



RESPIRABLE QUARTZ

“ITS NOT JUST DUST”

1st Edition

**QUESTIONS & ANSWERS
2001**

RESPIRABLE QUARTZ

“IT’S NOT JUST DUST”

1st Edition

The Joint Coal Board’s Standing Committee on Dust Research and Control has produced this booklet to promote a better understanding of the effects and control of respirable quartz (silica) in the coalmining industry.

Copies of this booklet may be obtained from the Board’s Offices in Singleton, Warners Bay, Corrimall and Lithgow or from:

The Secretary
Standing Committee on Dust Research and Control
Joint Coal Board
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Sydney NSW 1042
Telephone: (02) 9291 5678
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A copy can also be downloaded from the Board’s website at www.jcb.org.au.
(check “Current and Emerging Issues/Respirable Dust” and follow the prompts).

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1. What is quartz ?

“Quartz”, “Crystalline Silica” and “Free Silica” are common names for a naturally occurring mineral compound in the earth’s crust and is a form of quartz which can be a health hazard.

2. How does quartz affect you ?

Breathing air containing quartz dust for a prolonged period can lead to a lung disease called Silicosis, in which the lungs become damaged due to a reaction between the quartz dust and the lung tissues causing scarring.

It usually takes decades of exposure to quartz dust to develop Silicosis, but prolonged exposure to very high concentrations of quartz-containing dust can lead to earlier development of the disease (ie. in years rather than decades).

Silicosis can also make an individual more susceptible to lung infections such as Tuberculosis (TB) and can also be associated with the development of lung cancer.

3. What are the Symptoms ?

In the earliest stages, Silicosis causes no symptoms. However, as the disease progresses, the scarred lungs are less able to function normally and this can lead to early symptoms such as shortness of breath on exertion; cough; occasional chest pains; loss of appetite; and minor fatigue.

As further damage to the lungs occurs the symptoms tend to worsen, and can be: more severe and persistent shortness of breath; more severe and persistent cough; worsening chest pains; weight loss; fever; night sweats; cyanosis (blue discolouration of the skin); and respiratory failure.

The disease can be detected by chest X-ray in the early stages before symptoms develop and, if detected early, steps can be taken to prevent further exposure to quartz dust, thus preventing further damage to the lungs.

Note: It is important to remember that there is no cure for Silicosis, and thus prevention is the only reasonable option.

4. Where are coalminers exposed to quartz ?

The most common exposures occur, but are not limited to, the following:

- | | | |
|-------------|---|---|
| Underground | - | cutting stone roof or floor or stone bands in the seam during continuous miner or longwall operations |
| | - | roof bolting into sandstone or mudstone |
| | - | at material transfer and loading points |
| | - | in ventilation returns |
| Open Cut | - | drilling or shotfiring operations |

Note: Stone Dust (a term used in coal mining operations) is made from limestone. Its use in coalmines is controlled by regulation and it is not permitted to contain more than 3% quartz.

5. What are the current respirable quartz & dust exposure limits ?

In the NSW coalmining industry the levels for respirable quartz and dust are regulated as follows:

The specified limit for quartz-containing dust is 0.15 milligrams of respirable quartz per cubic metre of air sampled. ("quartz containing dust" means dust which contains five per cent or more by mass of respirable quartz).

Note: The higher the quartz level the more dangerous it is.

The specified limit for respirable dust (other than quartz-containing dust) is 3 milligrams of respirable dust per cubic metre of air sampled.

A copy of the gazettal notice made pursuant to the Coal Mines Regulation Act 1982 is attached as Appendix "A".

It is important to note that respirable dust particles (which are only a fraction of the width of a human hair) are too small to be seen with the naked eye. Therefore a lack of visible dust does not mean that respirable dust is not present.

6. How were the limits determined and are they effective ?

The current coalmine exposure standard was determined after extensive research at a number of NSW coalmines in the early 1980's and these levels are constantly being reviewed in the light of new research. There has been a steady decrease in dust disease patterns in NSW coalmine workers and consequently the Standing Dust Committee considers that compliance with current exposure standards will provide effective protection. The gravimetric measurement of respirable dust and quartz is the internationally recognised technique for monitoring the exposure of coalmine workers.

