Assay Laboratories - Unhealthy Dusty Work?

Assay laboratories in the mining and exploration industries can be dusty places – but it doesn't have to be so.

Silica dust levels exceeded the exposure standard in 50% of measurements in a recent study by WA government inspectors. [1] In some cases using compressed air to clean crushing machines created dust levels up to seven times the inhalable dust exposure standard.

Dust, especially silica, increases the risk of chronic obstructive pulmonary disease, silicosis and lung cancer.

Silica dust causes irritation and inflammation of the airways and lung tissue. Scar tissue [fibrosis] forms when the inflammation heals. The fibrosis continues even after exposure ends. The International Agency for Cancer lists crystalline silica as a cause of - lung cancer – the risk is higher in smokers who also have silicosis. Treatment can only help manage symptoms such as cough. The law says that workers need to have regular medical examinations if placed at risk by exposure to silica dust.

Work design and work practices that produce too much dust include:

- cleaning robotic or manual milling equipment with compressed air (even where local extraction ventilation was present)
- use of crushers outside ventilated work booths
- operating manual or robotic mills fitted with a compressed air cleaning mechanism with inadequate local extraction ventilation
- handling calico sample bags with dust on the outside of the bags
- hitting bagged samples with mallets to break up solidified samples
- sample splitting
- pouring samples into containers on open benches
- pouring waste samples into bins
- the use of "quartz washes" in milling machines increases risks of exposure to respirable crystalline silica
- dry sweeping dusty areas.

[1] Lewis MJ & North SA, *Silica and dust exposure and control in assay Laboratories*, Australian & New Zealand Journal of Health, Safety and Environment. 2016 Volume 32(1).

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But It Doesn't Have To Be So – There Are Many Solutions. By installing and using proper ventilation systems many of the dust problems can be controlled. For example:

- dust extraction in the sample receipt and sorting areas
- work benches equipped with dust extraction for
    - handling sample bags,
    - where sample bags are hit to dislodge hardened material
    - splitting and disposing of samples into bins
- use of dust-tight alternatives to calico bags to reduce residue on the exterior of sample bags
- "dust boxes" used for manual mills make sure that the volume and velocity of air is enough to provide adequate ventilation
- provide adequate suction at the cleaning handpiece of the vacuum system when cleaning residual sample out of the bowls on the larger mills
- ensure all larger mills are connected to a dust extraction system that achieves an adequate flow of air through the mill,
- ensure all larger mills are cleaned using vacuum systems and not compressed air
- use vacuum systems to clean smaller manual milling machine bowls
- use of vacuum rather than compressed air to clean plant, eg crushing machinery or milling machines, where practicable
    - the use of reduced pressure compressed air, from about 650 kPa to 220 kPa, where vacuum is not practicable
    - for the cleaning small manual milling bowls ensure all work-hoods that are supplied with compressed air for cleaning purposes are connected to a dust extraction system that achieves an adequate flow of air through the work-hood
- never dry sweep dusty areas
- don't use compressed air must to clean large manual mills - vacuum cleaning is practicable alternative.

As the production of dust is an outcome of the work processes constant checking and monitoring of control measures is necessary to protect workers health.

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And a word of caution – it is possible that samples from overseas may contain asbestos. Many countries do not have the same awareness about the risks of asbestos as we do in Australia.