

Personal DP and Noise Exposure Monitoring

Hazard Awareness & Control

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CS Coal Services Pty Limited

Why Bother?

Two emerging Issues

- Diesel Particulate
- Noise

What are the risks and how do we manage them?

The long –term cumulative effects of Exposure to DP & Noise are debilitating to the individual

The extended latency period between exposure and onset of symptoms leads to complacency

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Diesel Particulate

- Determined to be a carcinogen.
- Potency is not well-defined but significant
- Small particle size of DP has resulted in it being linked to non malignant health effects similar to PM2.5
- Non malignant respiratory effects –
 - exacerbation of diseases like asthma
- Irritant (eyes, nasal & bronchial)
- Exposure Guideline in MDG 29 0.1mg/m³

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Diesel Exhaust Composition

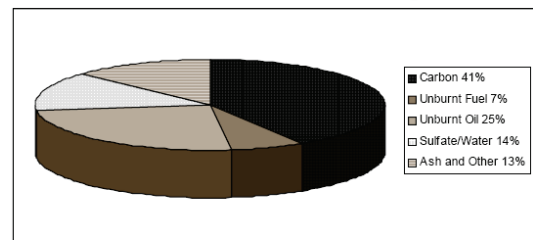


Fig. 1: Composition of particles from a heavy duty diesel engine, tested in a transient cycle (Kittelson, 1998). Depending on engine design and operating conditions the composition may vary widely.

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How to Reduce Your Exposure

- Understand your Risk
- In order to control risk it must be identified
- Measure and Rank
- Assess control measures and/or procedures
- Interrogate the process
- Empower the workforce – education
- Review the progress

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The key steps in the control process

Measure the Exposure

- Undertake Survey of Equipment
- Personal Monitoring
- Task based monitoring

Assess Risk

- Review results against Exposure standards
- Risk rank against internal/corporate standards
- Assess personnel/tasks at most risk

Review/Implement Control Measures

- Review existing data, processes and systems,
- Ensure standards are being maintained
- Research and Implement effective control strategies

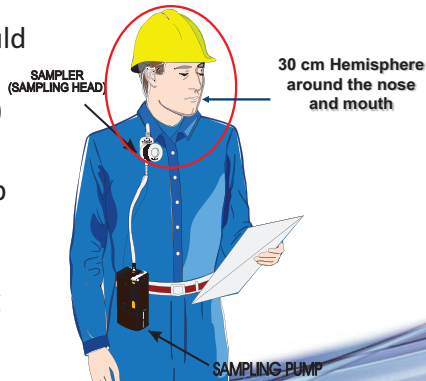
Review the Process

Undertake monitoring of persons, task and equipment to determine effectiveness of control strategies

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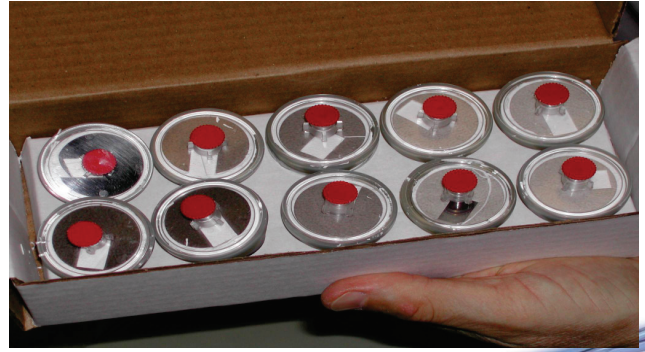
Sampling Strategy

- All samples should be personal.
- Pump rate at 2.0 l/pm
- Crib room to crib room sampling.
- Cyclone worn within breathing zone.



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Variation in Exposures



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Coal Mines Safety Regulations 2006

- Operations required to control exposure to DPM.
- No guidance provided or exposure standard mentioned.
- This was issued via MDG 29 by the DI&I
- Change in definition of dust.
- Sampling frequencies and persons in new Gazettal Notice for respirable and inhalable dust and cementitious products – not for diesel.

