

OHS6138 Assessment One – Online Tutorial

Due Date: Week 7 Monday 6 April 2020 Midnight (AWST)

Weighting: 40% Length: 3000 ($\pm 10\%$) words

In this assessment you are required to **select one** of the two provided case studies of a hazard (**noise or silica dust**) that is present in a workplace and provide **advice** on the **types and frequency of health surveillance that should be implemented** to ensure that there is no adverse long term health impacts.

In preparing your advice, you need to:

- review what the hazard is in your chosen case study
- are the exposures high
- what types of health surveillance can be used to assess potential health and
- the reasons why health surveillance should or should not be implemented, both a short term and long term basis.

Literature reviews

Literature about the selected hazards in the selected case study, outline health surveillance requirements and typical controls that can be used to control the risk of exposure.

Evaluation criteria

Identification of the hazard/s that may be an issue in the case study and outline in brief the characteristics of this hazard presented in the case study. (5 marks)

Description of what the typical health surveillance measures that should be considered for this workplace and your reasons why. (10 marks)

Outlining the design of a health surveillance measures to be implemented within this workplace. (10 marks)

Proposed timelines for the implementation of the health surveillance measures and how they will be assessed as effective. (5 marks)

Conclusions and recommendations, you would make to management. (5 marks)

Referencing & citing of information sources (5 marks)

Physical hazards – noise

Noise is normally defined as an
“unwanted sound”.

Either by its potential harm or annoyance.

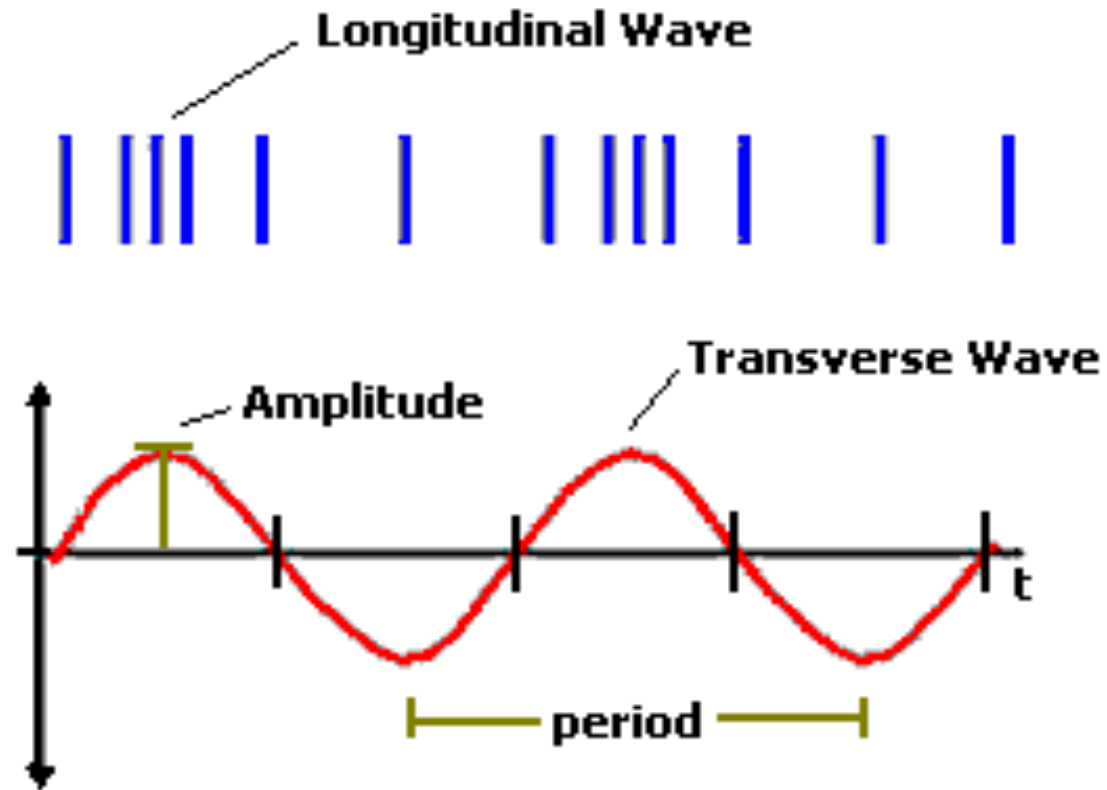
Physical characteristics of sound

Sound travels like waves in a pond when a pebble is dropped in the centre.



