Prevention against Silica Dust

Silica is used in building materials such as concrete, brick, stucco and mortar. When sanding, drilling or chiselling in some building material will release silica dust.

Inhalation of silica stone dust may cause lung damage in the form of silicosis and lung cancer. Other cancers are also associated with exposure to silica dust.

Particularly high risk of hazardous exposure to silica dust is present at drilling and demolition indoors. At total demolition or robotic demolition it may be more dangerous to the environment than for workers who operates the demolition tools.

By preventing the spread of dust at source the risks will be minimizes for both workers and to other persons in the surrounding.

Examples of measures against the spread of stone dust:
• enclose of and encapsulating the entire work process,
• use local exhaust ventilation at machinery;
• prevent the dust to spread through the air by means of water

Swedish Work Environment Authority Rules on Silica

Swedish Work Environment Authority regulations on silica applies to all work activities in which silica or silica containing materials is handled (Exception: farm work). The rules are applicable on works on material that contains more than 3 weight percent silica.

Section of paragraphs and content with relevance to demolition and drilling works:

5 § Work where silica dust may arise shall be planned and arranged so that exposure to such dust is kept as low as possible.

7 § The work required written handling and protection shall be available at work.

13 § A technical device where silica dust generated shall be designed and equipped to spread of dust is avoided.
Encapsulation around the machine or process should be as tight and sucked air volume so high that dust does not leak out from the shelter.

14 § Workplace where silica material handled so that silica dust arises, shall be cleaned of dust at least weekly, and when work completed.

15 § The cleaning must be performed to prevent dust being stirred up and spread. Dust should primarily be vacuumed or removed by flushing with water. Bins and device for collecting waste shall be readily available.

Employer's responsibility include:
• to find out if the materials used in the work can give rise to dust containing silica and if the content of silica is unknown, to determine this.
• to notify the Swedish Work Environment Authority before mobile crushing plant, mobile concrete plants, mobile asphalt or similar mobile facility, where silica material is handled, operating or moved.
• to perform exposure measurements in workplaces with silica dust
• to provide regular medical examinations of personnel exposed to silica dust at a higher level than half the limit

Recommendations

These recommendations are applicable primarily on drilling and demolition in confined spaces. Other demolition activities may require different dust mitigation measures to prevent the spread of silica dust into the environment.

Respiratory Protection

Respiratory protection should be used both during the work process of demolition and in the subsequent material collection and cleaning.

Requirements for respiratory protection:

• half mask, personally tested and adapted to the shape of the face

• filter type P3 to well fitted and closed tightly, maintained and frequently changed

• filter should be stored so that it does not get dusty.

Encapsulation and partitioning of the work area

To prevent the spread of dust to adjacent areas where other workers or residents may be at risk of exposure to silica dust the demolition area and process could be encapsulated.

All openings to the work area will then be closed or covered with plastic and a vacuum is created by connecting a fan or air cleaner with particle filter.

Requirements and practices for the encapsulation of the work area:

• work area screened in smaller work areas with makeshift place walls or entire premises foreclosed by doors and other openings closed.

• screen so small working areas as possible because it provides more efficient air cleaning

• sealing of cracks and airlock can further improve the dust mitigation and air purification

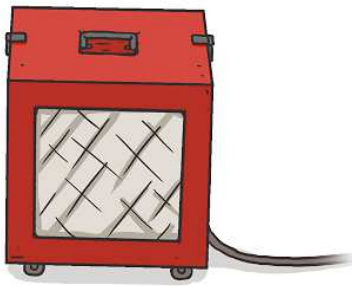
• vacuum is created with the help of a fan or air purifier that is connected so that the exhaust is done outside the work area

• particulate filter is used regardless of the air is returned or blown out

• no persons other than those performing the demolition or drilling work will be permitted in the work area while work is in progress or the room is untidy.

• cleaning in the screened work area must perform before encapsulation is removed and the fan plugged out and before others will be permitted the screened area.

Air purifiers and particle filters



Air cleaners can be used to create a negative pressure within the shielded working area.

An air purifier works best if the work area is small and as a complement to other measures on
dust.

An air purifier in larger rooms and not placed directly at the source of dust requires a flow rate of several thousand m^3/s to function effectively.

Filter risks to quickly become clogged. Operational procedures for maintenance and replacement of the filter is necessary to maintain the function and suppression.

Air purifier placement:

• as close to the dusty work step as possible or

• linked to the exhaust and hose as close to the workplace as possible or

• in the doorway or wrapping to also create negative pressure in the working area is shielded

Dust exhaust at the source

A local exhaust ventilation may limit the spread of dust in an efficient manner and connected to a building vacuum cleaners, air purifiers or central vacuum.

Local exhaust works most effectively if the tools used in the process performs at as low peripheral speed as possible.

Higher peripheral speed means that more particles ejected in other directions than where the extractor nozzle is placed.

Placement and use of local exhaust ventilation:

• the extractor nozzle shall be placed as close to the dust source of dust as possible

• airflow and connected equipment shall be adequately

• both the extraction hose and connections to the hose must be designed with sufficiently large dimensions so that airflow is not throttled or limited by friction.