Étude de cas

Le contrôle de l'exposition au quartz dans le domaine du granit en Estrie : Un énorme défi

Animation scientifique de l'IRSST, 2014-09-03
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CSSS du Haut Saint-François et Direction de santé publique de l'Estrie

Objectifs et défi :

- Partager une problématique terrain afin de lancer la journée
- Stimuler l’intérêt pour cette problématique
- Et le défi …
- Cadrer dans le thème de la journée

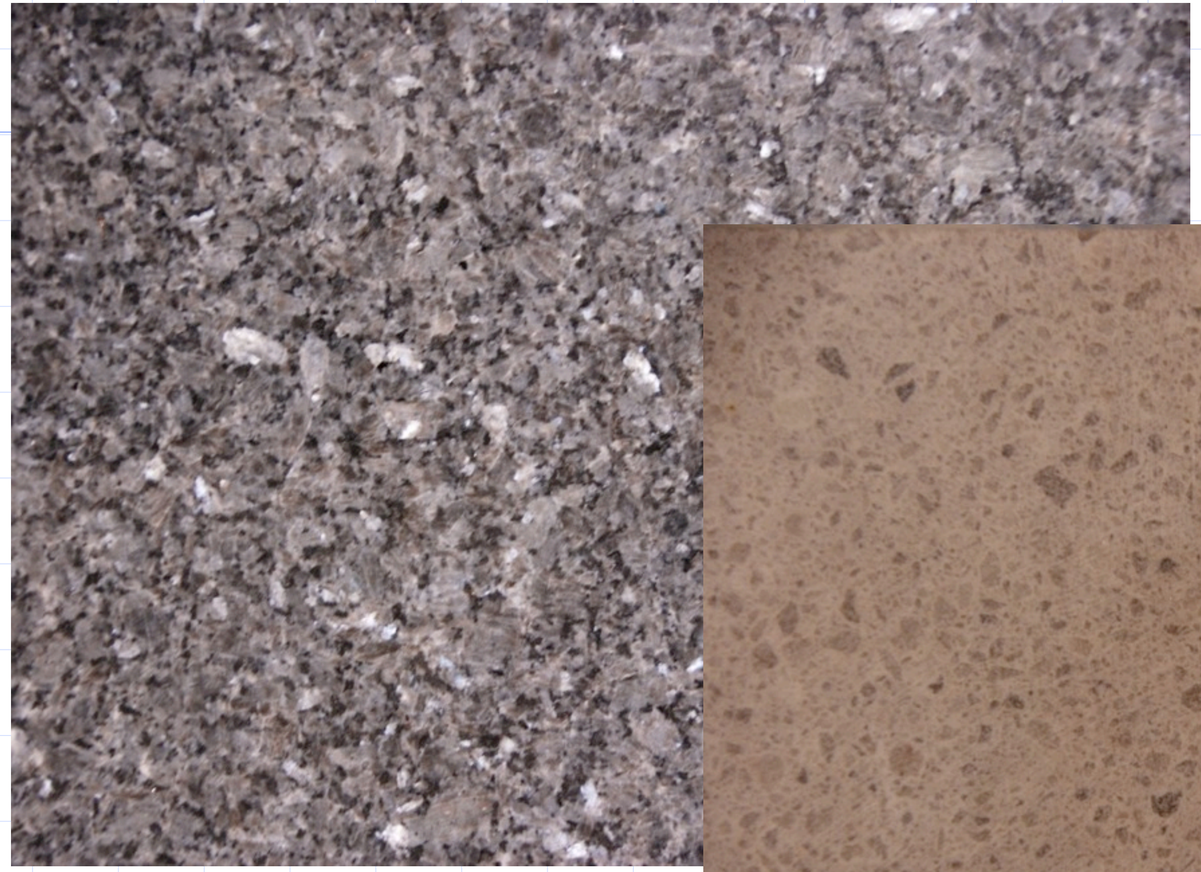
Granit, quartz et maladies

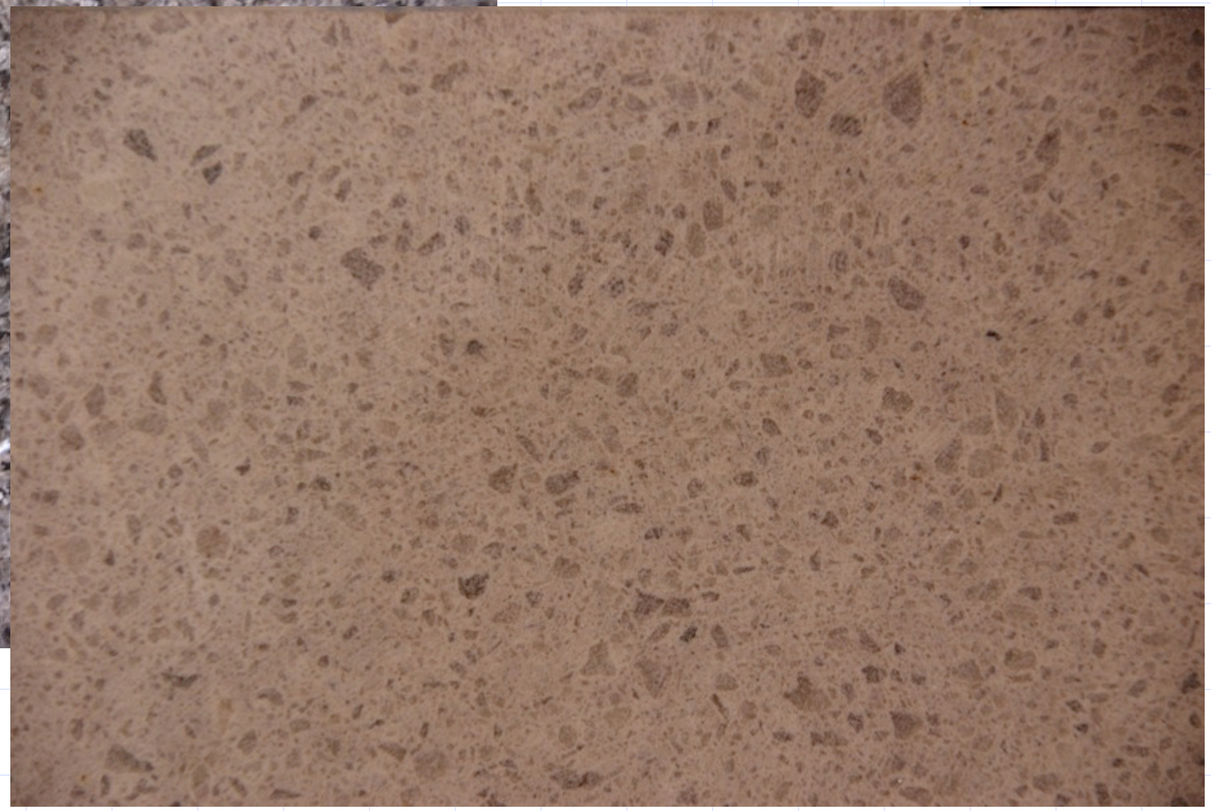
- Teneur en quartz
  - Généralement de 10 à 40 %
  - Peut aller de 0 à 60 %
  - Lien avec la couleur
  - Introduction récente d’une pierre synthétique qui contient > 90 % de quartz

