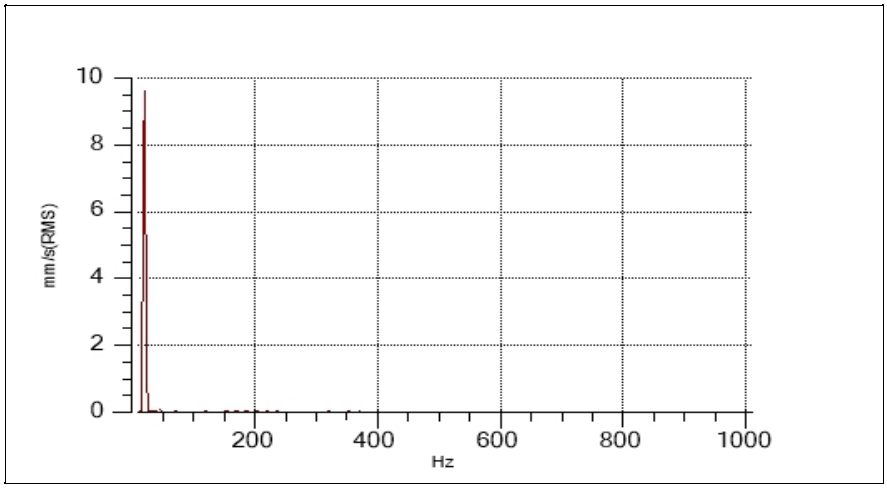
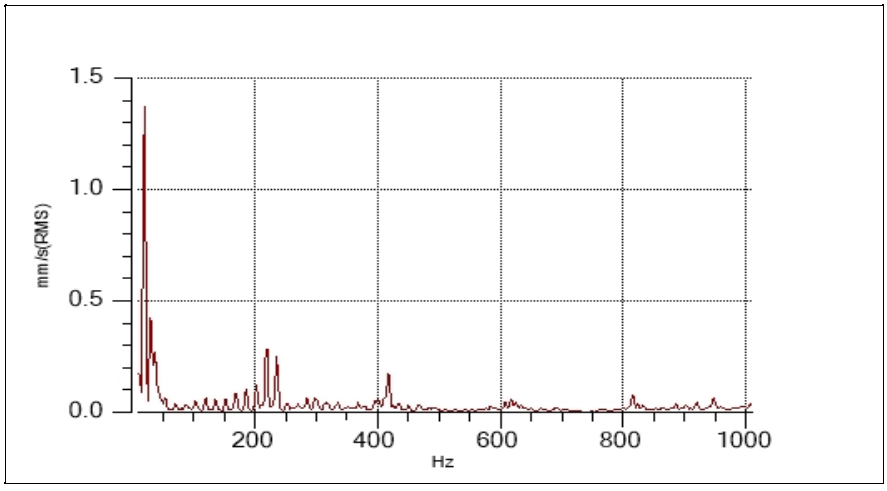
Velocity with Power Spectrum



Factory Name	Area Name	Train Name	Machine Name	Point Name
LG-Electronic1	Area	Train	Machine1	Point3

Value	Date & Time	Parameter with Direction
3.26365	01-Jan-00 12:09:47 AM	Velocity Horizontal
0.688554	01-Jan-00 12:09:47 AM	Velocity Vertical

