

**332 Silicosis and lung cancer in (East) German uranium mining**

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**Objectives:** This paper gives an overview on silicosis and lung cancer as occupational diseases in uranium mining of Wismut Company from 1946 to 1999. The main hazards in Wismut mines were radon and silica. Due to the lack of exact data about the total number of employees of Wismut Company (assumed 400.000) no prevalence can be described.

**Methods:** Data on occupational diseases (claimed as well as recognised) are taken from the Wismut Social Insurance Register [1946 to 1990] and from Federation of German Statutory Accident Insurance (Berufsgenossenschaften) [1991 to 1999]. According to changes of law and system (GDR/FRG) during 44 years of uranium mining the number of occupational diseases given here can not reflect the total number of diseases caused by the poor working conditions especially in the first ten years of work.

**Results:** From 1946 to 1990 silicosis were claimed as occupational diseases in 21,420 cases (Wismut Social Insurance). Additional 4,120 cases were assigned at Berufsgenossenschaften from 1991 to 1999. Wismut recognised 14,531 and Berufsgenossenschaften 1,829 cases of silicosis. From 1946 to 1999 the total number of lung cancers accepted as occupational diseases is 7,695 (Wismut: 5,492; Berufsgenossenschaften: 2,203). After a peak in 1965 with about 700 cases the annual number of silicosis accepted dropped steadily to 166 cases in 1999. For lung cancer the development is a bit different: with a peak of cases recognised in 1980 the number of annual accepted cases remains relatively high due to the latency effect and a change in criteria for recognition. In 1999 about 200 cases of lung cancer were recognised.

**Conclusion:** Due to the effect of latency silicosis and especially lung cancers of uranium miners had to be expected. But the number of recognised lung cancers as occupational diseases will also become greater because there will be a new figure in German table of occupational diseases in few month: lung cancer after exposure to silica and presence of radiological de-

role of inspection and control about SLC (free crystalline silica) worker exposure. The different sampling and analysis methodologies by the two governmental bodies have never been harmonized.

**Objectives:** In the context of a collaboration project, INAIL and ASL conducted joined series of respirable free silica samplings and analyses (100 samples), to point out differences in the adopted methods and to verify the influence of various parameters on the experimental results of this kind of determinations. The final goal of this project should be the harmonization of the two different assessment protocols, to allow a profitable data and information exchange between all organizations involved, each one according to its own assignment, in the prevention work.

**Methods:** For the comparison of the two different sampling methodologies it has been considered the total airborne dust concentration and the SLC concentration, both related to the respirable fraction, that is captured by the sampling apparatus. Because of the several variables involved in the study, both during the sampling and the analysis, the following criterion were adopted during the sampling survey: each time we have taken off one of the different variables, that can have an influence on the final result.

In this study we make some remarks about the following aspects: type of sampling apparatus; type of filter; comparison between personal and environmental sampling.

**Results:** The comparison between the two different methodologies points out that Casella sampler is characterized by a lower amount of dust on the filter. This concerns both environmental and personal samplings; furthermore this result is independent from the type of filter. Moreover the amount of SLC is higher using Casella sampler, but only when silver filter were used.

**Conclusions:** It's still very difficult to locate a systematic trend among the comparison of this two different sampling methodologies. Nevertheless, the higher SLC concentration collected with Casella sampler can be probably related to the better picking up of the coarse particles compared with Dorr-Oliver sampler. This result is in concordance with "differential pulverization": according to this phenomenon quartz is supposed to be more present in the coarse fractions of the dusts.

**334 National and international reviews of crystalline silica**

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The National Institute for Occupational Safety and Health (NIOSH) in the United States conducted a review of the health effects of occupational exposure to respirable crystalline silica. The World Health Organization's International Programme on Chemical Safety (IPCS) conducted a review of the most common form of crystalline silica (i.e., quartz) based on published or forthcoming reviews by NIOSH, the United States Environmental Protection Agency (US EPA), and the International Agency for Research on Cancer (IARC). Both NIOSH and WHO utilized internal and external peer review processes to produce balanced documents on the health effects of crystalline silica. Epidemiologic studies provided support for the conclusion by

**335 Assessment of silica containing dusts in workplaces: experimental comparison between two different methods**

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**Background:** Italian regulations concerning risk assessment of silica dust in workplaces, don't provide detailed instructions about standardized methods to adopt for environmental investigations. INAIL (National Institute against Accidents at Work) and ASL (Local Health Unit, Department of Prevention), within the limits of their institutional tasks, carry out a

both agencies that exposure to quartz-containing dust can present significant health risks for workers in the form of silicosis, lung cancer, pulmonary tuberculosis, airways diseases, autoimmune-related diseases, and renal diseases.

Publication of summary documents based on extensive reviews such as those conducted by NIOSH and WHO are an integral part of informing workers and the international health and safety community of risks inherent in exposure to specific occupational hazards.