Échantillons de granit

Échantillons de pierre synthétique

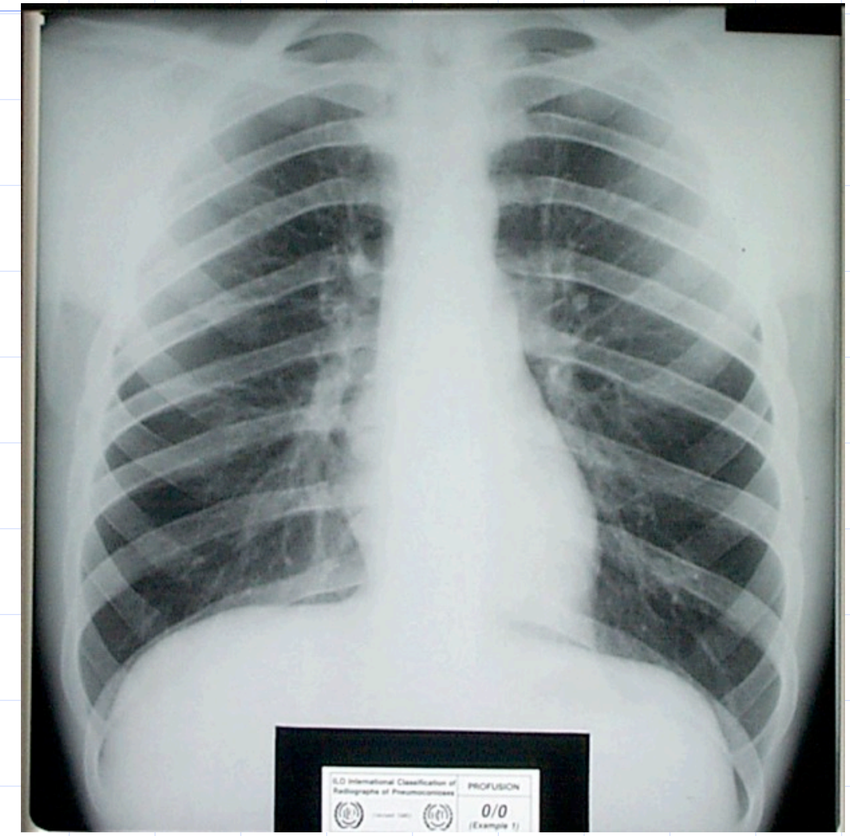
Granit vu de près

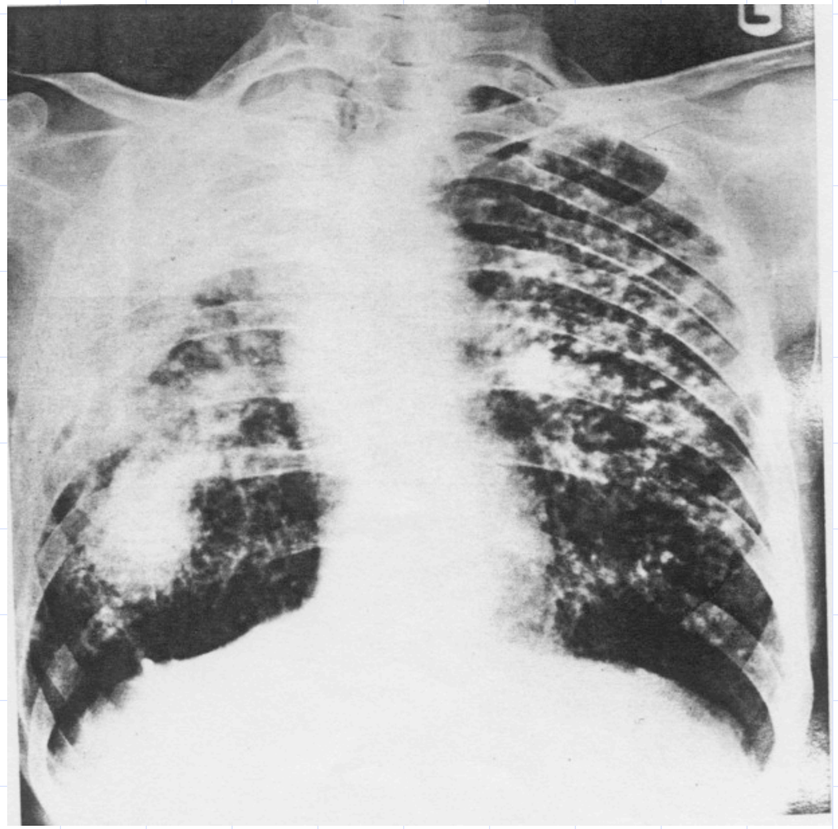




Synthétique vu de près

Granit, quartz et maladies





- Risque à la santé connu de longue date
- Mais toujours d’actualité : Épidémies récentes

CHEST

Original Research

OCCUPATIONAL AND ENVIRONMENTAL LUNG DISEASES

Artificial Stone Silicosis

Disease Resurgence Among Artificial Stone Workers

Mordechai R. Kramer, MD, FCCP; Paul D. Blanc, MD, MSPH, FCCP; Elizabeth Fireman, PhD; Anat Amital, MD, FCCP; Alexander Guber, MD, FCCP; Nader Abdul Rhahman, MD; and David Shitrit, MD

Background: **Silicosis is a progressive, fibrotic, occupational lung disease resulting from inhalation of respirable crystalline silica. This disease is preventable through appropriate workplace practices. We systematically assessed an outbreak of silicosis among patients referred to our center for lung transplant.**

Methods: **This retrospective cohort analysis included all patients with a diagnosis of silicosis who were referred for evaluation to the National Lung Transplantation Program in Israel from January 1997 through December 2010. We also compared the incidence of lung transplantation (LTX) due to silicosis in Israel with that of the International Society for Heart and Lung Transplantation (ISHLT) registry.**