Power Horizontal



Power Vertical

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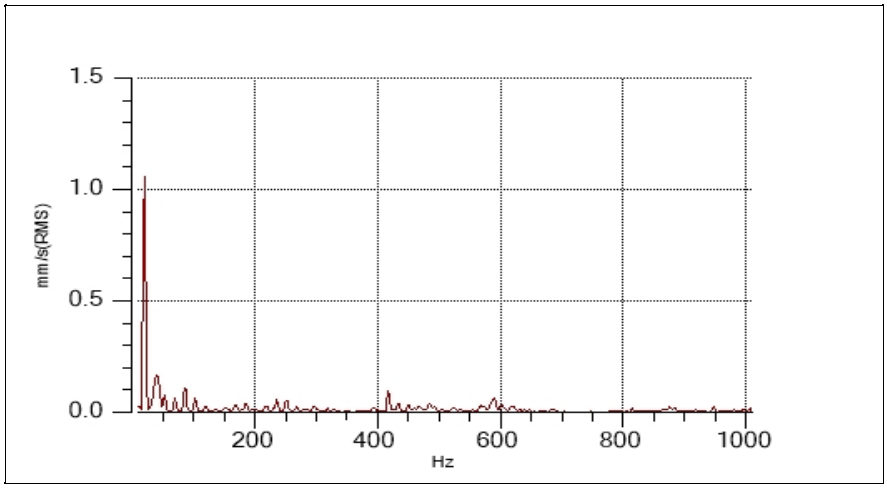
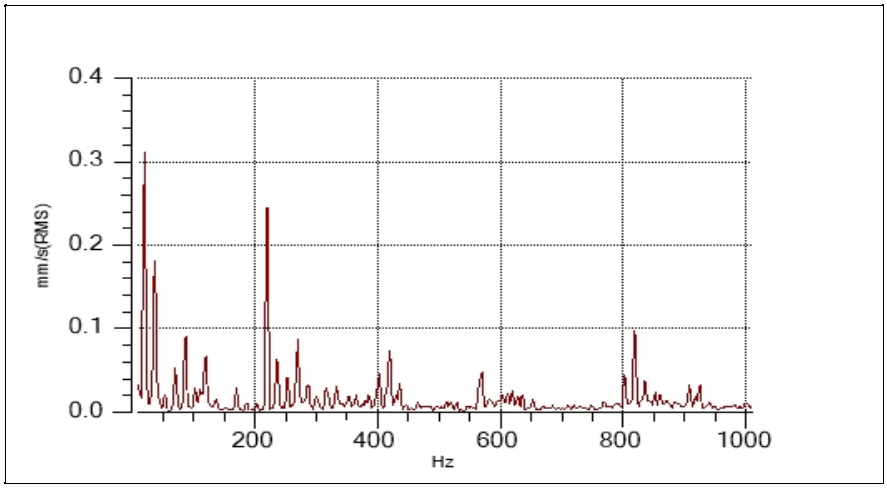
Velocity with Power Spectrum



Factory Name	Area Name	Train Name	Machine Name	Point Name
LG-Electronic1	Area	Train	Machine1	Point4

Value	Date & Time	Parameter with Direction
1.66269	01-Jan-00 12:11:26 AM	Velocity Axial
1.17014	01-Jan-00 12:11:26 AM	Velocity Horizontal

Power Axial



Power Horizontal

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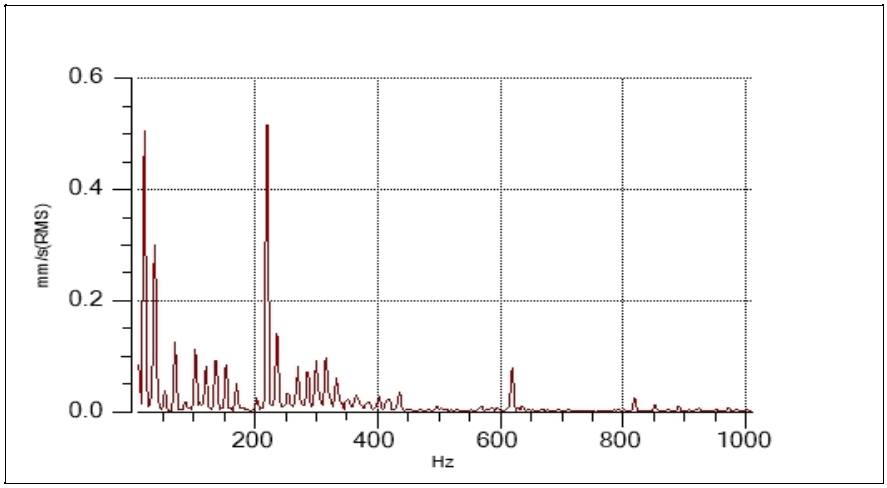
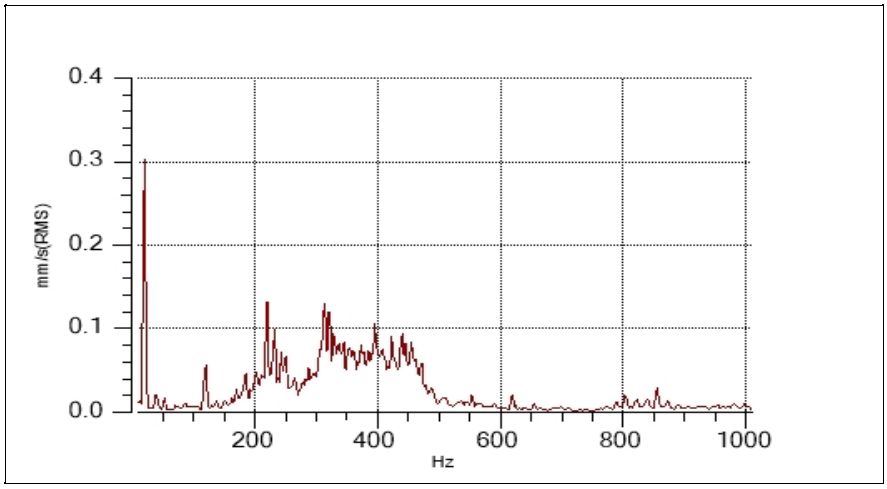
Velocity with Power Spectrum