7. Because different mining methods are now used, would it better to take real-time (instant) dust measurements rather than the current method of measuring over a shift (time-weighted measurement)?

Real-time dust measurements are useful to determine the levels to which respirable dust concentrations can reach at an instant in time. However, to accurately measure the total respirable dust and quartz that a coalmine worker is exposed to over a shift the current time weighted testing is the most effective method.

8. Should the exposure limit be less for extended shifts ?

The current exposure limits for dust and quartz were based on a 40 hour week (working an 8 hour shift 5 days a week) over a 40 year working life.

For working weeks greater than 40 hours therefore the exposure limit needs to be lower. As a general rule the exposure limit can be adjusted by a factor calculated from the ratio of weekly exposure in a normal work cycle to the average weekly exposure in the extended cycle.

For more detailed information on this matter please refer to the JCB Health & Safety Trust research project on “Extended Shift Exposure Limit Adjustment Factors for Coal Mine Dusts”. Contact the Trust Secretary by email on: trust@jcb.org.au

9. Would a personal gravimetric sampler give a false reading when exposed to non contaminated atmospheres following a short but high exposure to a dusty environment ?

No.

The key factor in the onset of lung dust disease is the total body burden of coal dust or quartz not whether it occurs on one part of a shift or during a particular mining method or whether there is a short high exposure. The measuring method is designed to give the average result for the duration of the shift taking into account periods of high and low exposure.

The dilution effect of a coalmine worker being exposed to a non-contaminated atmosphere following a short but high exposure would therefore be beneficial to the worker eg. task rotation during the shift.

10. Can exposure to visible dust be harmful ie. large dust clouds in an open cut ?

Yes – because they may contain respirable dust and quartz.

Visible dust, when inhaled or inspired, can cause minor irritation to nose and throat. This dust is usually removed by the body's natural clearance systems (coughing, sneezing, etc). A coalmine worker can be exposed to large clouds of dust but still be within the respirable dust exposure limit. This is a concept that some coalminers find hard to accept. Excessive levels however can cause respiratory disorders eg. bronchitis, and exposure should be kept to a minimum.

11. What about using personal protective equipment ?

There are numerous respirators of approved types that can be used to minimise a coalmine worker's exposure but it is important that they be properly fitted and maintained. However, the use of personal respiratory protection is not a substitute for adequate dust control.

12. What is the best protection ?

Adequate ventilation and the application of water, in sufficient quantity and in the correct location, will provide adequate protection for most dust problems. Personal protective equipment should be worn where a dust problem cannot be solved immediately by the above methods. The best protection however is prevention – work in clean air wherever possible and STAY OUT OF THE DUST.

Further information

The Board's Standing Committee on Dust Research and Control endeavours to provide the industry with the latest information on respirable dust and quartz through various publications.

The Committee previously produced the booklet "Respirable Dust in Coal Mines" which can also be obtained from any of the Board's district offices or viewed on the Board's website at www.jcb.org.au.

Further information and training may also be provided by your employer.

**COAL MINES REGULATION ACT 1982
COAL MINES (UNDERGROUND) REGULATION 1999
COAL MINES (OPEN CUT) REGULATION 1999**

File No. C99/0691
Date: 1 September 1999

SPECIFIED LIMITS FOR AIRBORNE DUST

FOR the purposes of clause 161 of the Coal Mines (Underground) Regulation 1999 and clause 29 of the Coal Mines (Open Cut) Regulation 1999, (definition of 'specified limit'), it is hereby notified that the limit specified in respect of certain types of dust is as follows:

Specified Limit for Quartz-Containing Dust:

The specified limit for quartz-containing dust is 0.15 milligrams of respirable quartz per cubic metre of air sampled.

Specified Limit for Respirable Dust (other than quartz-containing dust):

The specified limit for respirable dust (other than quartz-containing dust) is 3 milligrams of respirable dust per cubic metre of air sampled.

Definitions:

In this notice:

- "quartz-containing dust" means dust which contains five per cent or more by mass of respirable quartz
- "respirable dust" has the same meaning as it has in Australian Standard 2985
- "respirable quartz" means the quartz present in respirable dust
- "breathing zone" has the same meaning as it has in Australian Standard 2985

PAUL THOMAS HEALEY,
CHIEF INSPECTOR OF COAL MINES.