Results: **During the 14-year study period, 23 patients with silicosis were referred for evaluation, including 10 patients who went on to undergo LTX. All patients were exposed by dry cutting a relatively new, artificial, decorative stone product with high crystalline silica content used primarily for kitchen countertops and bathroom fixtures. The patients had moderate-to-severe restrictive lung disease. Two patients developed progressive massive fibrosis; none manifested acute silicosis (silicoproteinosis). Three patients died during follow-up, without LTX. Based on the ISHLT registry incidence, 0.68 silicosis cases would have been expected instead of the 10 observed (incidence ratio, 14.6; 95% CI, 7.02-26.8).**

Conclusions: **This silicosis outbreak is important because of the worldwide use of this and similar high-silica-content, artificial stone products. Further cases are likely to occur unless effective preventive measures are undertaken and existing safety practices are enforced.**

CHEST 2012; 142(2):419–424

Outbreak of silicosis in Spanish quartz conglomerate workers

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Objectives: To describe the epidemiological and clinical characteristics of an outbreak of occupational silicosis and the associated working conditions.
Methods: Cases were defined as men working in the stone cutting, shaping, and finishing industry in the province of Cádiz, diagnosed with silicosis between July 2009 and May 2012, and were identified and diagnosed by the department of pulmonology of the University Hospital of Puerto Real (Cádiz). A census of workplaces using quartz conglomerates was carried out to determine total numbers of potentially exposed workers. A patient telephone survey on occupational exposures and a review of medical records for all participants were conducted.
Results: Silicosis was diagnosed in 46 men with a median age of 33 years and a median of 11 years working in the manufacturing of countertops. Of these cases, 91.3% were diagnosed with simple chronic silicosis, with an abnormal high-resolution computerized tomography (HRCT) scan. One patient died during the study period. Employer non-compliance in prevention and control measures was frequently reported, as were environmental and individual protection failures.
Conclusions: The use of new construction materials such as quartz conglomerates has increased silicosis incidence due to intensive occupational exposures, in the context of high demand fuelled by the housing boom. This widespread exposure poses a risk if appropriate preventive measures are not undertaken.

Keywords: Silicosis, Quartz conglomerates, Respirable crystalline silica, Marble works, Occupational disease

Introduction

Silicosis is a pulmonary disease resulting from the inhalation and accumulation of inorganic silica dust in the lung.[1,2] The risk of disease is related to lifetime cumulative exposure and to the amount of inhaled crystalline silica, which, in turn, depends on the concentration and the size of respirable particles (<5 μm), and on individual susceptibility.[3,4] Prevention of this disease is based on respirable dust control, and no curative treatment currently exists.[5] Chronic silicosis is the most common clinical presentation classically appearing in miners after exposure to low concentrations over a long period of time (>15–20 years).[3] To establish the diagnosis, it is useful to match labour history of exposure to crystalline silica dust over time with compatible clinical, functional, and radiological signs.[2]

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The most frequent crystalline forms of silica in workplaces are quartz, tridymite, and cristobalite.[6] In recent years, clusters of cases have been reported in relation to new occupational exposures in several countries.[7–9] Some of them are related to mechanization procedures (cutting, calibration, and polishing) used in the manufacturing and installation of kitchen countertops made of quartz conglomerates, materials with a high content of crystalline free silica (70–90%). These workers are exposed to high concentrations of silica, resulting in disease after relatively short latency periods.[9]

More than three million European workers were exposed to crystalline silica at the beginning of the 1990s.[10] Despite the decline in silicosis incidence observed in developed countries in the following decades, mainly due to the improvement of prevention measures such as protective equipment,[8] additional efforts to reduce dust exposure by strict

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Clinical Note

Silicosis: a Disease with an Active Present

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ABSTRACT

Silicosis, is an interstitial lung disease caused by inhaling crystalline silica dust. Despite it being one of the oldest occupational diseases, it continues being a cause of morbidity and mortality all over the world. The World Health Organisation and the International Labour Organisation (WHO/ILO) are aware of the current problem and have designed the International Programme on the Global Elimination of Silicosis, which identifies occupational groups at risk. We present 3 cases of silicosis in young construction workers, who are exposed to high concentrations of silica due to handling artificial silica conglomerates. The main objective of this study is to identify new risk sources, to highlight the dangers involved when the substance is used without any preventative measures, and to outline the importance of the occupational history to avoid under-diagnosis of this disease.