Factory Name	Area Name	Train Name	Machine Name	Point Name
LG-Electronic1	Area	Train	Machine1	Point5

Value	Date & Time	Parameter with Direction
0.814177	01-Jan-00 12:12:24 AM	Velocity Horizontal
0.911501	01-Jan-00 12:12:24 AM	Velocity Vertical

Power Horizontal



Power Vertical

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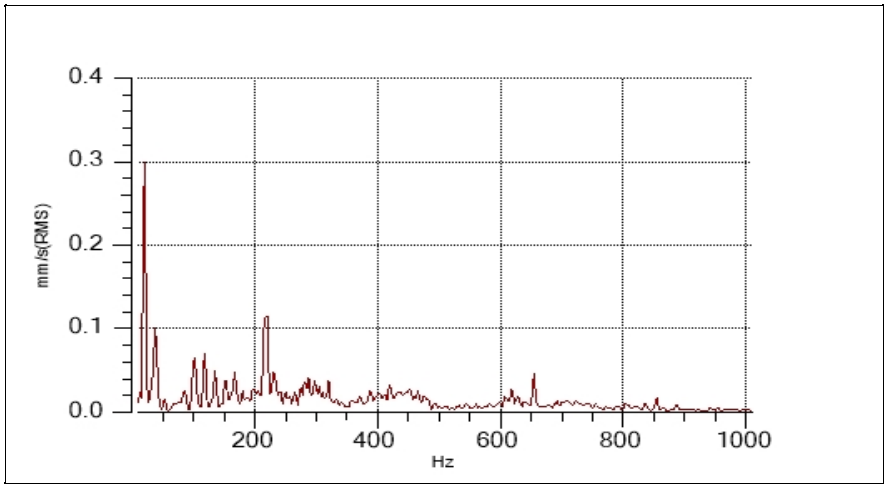
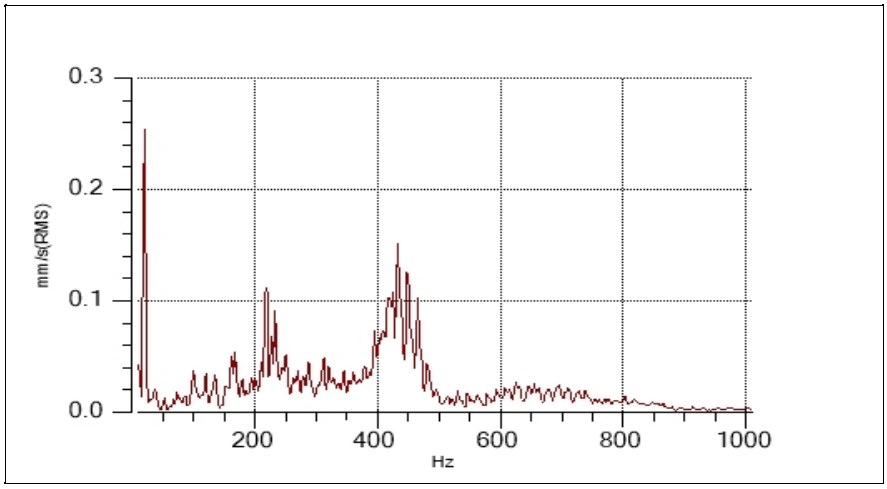
Velocity with Power Spectrum



