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Client:	Plant:
Report to:	Date: July 2009

Hand Tool Vibration Report

Data collected by:	
Report Author:	

Hand Tool Vibration tests

Introduction

Various Power Stations (and other sites) are now subject to a GMI requiring vibration testing of hand tools to check that they comply with new HSE legislation.

MMS was requested to carry out this work and the initial tests on 9 hand tools at the site were made on 14.7.09.

Development

This was the first set of measurements for your site although a set has been taken at another of your sites, which is considered to be the development location and as a result various approaches will be applied. Therefore the results from this initial survey should not be considered to be absolute but to be used as a guideline whilst the technique is refined.

Equipment

For this initial survey MMS made use of the Rockwell Enpac/Emonitor vibration analysis system.

Method

The list of tools surveyed is given in Table 1.

In order to measure their vibration levels, each one was run on the bench under no-load conditions. Vibration spectral and magnitude was then recorded in 2 x radial and 1 axial direction at a single location on each tool. The maximum recorded amplitude was used in the exposure calculations.
(ISO 5394-1 calls for triaxial measurements from 8-1KHZ frequency range.)

A standard 100 mv/g accelerometer was used to collect the spectral data which was then converted into a single overall vibration level by calculating the area under the curve in **m/s^2** or **G**.

Table 1-Tool list

	Make	Model	Serial No.	Comment
1	Bosch	Angle Grinder	D7045	
2	Makita	Die Grinder GD0800C	27482E	
3	Makita	Die Grinder GD0810C	24771E	
4	Bosch	Jigsaw	691000098	
5	Makita	Impact Wrench	264080	
6	Makita	Power Saw	0316678Y	
7	Maktec	Battery Drill	77347	
8	SIP	Pedestal Drill	P1562	
9	Asada	Pipe Threader	DC987	

Results
The results are recorded in the second column of Table 3. These figures represent the maximum vibration amplitude recorded on each of the tools tested.
These vibration figures were then entered into the Hand-Arm vibration exposure calculator shown at Table 2. This calculates how long a particular tool may be used for before it reaches vibration levels that could cause injury. These limits are defined as:-

EAV-Exposure action value of 2.5 m/s^2
ELV-Exposure limit value of 5 m/s^2

The results show that the worst machine-in terms of potential injury- is Tool 2, a Makita Die Grinder 800C ID number 27482E. This tool will reach EAV after 4 minutes of usage and ELV after 14 minutes.

Table 2-Exposure calculator

HSE Health & Safety Executive

HAND-ARM VIBRATION EXPOSURE CALCULATOR

Version 3 June 2005

	Vibration magnitude m/s² r.m.s.	Exposure points per hour	Time to reach EAV 2.5 m/s² A (8) hours	Time to reach EAV 2.5 m/s² A (8) minutes	Time to reach ELV 5 m/s² A (8) hours	Time to reach ELV 5 m/s² A (8) minutes	Exposure duration hours	Exposure duration minutes	Partial exposure m/s² A (8)	Partial exposure points
Tool or process 1	0							0		
Tool or process 2	0							0		
Tool or process 3	0									
Tool or process 4	0									
Tool or process 5	0									
Tool or process 6	0									

Instructions for use:

Enter vibration magnitudes and exposure durations in the white areas.
To calculate, press the Enter key, or move the cursor to a different cell.
The results are displayed in the yelllow areas.
To clear all cells, click on the 'Reset' button.

Daily exposure m/s² A (8)	Total exposure points

Table 3-Results

	Vibration magnitude m/s² r.m.s.	Exposure points per hour	Time to reach EAV 2.5 m/s² A(8) hours	minutes	Time to reach ELV 5 m/s² A(8) hours	minutes
Tool 1	1.6	5	19	32	>24	
Tool 2	29.1	1694	0	4	0	14
Tool 3	0.95	2	>24		>24	
Tool 4	2	8	12	30	>24	
Tool 5	1.1	2	>24		>24	
Tool 6	5.6	63	1	36	6	23
Tool 7	0.75	1	>24		>24	
Tool 8	0.18	0	>24		>24	
Tool 9	0.13	0	>24		>24	

EAV-Exposure action value
ELV-Exposure limit value