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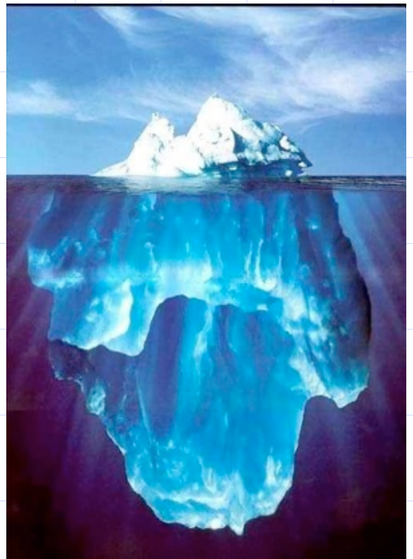
Le monde du granit en Estrie
Profil industriel

Taille (Nombre de travailleurs)	Nombre d'entreprises	Nombre total de travailleurs
1-9	11	34
10-24	13	203
25-49	4	133
≥ 50	5	428
Total	33	798

CAMBRIA
Natural Quartz Surfaces

Le monde du granit en Estrie : Aspect santé
Silicoses reconnues, 1999-2009

- 15 réclamations acceptées par la CSST
- Travailleurs de 49 à 85 ans
- Moyenne de 68 ans
- 7 travailleurs de moins de 65 ans
  - 3 toujours au travail
  - 4 retraités récents



Le monde du granit en Estrie
Aspect exposition au quartz, compilation 1984-2004

Postes ou fonctions	**Nombre de mesures**	**Poussière respirable** (mg/m^3)	**Quartz** (mg/m^3)	**% Quartz**
Ensemble des mesures	**341**	**1,20**	**0,17**	**12,0 (1 à 35)**
Polisseurs manuels à l'eau	**113**	**1,98**	**0,30**	**-**
Polisseurs manuels à sec	**67**	**2,62**	**0,40**	**-**

Le constat en 2004

Si rien de nouveau n’est fait,
ça va continuer.

Priorisation Réseau – CSST
Programme d’intervention régional

Le PIR Granit
Le volet poussières de quartz

- La pierre angulaire =

  Humidification des procédés

- Ventilation locale et générale
- Méthodes de travail
- Aménagement et entretien des lieux
- Protection respiratoire

Les résultats en chiffre
Toutes fonctions confondues

	Avant	Après
Nombre de données	341	252
Concentration moyenne de poussières respirables	1.20 mg/m^3	0.58 mg/m^3
Concentration moyenne de quartz	0.17 mg/m^3	0.07 mg/m^3
% moyen de quartz	12	14
Proportions		
≤ 0,05 mg/m^3	38 %	48 %
≤ 0,10 mg/m^3	63 %	83 %
≥ 0,20 mg/m^3	13 %	1 %

Les résultats en chiffre
Polisseurs manuels (à l'eau)

	Avant	Après
Nombre de données	113	53
Concentration moyenne de poussières respirables	1.98 mg/m^3	0.72 mg/m^3
Concentration moyenne de quartz	0.30 mg/m^3	0.11 mg/m^3
% moyen de quartz	14	20
Proportions		
$\leq$ 0,05 mg/m^3	20 %	19 %
$\leq$ 0,10 mg/m^3	37 %	53 %
$\geq$ 0,20 mg/m^3	27 %	6 %

Défis

Poursuivre les améliorations, mais comment ?

- Meilleurs paramètres d'humidification ?
- Questionnement concernant la contribution à l'exposition du brouillard d'eau possiblement contaminé et l'impact de la recirculation de l'eau
- Aspects « ventilation » en procédés humides
- Le travail avec la pierre synthétique
- Les opérations de polissage manuel
- Les postes de taillage manuel

⇒ Demande à l'IRSST

- Guide bonnes pratiques
- Projet de recherche

www.irsst.qc.ca/media/documents/PubIRSST/Silice-CSST-IRSST.pdf

En guise de conclusion

« Bien qu'on soit en droit d'espérer qu'une prévention rationnelle et efficace permette qu'un jour la silicose disparaisse et devienne une maladie professionnelle historique, il est certain qu'elle sévira encore pendant longtemps. »

Dérobert, Léon : *Intoxications et maladies professionnelles*.
Ouvrage de référence français, Flammarion,**1954**, p. 376-7