International

Australia's ban of engineered stone: a historic turning point

The health risks of working with crystalline silica, a mineral ubiquitous in the earth's crust, were for a long time associated with the mining industry alone. But interdisciplinary work has led to the (re)discovery that thousands of workers in various sectors are developing the lung disease silicosis or other related serious systemic diseases. Australia's ban of engineered stone, a manufactured composite material with a high concentration of silica, represents a recent success in the fight against these risks. The European Union should be paying attention.

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In an article published in *HesaMag* in 2020[1] on the re-emergence of the risks from respirable crystalline silica in the fabrication, processing and installation of engineered stone, Steven Ronsmans asked 'where did it all go wrong?' How can it be that such risks – especially silicosis, a serious respiratory disease – which were described in medical literature as far back as the 1930s, are still opening lethal cracks in occupational health and safety today? What mechanisms can explain how, in the long history of knowledge on crystalline silica, the diseases caused by its inhalation can still be ignored and rediscovered on a regular basis, all while being chronically under-recognised and under-compensated where affected workers are concerned?

The decision of 13 December 2023 to prohibit the importation and any new installation of engineered stone on Australian territory marks a break with such inertia. In a world where toxicity tends to be managed rather than prohibited under public policy, a decision to ban a product is a rarity, as illustrated by the still considerable challenges to banning asbestos.

In fact, the long history of extractive industries in Australia has given the health authorities a heightened awareness of the serious social problem represented by silicosis in the 20th century. Moreover, the legacy of the burden that asbestos has left in Australia, which has the highest mortality rates for mesothelioma (a type of cancer specifically caused by asbestos exposure), weighed decisively on how government, experts and the country's trade unions reacted to the emergence of silica-related diseases caused by working with engineered stone.

The narrow foundations of silicosis

Sadly known as the 'queen of occupational diseases', silicosis is thought to be the most deadly of them all. Its prevalence is potentially immense given the ubiquitous presence of crystalline silica in manufacturing processes involving minerals. Silicosis has also served as the canonical model for understanding the medical and legal dimensions of the concept of 'occupational

1. Ronsmans S. (2020) A global outbreak of silicosis in an unexpected industry, HesaMag, 21, 51-55, ETUI.

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diseases', which are the result of negotiations between states, trade unions and employers. But the medical content that social protection systems consider under the 'occupational disease' definition has been questioned by multiple disciplines.

Silicosis was defined very restrictively at the 1930 Johannesburg Conference, instigated by the International Labour Office and employers of South African gold mines. The Conference regarded mining as the main setting in which there was a risk of contracting silicosis. The disease was, furthermore, described only in its chronic form, arising following relatively moderate exposure over an entire working life and remaining latent for decades. A final shortcoming of the Johannesburg Conference was its recognition of silicosis as the only disease arising from exposure to crystalline silica, even though it had already been shown at that time that other diseases of the lungs or other organs could ensue from this.

These limitations have had a lasting hold on the medical consensus. Their legacy makes it difficult to prevent the risks posed by crystalline silica and to recognise their consequences, which extend well beyond the chronic silicosis identified in miners.

A new century brings new questions

Over the past three decades, however, new circumstances have lent grist to the mill of knowledge that had haphazardly emerged over the 20th century. The use of fine sand to extract shale gas, the sandblasting of 'stone-washed' jeans, and the fabrication and processing of engineered stone are among the industries that have re-opened the Pandora's box of risks from exposure to crystalline silica that had been hidden away out of sight. Young workers in the sectors concerned are experiencing systemic auto-immune diseases such as lupus, rheumatoid arthritis or systemic sclerosis, as well as accelerated silicoses requiring lung transplants.

This epidemiological (re)discovery has been corroborated by the incidence of systemic diseases among individuals who were exposed to mineral particles in an entirely different context: the collapse of the Twin Towers of the World Trade Center. And the biomedical literature confirms yet more broadly the extent of the spectrum of risks from silica, drawing attention, for example, to the exposures experienced by the very high numbers of workers in construction and public works and giving consideration to diseases other than silicosis. The past decade has seen government health agencies updating their knowledge of the risks of silica in Sweden (2014), the United States (2016), France (2019), Australia (2021) and the Netherlands (2023).

At the same time, the mechanisms that have historically minimised those risks are still running at full steam, as illustrated by the diseases contracted by engineered-stone workers in Spain. Agnotology, the study of the social actors and mechanisms that manufacture ignorance or doubt, including in relation to scientific output, is helping to bring these mechanisms to light. At least three factors are in play.

The first occurs when industry orchestrates deliberate ignorance. In January 2023, the Criminal Court in the Spanish city of Vigo handed down a criminal conviction to the Spanish producer of engineered stone Cosentino, finding that the manufacturer had provided too little information too late to workers at the smaller company Granitel about the dangers of processing or installing the stone. Known as *marmolistas*, or marblers, these workers have been working with engineered stone since the 1990s in small family businesses.

Second, the public debate on 'the silicosis epidemic' disguises the fact that even the manufacture of engineered stone can cause serious disease. Here again it's the *marmolistas* processing the material who are the most at risk. Investigations by journalists have revealed the signing of compensation agreements with confidentiality clauses for the affected plant workers.[2] These 'private agreements' have consequences for the community. They help, in part, to disguise the risk from labour and health authorities, as at least some of the agreements were probably signed before the diseases in question were officially recognised as occupational in nature. The agreements' invisibility also adversely affects the opportunity for medical research. The silence they imposed probably prevented sick workers from talking to colleagues about the circumstances of their lives with disabilities.

