COSHH MONITORING REPORT ON OCCUPATIONAL

EXPOSURE TO DUST FROM "NO MORE PLY" BOARDS

AT

SPECIALIST TILING SUPPLIES LTD

LEEDS

Date of Survey: 29th March 2007
Carried out by: Mark Matthews
Function: Consultant
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1. INTRODUCTION

Following a request from the company, an investigation into operative exposure to hazardous airborne substances has been conducted at Specialist Tiling Supplies Ltd, Leeds. The survey investigated the nuisance dust and respirable crystalline silica exposure levels in the workplace air whilst working with “No more Ply” boards. Throughout the monitoring period a study was made of the working practices of the operatives such that the exposures could be explained and recommendations would be specific to the processes.

The results of this monitoring programme are the subject of the following report. The report discusses the methods employed and provides a summary of the results. Conclusions and recommendations based on the findings of the survey can be found in sections 4 and 5 of this report.

2. METHODOLOGY & APPARATUS

The results for occupational exposure for all methods were calculated using the procedures provided in the methods below and then each expressed as an 8-hour TWA exposure for the normal working shifts (as specified in Health & Safety Executive's Guidance Note EH 40/05) before comparison with the Workplace Exposure Limits (WEL) 2005 values for the relevant substances as shown in section 2.3 below. Where there is no relevant WEL other guidance limits have been suggested instead.

2.1 Nuisance Dust Monitoring & Respirable Crystalline Silica

Static and personal monitoring for respirable dust exposure was carried out as described in the HSE's MDHS-14/3 "General Methods for the Gravimetric Determination of Respirable and Total Inhalable Dust."

The respirable dust sampling was carried out using pumps with a cyclone head fitted with a 25mm filter PVC filter. The respirable cyclone samplers were set at a flow rate as close to 2.2L/min. as possible. All samplers were calibrated using a rotameter prior to and after the sampling period to obtain an average flow rate.

Sampling took place over about 2-3 hours, which was a significant part of the 8-hour normal shift. Any break times were removed from the sampling time if the pump was not worn or the break was taken at a distance from the working area. Following sampling the filters were analysed gravimetrically according to the procedures specified in MDHS – 14/3. All gravimetric determinations were carried out using a five-figure balance i.e. to 0.01 mg. X-ray diffraction (XRD) analysis of the respirable crystalline silica samples was carried out according to MDHS method 51/2 to determine the crystalline silica content of the samples.

2.2 Sampling Strategy

Three samples were taken to assess nuisance dust exposure during the unloading and stacking of “No more Ply” boards. Two of the samples were located within close proximity to the operation as static samplers. A personal sample was carried out to ascertain exposure for the employee carrying out the activities. This personal sample was sent for X-ray diffraction to ascertain respirable crystalline silica content of the sample.

2.3 Relevant Workplace Exposure Limits (WEL)s

The 8-hour TWA, Workplace Exposure Limits (WELs) for the substances under investigation are shown below:

Substance	Long Term WEL 8hr TWA mg/m³	Notation
Dusts		
General Nuisance Dust, respirable	4	
Respirable Crystalline Silica (RCS)	0.1	CHAN

(taken from Guidance Note EH 40/05, published by the Health and Safety Executive (HSE).)
CHAN - Respirable Crystalline Silica (RCS) has a CHAN (no.35) (chemical hazard alert notice) Long-term exposures to high levels can also lead to an increased risk of developing lung cancer.
The table below shows the significance level of the results described when compared to the relevant exposure limit.

% of WEL	Phrase
<10%	Insignificant
10 – 35%	Significant but low
36 – 60%	Significant
61 – 100%	Highly significant
>100%	Over the limit

These limits have been used as the basis of interpretation of the results of the monitoring programme.

2.4 Implications of Working Hours

In all of the results tables an 8-hr TWA has been expressed for the 8.5 hours of actual work, excluding breaks that is the normal working day shift. The normal working day is 07:30 – 16:30 with breaks totalling 30 minutes, which are taken away from the work area.

From discussions with operatives it is understood that a period of no more than 3 hours will be worked stacking the “No more Ply” boards that are under investigation in this report. The remaining time is spent working in the shop, preparing customers and other operations that do not generate high levels of dust.

A longer working period has been added to the report in order to show the effect of working for a longer period on the stack operations. This has been shown to be 4 hours and 5.5 hours carrying out other tasks.

3. RESULTS AND DISCUSSION

3.1 General

The results of the monitoring are shown in Table 1 – Dust & Respirable Crystalline Silica, showing the dust concentrations measured which are then converted to 8-hr TWA values. This latter calculation allows the measured concentration to be corrected for different work periods other than 8 hours. There is also a calculation that allows for a longer shift (final column on tables).