### 335 The Italian experience on silica exposure and its health effects: the Italian Silica Initiative (ISI)

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**Background:** The importance of silica exposure and its related health effects has been well appreciated in Italy in the past. The number of subjects compensated for silicosis has been high in the last decades and epidemiological studies conducted in the country have shown that not only silicosis but also lung cancer and end stage renal diseases should be considered as silica-related. The attention to the issue, however, has been decreasing in the last years and silica is now generally considered an old problem. The recent IARC evaluation, however, together with evidence that silica exposure still occur in many Italian workplaces with levels well above the international standards, have raised the concern and motivated an Italian Silica Initiative.

**Objective:** The aim of the initiative is to create a network of national and regional institutions dealing with silica exposure, primary prevention, epidemiology, health surveillance, compensation, and policy regulation. The network acts to increase awareness and professional standards, to release guidelines, to motivate scientific research, to inform regulators and policy makers. The main areas of silica exposure in the country are ceramics, pottery, quarrying and processing, refractory brick industries, and glass and construction industries.

**Results:** Work is on going to standardize collection and reporting of industrial hygiene data, to estimate the exposed workforce, to update criteria and quality control for health surveillance, to develop criteria for retrospective exposure assessment in order to perform epidemiological studies, to facilitate the use of statistics from the national institute of insurance of occupational diseases.

**Conclusion:** A national collaboration has been launched with the hope to increase the efforts for primary prevention of silica health effects.

### 336 Prevention and control of silicosis in India

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Silicosis is most widespread and preventable fibrogenic occupational disease of lungs. It causes progressive and permanent physical disability and affects tens of millions of workers worldwide. Although its incidence is decreasing with effective prevention programs in developed countries, there are millions in developing countries, involved in hazardous dusty occupations and dangerous work practices. In India, there are about 3 million people engaged in various mining and other industrial activities, who are exposed to potential risk of silicosis. Surveys by author and his colleagues in unorganized sector of industry show high levels of air borne dust containing free silica along with high prevalence of silicosis. Following table summarizes industry wise dust levels, average duration of exposure, prevalence of silicosis and tuberculosis.

For prevention and control of silicosis, a national programme has been initiated since 1997 by the Ministry of Health and Family Welfare, Government of India. National Institute of Occupational Health, Ahmedabad is the nodal agency for the same. The program consist of (1) Development of database on dust levels, silica contents and prevalence of dust related morbidity in various occupations; (2) development of simple engineering device for the control of work environment dust; (3) development of human resource for successful implementation of the program, and (4) generation of awareness in all the stake holders. Significant progress has been made in development of engineering control device for agate industry and stone crushing industry. The details will be discussed during the symposium.

Industry	Air Borne mean dust (mg/M <sup>3</sup> )	Free Silica (%)	Duration of Work (years)	Prevalence of silicosis (%)	Prevalence of TB (%)
Slate pencil workers	3.7-18.4	47.6-61	8.2 (2-24)	54.60	12.80
Ceramic and potteries	0.4-43.8	4.8-27.7	14.2 (3-32)	15.1	15.1
Quartz Crushing <sup>1</sup>	1.9-24.3	95-98	1.3 (0.5- 7)	12	6.7
Quartz Crushing <sup>2</sup>	3.5-17.6	95-98	3.4 (1-12)	40.8	28.4
Agate Industry <sup>3</sup>	0.88-4.0	58-62	9.8 (2-25)	38	38.3
Agate Industry <sup>4</sup>	0.7-0.9	20-60	11.2 (1-30)	33.9	40.0

Study carried out in 1981, 2001, 1987, 2001

### 337 Critical review on silica exposure during foundry activities in Lombard Region

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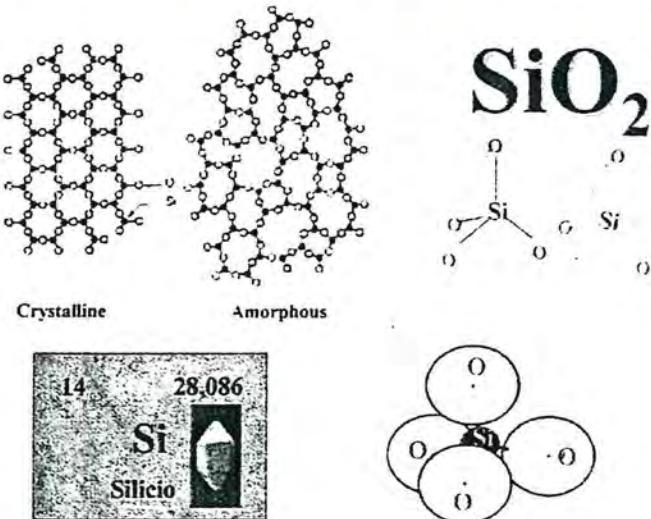
INAIL, Direzione Regionale Lombardia, Consulenza tecnica accertamento rischi e prevenzione, Milano, Italy

The occupational exposure during foundry work is well-known and widely investigated: the silica exposure, frequently exceeding exposure limits, is well acknowledged by many authoritative institutes.

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