Finally, it is not always possible to use social protection data to count the number of people who are sick, and this leads to unintended structural inertia. The data that can be disseminated for research purposes record the administrative events that punctuate the trajectory of a social security contributor suffering from an occupational disease (first recognition, change of status according to the degree of disability, etc.). We can thus count the administrative acts, but not always the people to whom they apply or their socio-demographic profile. This means that the social and epidemiological characterisation of the occupational risks of crystalline silica remains very opaque in Spain.

2. Muro I. (2017) Silicosis: dinero a cambio de silencio [Silicosis: buying silence], Revista Interviú, 11.09.2017.

3. Safe Work Australia (2023) Decision Regulation Impact Statement: prohibition on the use of engineered stone.

↳ **Workers processing engineered stone are at grave risk from respirable crystalline silica.**
Photo: © Belga

A game-changing policy approach

The Australian decision and the processes that led to it suggest lines of action that could be game-changing in this long history of limitation and obfuscation – especially in the European Union. In 2019, the National Dust Disease Taskforce (NDDT) and the federal agency Safe Work Australia (SWA) began conducting a rigorous scientific inquiry that formally examined stakeholders' interests. Trade unions have encouraged, participated in and mobilised expertise to play a key role in the process. In 2023, the SWA made a call for submissions as part of the Consultation Regulation Impact Statement. Once manufacturers, importers, installers, unions and other stakeholders involved in working with engineered stone had had the opportunity to express their views, the SWA issued a report recommending a complete ban of its manufacture.[3]

Several lessons can be drawn from this remarkable report. First, the SWA discredited the manufacturers' strategy of presenting engineered stone containing less than 40% silica as a safe product, taking the view that there is no scientific evidence that products of that concentration are harmless. Moreover, lowering the crystalline silica content does not settle the issue raised in the biomedical literature of whether the specific nature of the diseases caused by engineered stone is the result of a cocktail effect between the silica *and* other components of engineered stone. The SWA also noted that a prohibition only on the use of stone containing 40% or more silica could encourage processing and installation businesses to protect workers less rigorously, by giving the idea that working with a material with a lower silica content would present no danger to health. Policy decisions seldom counter the pseudo-scientific (and doubtless commercial) defence of industrial interests so firmly. And seldom are actual working conditions taken into account in the decision-making process.

Furthermore, the SWA agency relied on the 'substitution principle' to justify the ban on engineered stone. Although rarely used by policymakers, this is the principle that underpins European regulation in the use of carcinogens at work. It means that a less harmful substance *must* be substituted *to the extent that substitution is technically possible*. The SWA agency noted that engineered stone, which is extensively used to manufacture kitchen worktops, has many substitutes.

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4. See the article by Tony Musu in this issue.
5. Directive (EU) 2017/2398 of the European Parliament and of the Council of 12 December 2017 amending Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens or mutagens at work.
6. SCOEL (2003) Recommendation from the Scientific Committee on occupational exposure limits for silica, crystalline (respirable dust), SCOEL/SUM/94.
7. Directive (EU) 2022/431 of the European Parliament and of the Council of 9 March 2022 amending Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens or mutagens at work.

Pay attention Europe

In addition to the decision to ban the material, the Australian regulation points us to at least three levers that could support Europe in a fight against the risks of crystalline silica in which it has often been on the back foot.

The first line of action concerns product substitutability and the toxicity of a composite material. Engineered stone combines crystalline silica – the cause of silicosis, systemic diseases and lung cancer – with substances suspected by the International Agency for Research on Cancer (IARC) of being carcinogens or pro-inflammatories, risking a cocktail effect. This gives fresh impetus to reforming the European REACH regulation (on the registration, evaluation, authorisation and restriction of chemicals).[4] As of 2007, REACH should, in theory, have made it safe to manufacture, import and use chemicals in European industry. The case of engineered stone, however, illustrates the limitations of the regulation: it does not, in fact, regulate the production and usage of composites. Engineered stone cannot be registered as a 'substance' as such under REACH, even though a number of its components are substances that prompt enough health concerns to require registration under the regulation. The producers of the material are therefore outside the burden-of-proof requirement that REACH was supposed to place on them.

A second line of action concerns the regulation of occupational exposure limits (OEL), i.e. the maximum exposure values that can be enforced by a body such as the labour inspectorate. The eight-hour time-weighted average OEL for respirable crystalline silica is 0.1 mg/m^3 in the EU. That value was set under a 2017 Directive,[5] incorporating the recognition of crystalline silica as a carcinogen long after that of the IARC in 1997. Yet in 2020, during the public inquiry into the risks of engineered stone, Australia reduced its OEL to 0.05 mg/m^3, stating that a further reduction to 0.025 mg/m^3 would soon be necessary. There can be no avoiding an EU debate on a similar reduction today. And indeed, even before 2017, a scientific report drawn up at the request of the European Commission had evidenced the inadequacy of the threshold.[6] That inadequacy was then confirmed in other reports by independent experts, and European regulators have recognised the need to reduce it.[7]

Finally, the economic assessment criteria deployed in the Australian report supply a third line of action. A cost-benefits analysis estimated the number of silicosis cases that would need to be prevented to 'offset' the costs associated with each prohibition scenario considered. Using the formula for the 'value of a statistical life' (VSL), as updated in Australia in 2023, it was calculated that the value of each silicosis avoided was 4.9 million Australian dollars. This methodology holds a lot of interest for occupational health. The approach that the SWA has developed reminds us what is at stake: the value of human beings as workers.

At this crossroads in the history of risks posed by crystalline silica, we need to reform the means of recognising occupational diseases and the regulations governing occupational health so that there can be genuine improvements in prevention and how we respond to affected workers. The EU has proved itself very reluctant to regulate the use of toxic substances in recent years, in particular when rowing back on the ambitions of the Green Deal in this area. If pursued, the lines of action suggested in this article may help to resist such row-backs. The decision is in the hands of the new European Parliament and the European Commission. ●

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