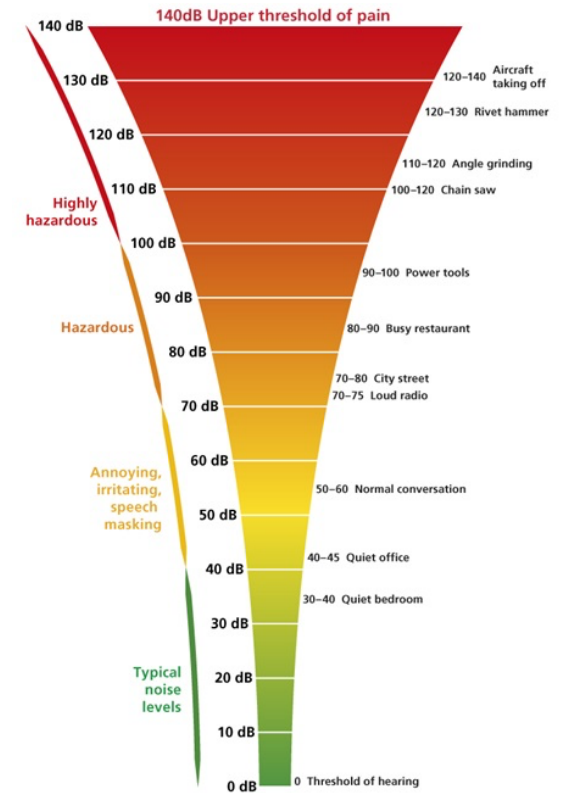
Sound waves

Sound waves are caused by vibrating objects e.g. strings on a guitar



Sound pressure

- Sound pressure is the **actual amount** of sound energy generated by a noise source and is **dependent** of the environment in which it is generated.
- Sound pressure is measured in **Pascal** and sound pressure level is measured in **decibels**, similar to sound power level.