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MDG 29

- Available on DPI website.
- Includes requirement for exhaust measurement for DPM in addition to gases.
- A number of instruments currently available.
- Gas test requirements were gazetted in February '07.
- Implemented in April 2008.
- Requirement for personal exposure monitoring.
- An exposure standard of 0.1mg/m³ EC
- Requirement for noise and vibration measurement

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Best Practice

- Low emission fuel
- Emissions based maintenance program
 - Suitable equipment
 - Maintenance training
- Ventilation Strategy
 - Quantity, maintenance
 - Vehicle tag boards
- Control of contractor/hire vehicles

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Best Practice

- Low emission engines
- Exhaust Treatment
 - DPF – Exhaust Filters
 - Catalytic Converters
- Alternative power – electric
- Road Maintenance
 - Well drained, dry
 - Even, good gradient

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Noise

- Coal Industry exemption removed in 2006 from requirements of OH&S Regulations.
- Must therefore comply with:
 - NOHSC 1007(2000)] – National standard for Occ. noise.
 - [NOHSC 2009 (2004)] – National COP for Noise Management and hearing protection at work
 - NSW OH&S Act & attendant Regulations
 - Hearing Protection - Code of Practice

Health Effects

In addition to NIHL excessive exposure can have other health effects including:

Impact on your Body

- High Blood Pressure
- Sleeping Problems
- Cardiac problems
- Muscular contraction

Impact on your Quality of Life

- Nervousness
- Poor concentration
- Fatigue
- Anxiety and Stress

- No improvement in hearing loss stats for Cal Industry in the past Twenty Years
- Claims exceed 1.5 m over the past decade.

Introduction to Sound Level Meters

- Integrating or non-integrating
- Type 0,1 – precision
- Type 2 – general/industrial use
- Type 3 – indication only
- Filters and weighting networks A, C, lin
- Frequency analysis – 1/3 and octave band
- Primarily for walk-through survey work



Introduction to Dosimeters

- SLM with ability to provide an integrated noise exposure over a given period (ie work shift – 8, 10, 12 hr)
- Most provide data logging with ability to set statistical parameters, alarm levels, and record peaks in addition to exposure in increments – normally 60 sec.
- Microphone should attached as near as possible to the employees ear (generally the collar).

How Do You Determine What is Required?

- Noise survey, contour plans, dosimetry
- A or C weighted readings or both.
- Is the survey based on reaction to specific complaints or issues.
- Is it a baseline survey to establish "hearing protection zones".
- Does the employer wish to assess suitability of hearing protection.
- Where does/do the worker/s spend the bulk of their time
- EPA Env. Noise Control Manual states "noise assessment may be necessary in several locations, but should be made at least at the place where the noise is most likely to be offensive".

When is a survey required?

- If you need to raise your voice to be heard
- Frequent complaints
- Loss of hearing over period of day
- Long term employees with NIHL
- Hearing protectors are provided
- Workers Comp claims
- Notifications on manufacturers equipment.

NOISE HAZARD IDENTIFICATION CHECKLIST

APPENDIX 2

Description of work location: _____

Task at workstation: _____

Assessed by: _____ Date: _____

Employee representation: _____

Yes to any of the following indicates the need for a detailed noise assessment.

1. Is a raised voice needed to communicate with someone about one meter away?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
2. Do workers complain that there is too much noise?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
3. Do workers say that they can't hear each other or hear instructions or warning signals?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
4. Do people working in the area notice a reduction in hearing over the course of the day? (This reduction might not be noticed until after work)	Yes <input type="checkbox"/>	No <input type="checkbox"/>
5. Do employees experience any of the following:		
(a) ringing in the ears (tinnitus).	Yes <input type="checkbox"/>	No <input type="checkbox"/>
(b) the same sound hearing a different tone in each ear.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
(c) blurred hearing?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
6. Are any long-term employees hard of hearing?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
7. Are personal hearing protectors provided?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
8. Are signs, indicating that personal hearing protectors should be worn, posted at the entrance or in the work area?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
9. Have there been any workers' compensation claims for noise-induced hearing loss?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
10. Does any equipment have manufacturer's noise information (including labels) that indicates noise levels equal to or greater than any of the following:		
(a) 90dB(A) Leq,1hr	Yes <input type="checkbox"/>	No <input type="checkbox"/>
(b) 120dB peak noise level	Yes <input type="checkbox"/>	No <input type="checkbox"/>
(c) 90dB(A) sound power level?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
11. Do the results of audiometry indicate that past or present employees have hearing loss?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
12. Does the noise in any part of the workplace sound so loud or louder than 85 decibels using the scale Decibel Levels of Common Sounds?	Yes <input type="checkbox"/>	No <input type="checkbox"/>