Factory Name	Area Name	Train Name	Machine Name	Point Name
LG-Electronic1	Area	Train	Machine1	Point6

Value	Date & Time	Parameter with Direction
5.15067	01-Jan-00 12:13:32 AM	Velocity Horizontal
0.543394	01-Jan-00 12:13:32 AM	Velocity Vertical

Power Horizontal



Power Vertical

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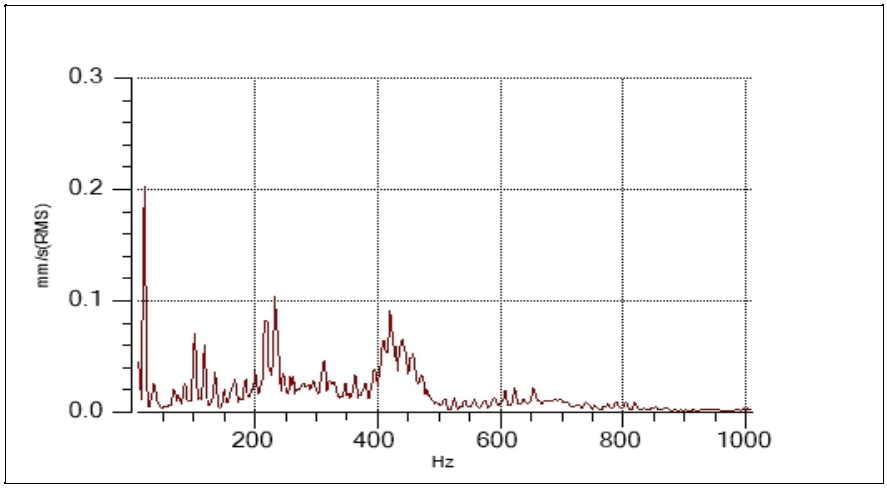
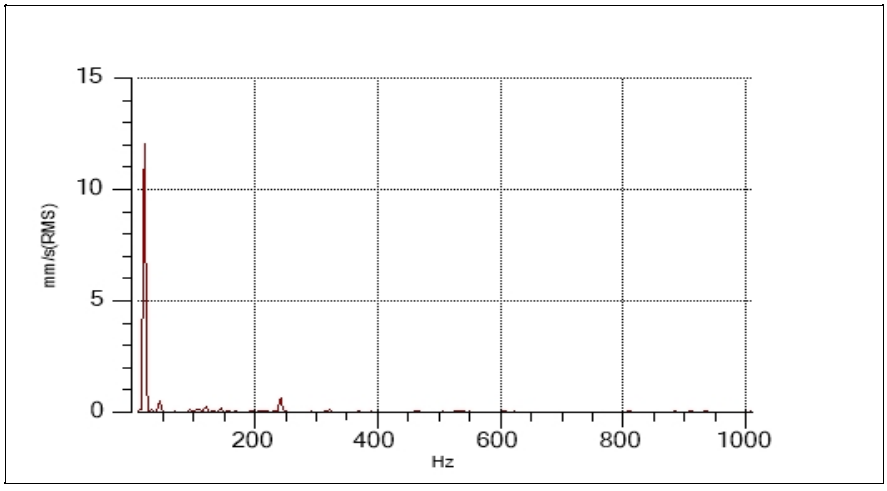
Velocity with Power Spectrum



Factory Name	Area Name	Train Name	Machine Name	Point Name
LG-Electronic1	Area	Train	Machine1	Point7

Value	Date & Time	Parameter with Direction
1.21585	01-Jan-00 12:20:48 AM	Velocity Horizontal
1.18539	01-Jan-00 12:20:48 AM	Velocity Vertical