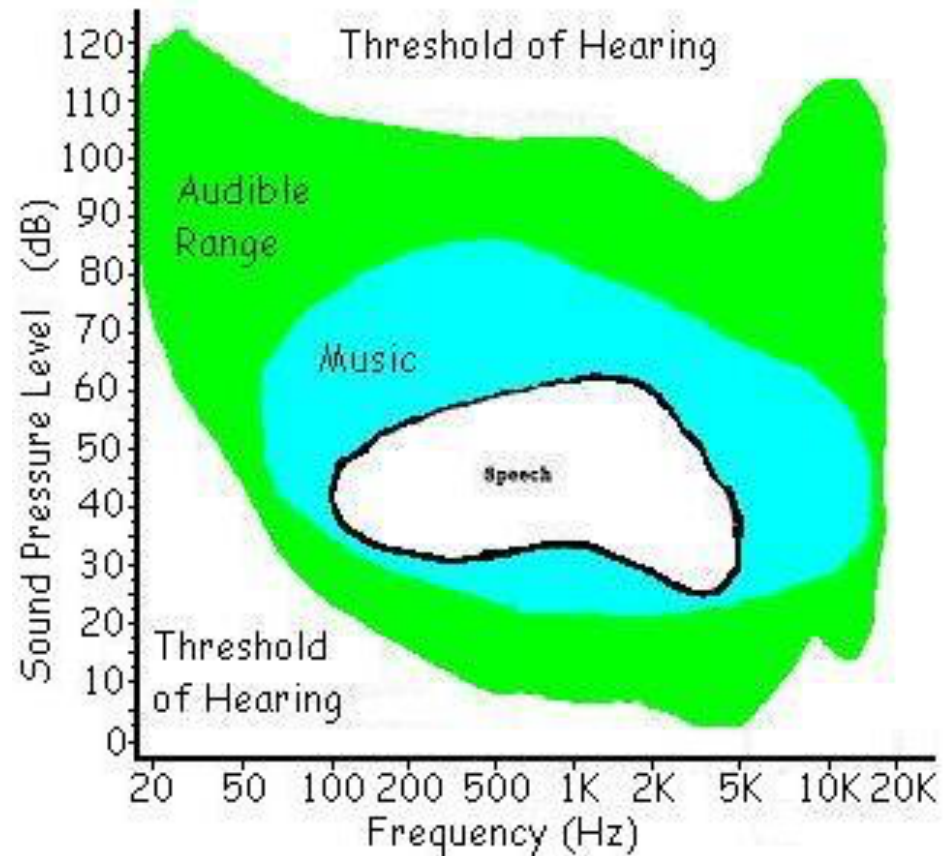


Sound pressure level

- Sound pressure level is measured and reported in the unit called a decibel and written 'dB'.
- The decibel is based on a logarithmic scale for ease of calculation.
- The ear can detect a one decibel change, but we can reliably notice a change of 2 to 3 decibels depending on the sound pressure levels (SPL) and the characteristics of the sounds.

Audible frequencies

Humans can generally hear in the frequency range from 20 Hz to 20 kHz (20,000Hz).



Effects of noise: infrasound (<20 Hz)

Infrasound (vibration) can give rise to the following effects:

- Headaches
- Nausea
- Fatigue
- Chest wall vibration
- Respiratory rhythm changes
- Body internal organ vibration.

Common sources are:

- large fans,
- traffic &
- aircraft

Effects of noise: ultrasound (> 20 kHz)

Ultrasound will give rise to the following effects:

- Nervous system effects
- Headaches

Common noise sources are:

- discharge of steam valves,
- silencers,
- ultrasonic welding machines etc.

Effects of noise: hearing range (20 hz to 20 khz)

Hearing range can give rise to the following effects:

- Temporary threshold shift
- Permanent threshold shift
- Tinnitus
- Acoustic trauma - *injury to the inner ear caused by exposure to a high-decibel noise. Can occur after exposure to a single, very loud noise or from exposure to noises at significant decibels over a longer period of time*

Common sources are:

- Industrial noise such as extractive industry, transport industry and agricultural industry
- Loud music;
- Shooting;
- Hobbies such as carpentry, metal work etc.

Effects of Noise: Hearing range (cont)

- Noise in the hearing range may have, health, emotional and disturbance effects such as:
- Health – nervousness
 - deafness
 - fatigue
 - headaches
 - stress
- Emotional – hatred
 - annoyance
 - fear
 - Anger
- Disturbance – sleeplessness
 - interrupting conversation
 - decreased efficiency
 - low morale