The operation involves stacking “No more Ply” boards onto pallets. Dust is created when it is expelled from between the “No more Ply” boards. This dust is a by-product of the cutting operations that takes place prior to Specialist Tiling Supplies receiving the “No more Ply” boards. Different operators have different techniques for moving the “No more Ply” boards, however dust will always been expelled and expose employees. Where “No more Ply” boards are slid from the original pallet onto smaller pallets it is believed to create less dust and is also

preferable due to the reduction in manual handling and should therefore be the chosen method of stacking “No more Ply” boards.

Dust masks are available to operatives and were observed being used by one of the employees whilst carrying out the operation. The type of dust mask is a type FFP1 and provides a protection factor of approximately 4 times the WEL.

The implications of these results will now be discussed by substance and unless stated relate to the result for the normal shift length.

3.2 Nuisance Respirable Dust

All of the samples were found to be below the WEL for respirable dust when the results are compared with an 8.5 hour shift which is worked by employees on site. As stated in section 2.4, the shift has been split into time spent stacking the “No more Ply” boards and time spent carrying out other tasks that tend not to expose employees to high levels of dust. The personal sample (ref.no.RCS1) when 3 hours are spent stacking “No more Ply” boards returned a result at 28% of the WEL. This can be classed as significant but low.

The two static samplers (ref.nos.2 & 3) were found to have been exposed to higher level of dust than the personal sample; this may be due to the dispersion of the dust whilst “No more Ply” boards are dropped onto the stack. From observation, the cloud is dispersed away from the employee working on the process. The two samples were found to be between 30-35%, which can also be classed as significant but low.

3.3 Respirable Crystalline Silica

One of the samples was sent for further analysis in order to ascertain what amount of the dust collected from the sample was respirable crystalline silica. Ref.no.RCS1 – the personal sample – was sent for analysis. Despite nuisance dust levels of approximately 25% of the WEL for respirable dust the results for respirable crystalline silica were found to be below the level of detection (0.02mg).

When this result is compared with the WEL for respirable crystalline silica it is found to be 30% which can be classed as significant but low. If the test were carried out for a longer sampling period (which was not possible at the time of the survey) it is highly likely that the concentration (personal exposure) would be lower than that found during this survey.

4. CONCLUSIONS

- 3 respirable dust samples were taken during the survey. All were found to be below the WEL for respirable dust. It is understood that employees may spend approximately 2-3 hours per day stacking the “No more Ply” boards; the rest of their time is spent carrying out tasks that are unlikely to expose them to high levels of dust. Personal exposure can be classed as significant but low at 25% or less of the WEL.
- The static samplers placed to the sides of the stacking operation returned the highest results. This is due to the dispersion of the dust during stacking operations.
- When respirable crystalline silica analysis is examined, the result was below the current WEL of 0.1mg/m^3.
- The results indicate that despite moderate levels of respirable particulate, the more hazardous components of silica were not found.
- The suitable RPE that is worn should minimise dust exposure levels further to well below the respirable dust WEL, providing that it is worn correctly.
- There is some use of dust masks during stacking, however it is not uniform.

5. RECOMMENDATIONS

- It should be noted that as Respirable Crystalline Silica has been issued a Chemical Hazard Alert Notice (CHAN35) and it is recommended that exposure be reduced to 0.1mg/m^3 or less as a 8hr TWA.
- As laid down in the new regulations under the principles of good practice employees working with the substance should be given information, instruction and training on the use of control measures used to control the risks.
- Other work practices, such sweeping dust with a dustpan and brush where more airborne dust is created, should be minimised and replaced by the use of vacuum techniques where possible.
- All personnel should be made aware of the fact that by improving their own working practises, it may be possible to reduce their own exposure to dust e.g. by improving general housekeeping in their own work area.
- Encourage operatives not to eat or drink at their workstations, but to use clean welfare areas instead.

6. REPORT DETAILS

Dates of survey: 29th March 2007.

Report written by: _____
Mark Matthews
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Checked by: _____
Dr Tony Smith
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Report Date: 26th April 2007.

APPENDIX I

Calculation of dust exposures with regard to the 8-hour reference period.

Taken from 'Calculation Methods' Section, Schedule Part 1, of HSE Guidance Notes EH 40/05.

The 8-hour reference period.

1. The term "8-hour reference period" relates to the procedure whereby the occupational exposures in any 24-hour period are treated as equivalent to a single uniform exposure for 8 hours (the 8-hour time-weighted average (TWA) exposure).

2. The 8-hour TWA may be represented mathematically by:

$$\frac{C_1 T_1 + C_2 T_2 + ...C_n T_n}{8}$$

where C_1 is the occupational exposure and T_1 is the associated exposure time in hours in any 24-hour period. (It has been assumed that the dust exposure level during lunch and breaks was zero.)