Power Horizontal



Power Vertical

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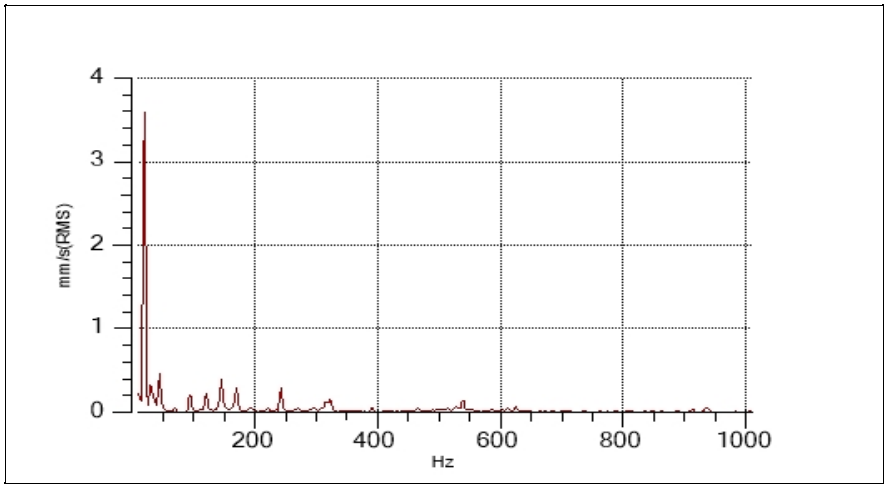
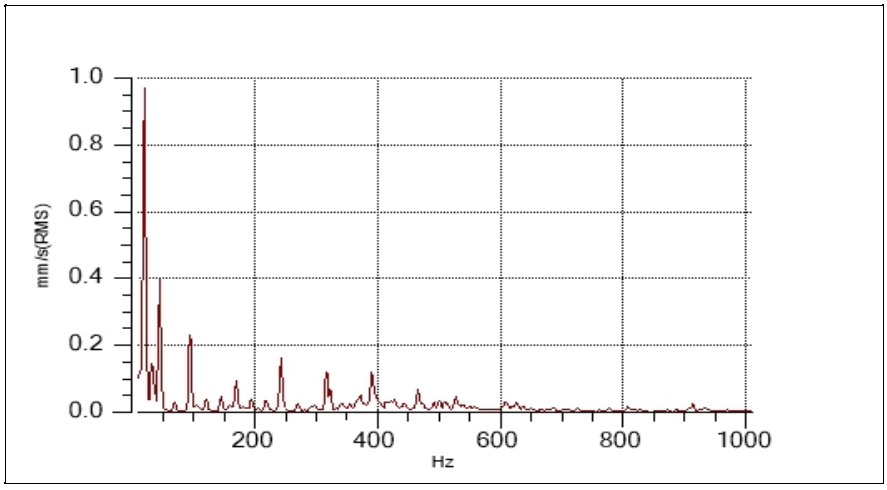
Velocity with Power Spectrum



Factory Name	Area Name	Train Name	Machine Name	Point Name
LG-Electronic1	Area	Train	Machine1	Point8

Value	Date & Time	Parameter with Direction
1.10738	01-Jan-00 12:22:16 AM	Velocity Axial
1.11742	01-Jan-00 12:22:16 AM	Velocity Horizontal
1.78132	01-Jan-00 12:22:16 AM	Velocity Vertical

Power Axial



Power Horizontal

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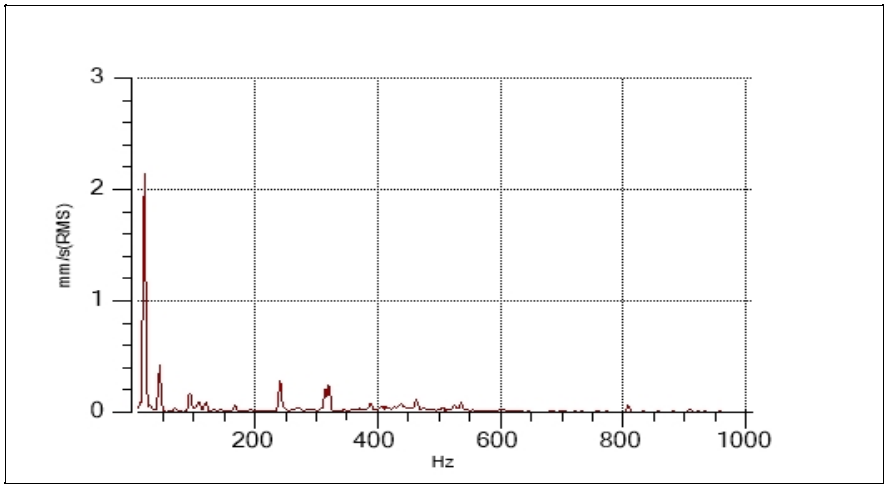
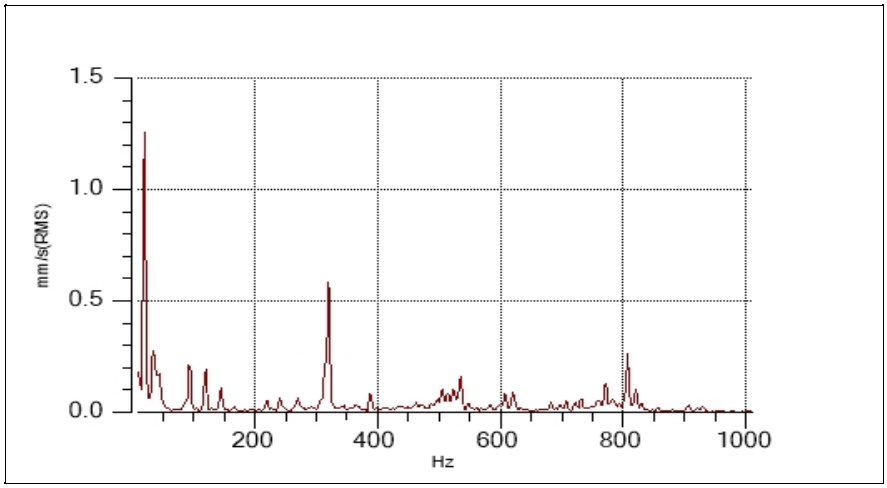
Velocity with Power Spectrum