- Statistically a number of samples should be taken.



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NOISE DOSE SURVEY AT
Location : NEW 100T M/C

Test No: M0405111 **Date:** 11/Aug/2004 **Start Time:** 15:00 **Run Time:** 05 hrs 00 mins **Sampling Period:** 60.00 secs

Log: 91.60 dB(A) **Linear Peak:** 143.06 dBS(Lin)

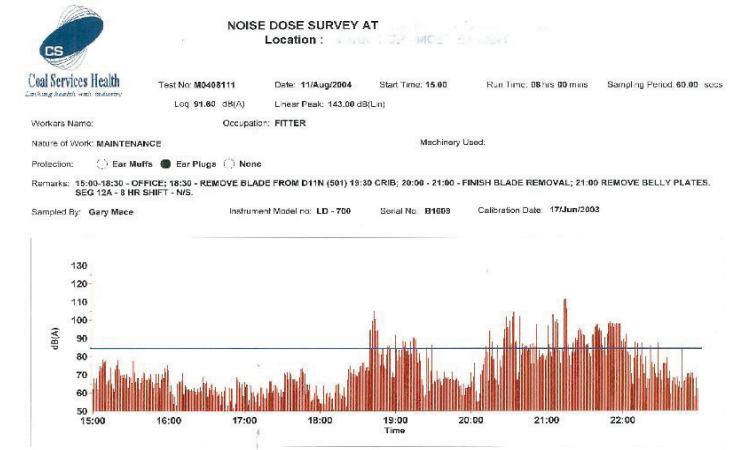
Workers Name: _____ **Occupation:** FITTER **Machinery Used:** _____

Nature of Work: MAINTENANCE

Protection: ☐ Ear Muffs ☒ Ear Plugs ☐ None

Remarks: 15:00-18:30 - OFFICE; 18:30 - REMOVE BLADE FROM D11N (591) 19:30 CRIB; 20:00 - 21:00 - FINISH BLADE REMOVAL; 21:00 REMOVE BELLY PLATES, SEG 12A - 8 HR SHIFT - NIS.

Sampled By: Gary Mace **Instrument Model no:** LD - 700 **Serial No:** B1609 **Calibration Date:** 17/Jun/2003



The Aim Should always be to Control Noise at the Source



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- Risk ranking and priority



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- Conduct audiometric testing of "at risk" employees.
- Provision of quiet areas for breaks (lunch etc)

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Best Practice

Stage 2

- Use of higher order controls (*substitution, isolation & engineering*) for noise hazards.
- Pre-employment audiometric testing to establish threshold baselines.
- Comprehensive mapping of hazardous noise on-site & incorporated into induction & risk management.
- Periodic retraining in PPE use (*fitting, selection & Maintenance*)
- Supervised compliance to posted zones
- Maintenance of records testing, training etc
- Auditing of systems.

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What is Coal Services doing?

- Establishment of Noise sub-committee of the SDC.
- Provision of information on hazards control measures, up-to-date research.
- Higher level training of staff
- Commitment to upgraded equipment and services for the industry.
- Collaborating with DI&I and industry groups to drive improvement in noise abatement.

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How can Coal Services Help?

- Assistance with Health Management Plans
(focus on Health hazards)
- Training and awareness packages
- Noise mapping and exposure monitoring
- Compliance assistance.
- Fit testing of PPE
- Audiometric testing
- Information services

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