APPENDIX II

The Control of Substances Hazardous to Health (Amendment) Regulations 2005

The new COSHH regulations fully came into force on 6th April 2005 and have set a number of changes to the exposure limit system and approach to **adequate control** as outlined below. A single type of exposure limit – the 'Workplace exposure limit (WEL)' replaces the previous 'maximum exposure limit (MEL) and occupational exposure standard (OES). The new system was developed to make it easier for duty holders to understand and comply with the limits. It also takes into account the fact that in reality, a "safe" limit cannot be guaranteed. This new limit system will be used to incorporate Indicative Occupational Exposure Limit Values (IOELVs).

The new regulations apply the **principles of good practice** to form the basis for the control of exposure to substances hazardous to health as set out in the new schedule 2A. Duty holders will have achieved adequate control if the WEL approved for a substance is not exceeded and they apply the principles outlined in Schedule 2A below:

"SCHEDULE 2A

Regulation 7(7)

PRINCIPLES OF GOOD PRACTICE FOR THE CONTROL OF EXPOSURE TO SUBSTANCES HAZARDOUS TO HEALTH

a) Design and operate processes and activities to minimise emission, release and spread of substances hazardous to health.

b) Take into account all relevant routes of exposure – inhalation, skin absorption and ingestion, when developing control measures.

c) Control exposure by means that are proportionate to the health risk.

d) Choose the most effective and reliable control options which minimise the escape and spread of substances hazardous to health.

e) Where adequate control of exposure cannot be achieved by other means, provide, in combination with other control measures, suitable personal protective equipment.

f) Check and review regularly all elements of control measures for their continuing effectiveness.

g) Inform and train all employees on the hazards and risks from the substances with which they work and the use of control measures developed to minimise the risks.

h) Ensure that the introduction of control measures does not increase the overall risk to health and safety."

In addition to the above, "for a substance:

i) which carries the **"risk phrase"** as assigned in regulation 2(1) of the CHIP Regulations, **R45, R46, or R49**, **or** for a **substance** or **process** which is listed in **Schedule 1**; or

ii) which carries the **risk phrase R42 or R42/43**, or which is listed in section C or HSE publication " Asthmagen? Critical assessments of the evidence for agents implicated in **occupational asthma**" as updated from time to time, or any other substance which the risk assessment has shown to be a potential cause of occupational asthma,

exposure is reduced to **as low a level as is reasonably practicable**."

R42 – May cause sensitisation by inhalation
R42/43 – May cause sensitisation by inhalation and skin contact
R43 – May cause sensitisation by skin contact
R45 – May cause cancer (carcinogen)
R46 – May cause heritable genetic damage (mutagen)
R49 – May cause cancer by inhalation (carcinogen)

Table 1 - Dust & Respirable Crystalline Silica Survey at Specialist Tiling Supplies Ltd, Leeds on 29/03/2007

Sample Ref.No.	Machine area and sample position	Flow rate (l/min)	Time of run (mins)	Volume (l)		Wt. Collected (mg)	Stacking operation Dust Conc (mg/m^3)	Stack operation 8-hr TWA (mg/m^3)	Other work activities Dust Conc (mg/m^3)	Other Work Activities 8-hr TWA (mg/m^3)	Normal shift 8-hr TWA* (mg/m^3)	Overtime 8-hr TWA** (mg/m^3)
	Respirable (RD)								**Assumed**	**Assumed**		
RCS1	M. Burrowes/M. Warner - Unloading & stacking boards	1.8	142	252		0.48	1.90	**0.7**	0.50	**0.3**	**1.06**	**1.3**
RCS2	Static - To left of stack operation. Head height	1.7	141	236		0.64	2.71	**1.0**	0.50	**0.3**	**1.4**	**1.7**
RCS3	Static - To right of stack operation - Waist height	1.6	142	231		0.5	2.3	**0.9**	0.50	**0.3**	**1.2**	**1.5**
	Respirable Crystalline Silica (RCS)											
RCS1	M. Burrowes/M. Warner - Unloading & stacking boards	1.8	142	252	<	0.02	0.079	**0.03**	0.00	**0.00**	**0.03**	**0.04**

WORKPLACE EXPOSURE LIMIT (WEL) (8hrTWA)
Respirable dust - 4 mg/m^3
Respirable Crystalline Silica - 0.1 mg/m^3

Level of Detection for respirable crystalline silica = 0.02mg

*Calculated as 8.5hrs of actual working time (3hours carrying out “No more Ply” boards stacking, 5.5 other tasks)
**Calculated as 9.5hrs of actual working time (4hours carrying out “No more Ply” boards stacking, 5.5 other tasks)