Power Vertical



Factory Name	Area Name	Train Name	Machine Name	Point Name
LG-Electronic1	Area	Train	Machine1	Point9

Value	Date & Time	Parameter with Direction
4.82117	01-Jan-00 12:23:13 AM	Velocity Horizontal
2.52203	01-Jan-00 12:23:13 AM	Velocity Vertical

Power Horizontal

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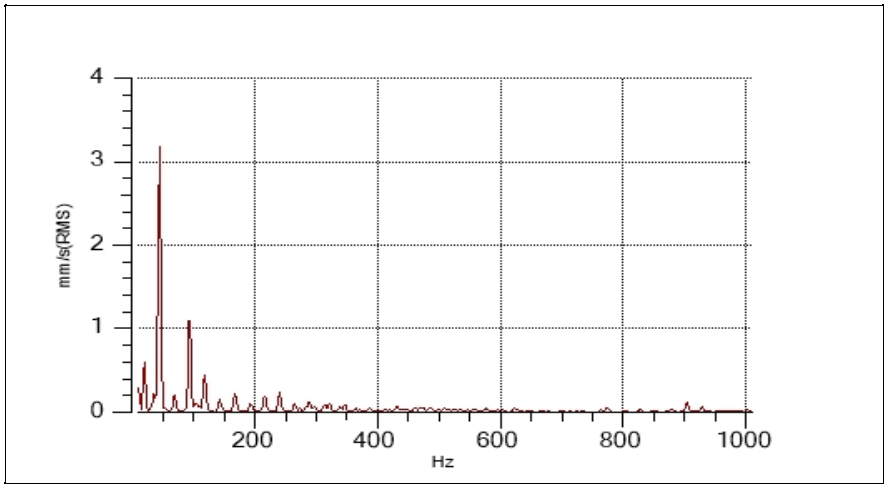
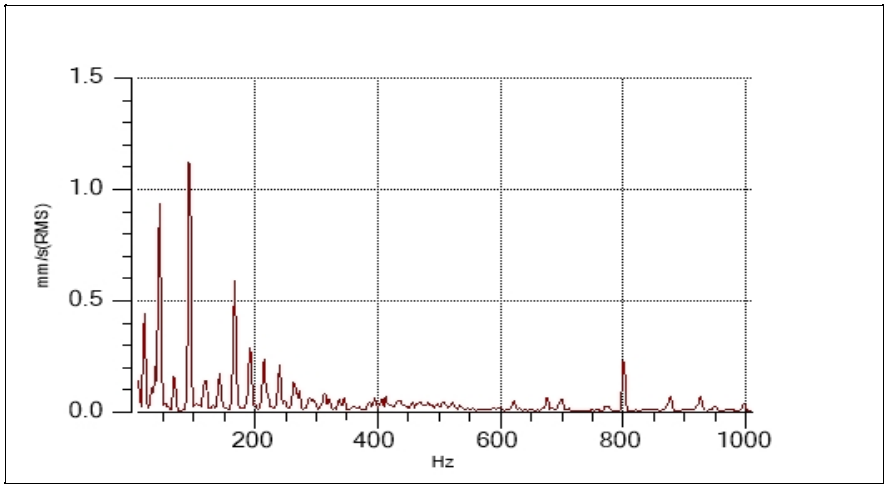
Velocity with Power Spectrum