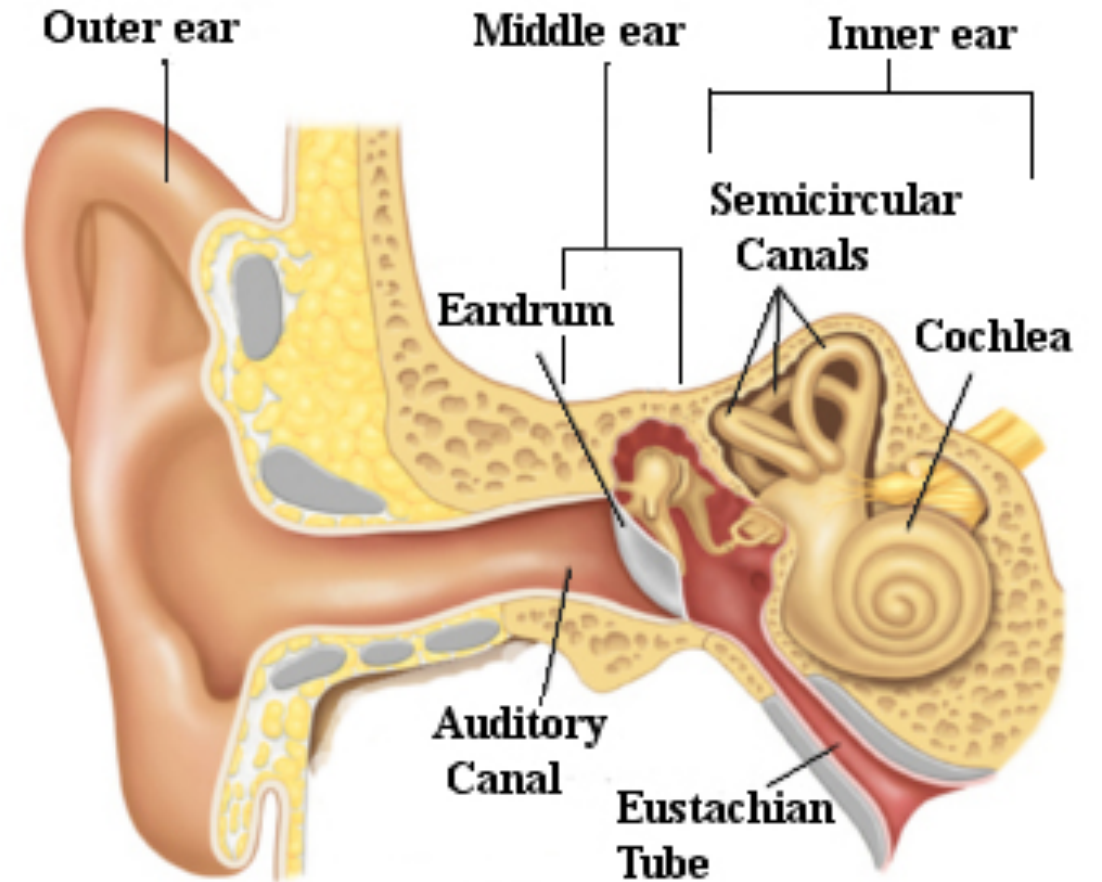
Anatomy of the ear

The ear has three distinct features:

The outer ear comprising of the ear lobes and the auditory canal.

The middle ear comprising the ear drum, the ossicular chain and the top end of the eustachian tube.

The inner ear comprising the oval window, the round window, the semi circular canals) the cochlea with its associated hair cells and the auditory nerves.



Hearing conservation program

A hearing conservation program is a planned procedure to protect hearing and may include:

- noise exposure determinations;
- audiometric measurements (before and after potential exposure and at regular intervals);
- on going education program;
- engineering noise control; and
- hearing protection devices.



Audiometric assessment

- The assessment of a person's ability to hear is conducted using audiometry.
- Some of you may have undergone audiometric tests.
- Even if you have good hearing if you are exposed to a high noise level such as loud music it may affect you the next day.

Noise level meters

The general purpose of a sound level meter can be used for simple noise investigations as long as it has the correct:

Response rate – slow fast and/or impulsive

Weighting system – linear, A and C

Meets Australian Standard -AS IEC 61672.1-2004

Class 2 SLM - sound level meter

Can be externally calibrated – must come with its own calibrator

For more details refer to:

- *AS/NZS 1269.0:2005. Occupational noise management - Overview and general requirements*, Standards Australia
- *AS/NZS 1269.1:2005 Occupational noise management - Measurement and assessment of noise emission and exposure*, Standards Australia
- *AS/NZS 1269.4:2005. Occupational noise management – Auditory assessment*, Standards Australia
- Safe Work Australia (2011). *Managing Noise and Preventing Hearing Loss at Work: Codes of Practice*, available online at <http://www.safeworkaustralia.gov.au/sites/swa/about/publications/pages/managing-noise-preventing-hearing-loss-cop>.

Occupational
noise levels (cont)

Silica Dust Exposure - Risk Factors

Any work that exposes silica dust:

- mining
- stone cutting
- quarrying
- road and building construction
- work with abrasives
- glass manufacturing
- sand blasting
- also, some *hobbies* can involve exposure to silica (sculptor, glass blower)



Silicosis - Sandblasting

Silicosis: Occupational lung disease

Silicosis is an often fatal lung disease caused by breathing dust containing crystalline silica particles, a basic component of sand and granite. There is no cure for silicosis, and treatment options are limited. However, the condition can be prevented if measures are taken to reduce exposure.

Symptoms

Continued exposure:

- > Shortness of breath
- > Fever
- > Bluish skin at the ear lobes or lips

As the disease progresses:

- > Fatigue
- > Extreme shortness of breath
- > Loss of appetite
- > Chest pain
- > Respiratory failure

At-risk occupations

- > Construction
- > Mining
- > Sandblasting
- > Masonry
- > Demolition
- > Manufacturing of glass and metal products
- > Plumbing
- > Painting

Inhaling the dust can cause scar tissue to form in the lungs that reduces the lungs' ability to extract oxygen from the air.