Power Vertical



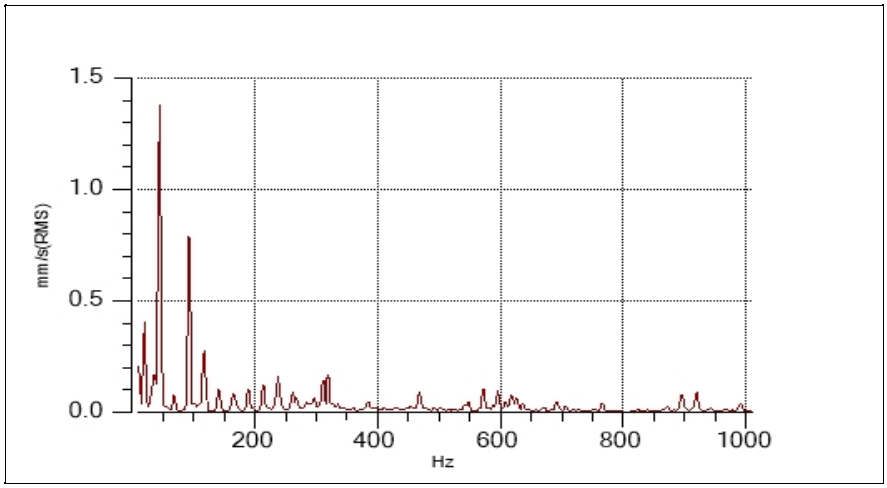
Factory Name	Area Name	Train Name	Machine Name	Point Name
LG-Electronic1	Area	Train	Machine1	Point10

Value	Date & Time	Parameter with Direction
2.00926	01-Jan-00 12:24:05 AM	Velocity Horizontal
2.55159	01-Jan-00 12:24:05 AM	Velocity Vertical

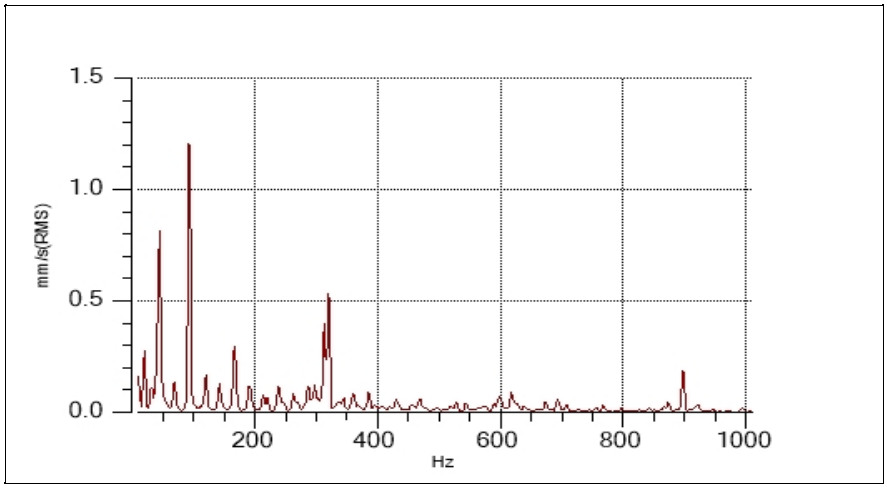
Power Horizontal

L.G Electronics

Velocity with Power Spectrum



Power Vertical



CONCLUSION

During the visit of our engineer to your site from **9th march 2016 to 10th march 2016** a detailed vibration measurement and analysis was carried out on your 58 machines.
It is suggested:

- To take up recommended corrective action given in the **machine surveillance report** for trouble free operation and plan next schedule for verification of the recommended action.
- To plan the next schedule at least **after 1 month** for those Machines which lies in alert zone by some marginal values for taking the close trend of vibrations.

Thanks & Regards
For Iadept Marketing

Brijesh Kumar
(Executive Director)