CRYSTALLINE SILICA DUST

Silica dust particles can embed themselves in the alveolar sacs deep in the lungs where they cannot be cleared by mucous or coughing.



Source: U.S. Department of Labor Occupational Safety and Health Administration, silicosis.com

AMY LEWIS/The Salt Lake Tribune

Exposure and Health Risks

Exposure to respirable crystalline silica has been linked to:

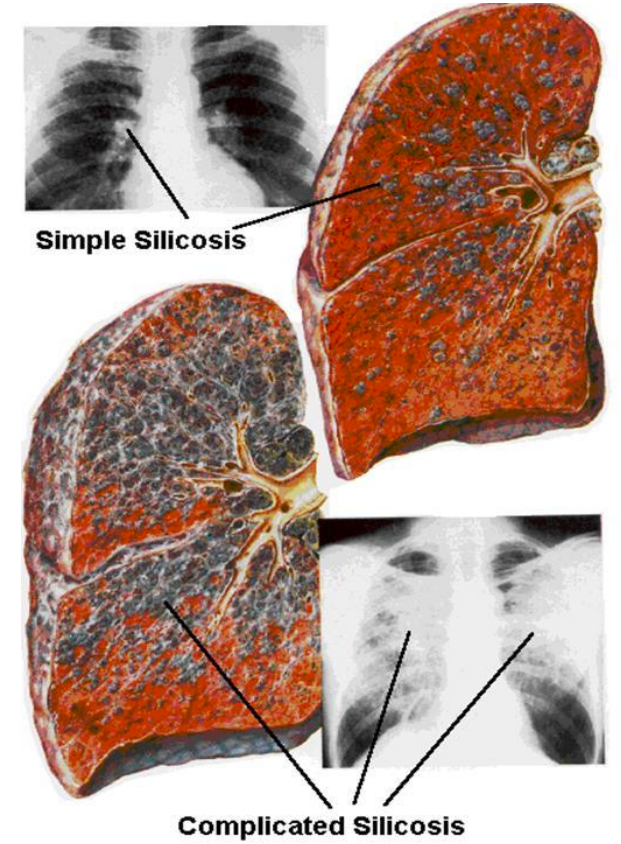
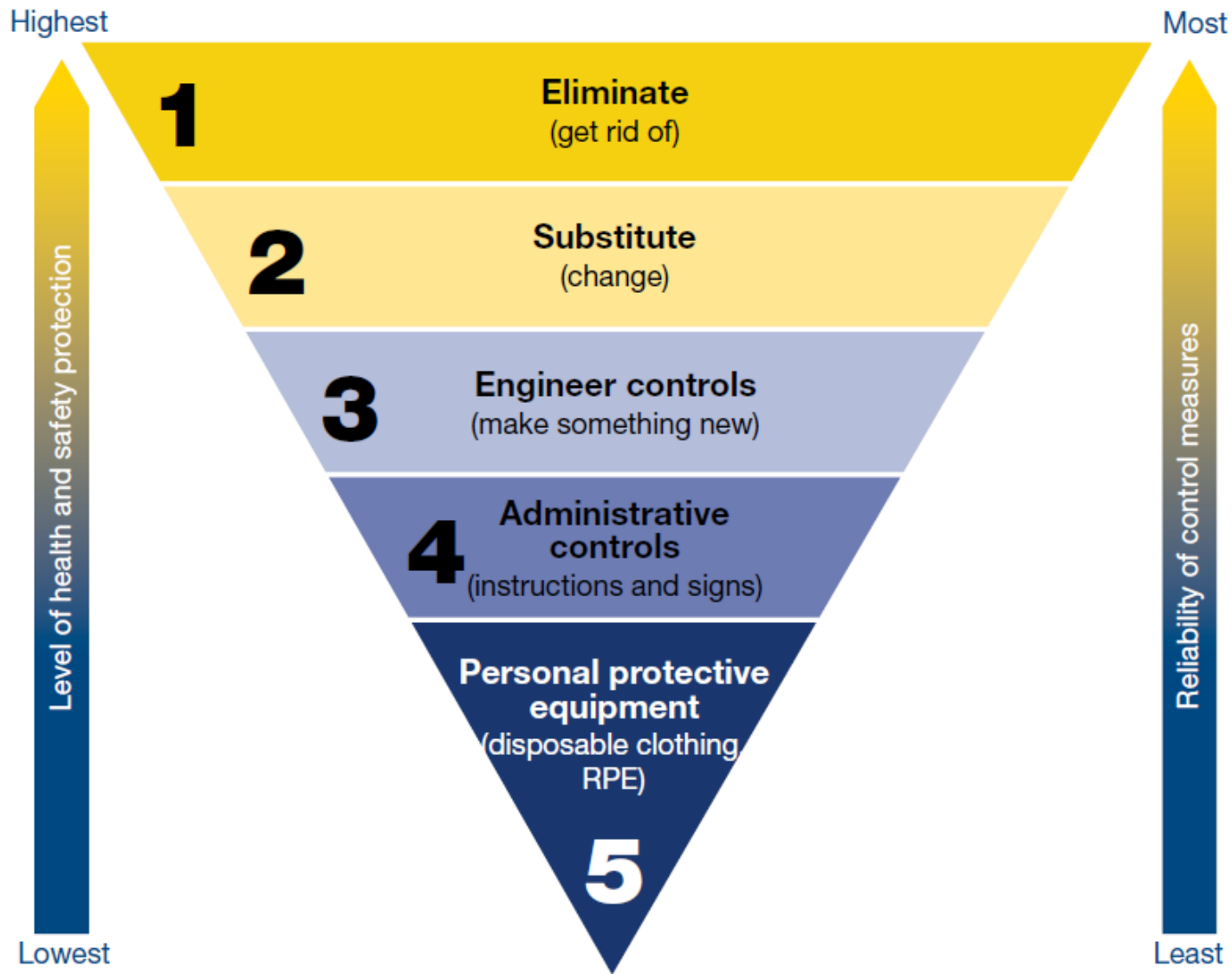
- ❖ Silicosis;
- ❖ Lung cancer;
- ❖ Chronic obstructive pulmonary disease; and
- ❖ Kidney disease



Healthy Lung



Silicotic Lung



Assessment Resources

Worksafe WA – Code of Practice Managing noise at workplace (2014)

- <https://www.commerce.wa.gov.au/publications/code-practice-managing-noise-workplaces>

Safe Work Australia – Managing noise and preventing hearing loss at work (2015)]

- https://www.safeworkaustralia.gov.au/system/files/documents/1702/managing_noise_preventing_hearing_loss_work.pdf

NOISH Sound Level Meter App

- <https://www.cdc.gov/niosh/topics/noise/app.html>

Noise exposure calculator

- <https://fswqap.worksafe.qld.gov.au/etools/etool/noise-exposure-calculator/>

What is harmful noise? WorkSafe New Zealand

- <https://www.youtube.com/watch?v=LxzPO9LPygk>

Napo in Stop that Noise

- <https://www.youtube.com/watch?v=LxzPO9LPygk>

Silica Dust exposures presentation

- Mining and Quarrying Occupational Health and Safety Committee (MAQOHSC) presentation on
- Work Safety with Silica
- <https://www.silica-safe.org/training-and-other-resources/presentations>
- https://miningquiz.com/powerpoints/dust_and_silica.htm

SILICA VIDEO

- Silica video has been retrieved from WorkSafeBC (2010). As described by this video is that silica is a common substance found in sand, rock, and building materials such as concrete and brick. Cutting, grinding, or drilling these materials releases dangerous crystalline silica dust into the air. This video shows how breathing in silica dust can cause permanent damage to the lungs.
- **Link:** https://www.youtube.com/watch?v=R_sC2wX9Uwc

SafeWork NSW

- Silica Safety Month – video and resources
https://youtu.be/liVsyx4J_sl

OHS6138 Assessment One – Final Words

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**THANK
YOU**

A vibrant, 3D-style graphic of the words "THANK YOU" in pink and yellow, surrounded by stars and motion lines. The text is rendered in a bold, bubbly font with a thick black outline and a drop shadow. The word "THANK" is in pink with yellow sides, and "YOU" is in yellow with pink sides. The background is white with scattered yellow and pink stars and black motion lines. There are also blue and yellow geometric shapes in the corners.