Should engineered stone products be banned?

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From 1 July 2024, Australia has banned the use, supply and manufacture of engineered stone, also known as artificial stone, which is made from crystalline silica-containing aggregates bonded with a polymer resin. Engineered stone is defined as an artificial product containing at least 1% crystalline silica on a weight basis. This far-reaching policy is the first of its kind in the world and is similar to the bans on the use of asbestos and asbestos products that are in place in many countries worldwide (currently 70 countries).

Artificial stone is widely used for surfaces in kitchens and bathrooms as a low-cost alternative for products such as marble and granite. It is non-porous, harder and more flexible than many forms of natural stone. The main use is for kitchen countertops, although it is also used to make vanity units, walls and flooring. The product typically contains a high proportion of crystalline silica (up to 95%), which, when the material is cut, can result in high levels of respirable crystalline silica (RCS). There is a global market for artificial stone products, which is estimated to be worth around US$25 billion per annum.[1]

The reason for the drastic measures being taken in Australia has been the striking evidence of new cases of acute or accelerated silicosis even in relatively young people working with engineered stone products.[2–5] Engineered stone-associated silicosis is however not restricted to Australia, with published evidence of problems reported from among other countries, including Israel,[6] Spain,[7] Belgium[8] and the USA.[9] Furthermore, 11 cases of engineered stone associated cases have now been observed in the UK and reported to the Surveillance of Work-related and Occupational Respiratory Disease (van Tongeren, personal communication). This evidence suggests that there is a global epidemic of a disease that has been known for centuries but has yet again surfaced in a dramatic way (partly) due to introduction of these new materials, leading to premature deaths, often in vulnerable workforces.

The very high silica content of engineered stone results in hazardous RCS exposure for workers engaging in manufacturing, finishing and installing countertops and other products made from this material. Alternative products, such as marble and granite, also result in exposure to crystalline silica when produced and used. However, their much lower crystalline silica content and probably more controlled use has not resulted in the serious outbreaks of (acute) silicosis among (young) workers using these products in recent years.

Measurements of 8-hour time weighted average (8-h TWA) RCS in 27 workshops where engineered stone products were produced using wet methods, showed median RCS concentrations of 34 µg/m^3.[10] These were considerably lower than 8-h TWA median RCS concentration of 90 µg/m^3 reported in less-controlled engineered stone workplaces in the USA (2019–2020),[11] but still higher than the 8-h TWA median RCS concentration of only 7 µg/m3 in the industrial minerals industry in Europe in 2016.[12] Short-term exposure while cutting or shaping engineered stone are likely to be much higher than these levels. Experimental tests in a small, enclosed chamber have shown RCS concentrations (20 min TWA) while wet grinding engineered stone of up to 6000 µg/m^3.[13]

Regulators have often resorted to banning chemicals or products in workplaces to protect the health of workers. This approach is in the hierarchy of control seen as the most effective way of eliminating health hazards, such as carcinogenic chemicals, and it is certainly the most appropriate strategy when control of exposure in workplaces is difficult to achieve.[14] The question is whether the Australian example of banning engineered stone should be followed?

In a recent editorial in 'Exposure', the official magazine of the British Occupational Hygiene Society (BOHS), Brampton[15] explained why the BOHS is against a ban on engineered stone in the UK, despite recent evidence of silicosis cases in the industry. He suggests that the risks presented by engineered stone can be adequately controlled by applying the principles of good occupational hygiene control practice. We disagree, mainly because of the nature of the hazard presented by these materials and the difficulty in ensuring all employers and workers understand the risks and abide by the necessary control measures. Furthermore, according to the hierarchy of control, elimination and/or substitution with less hazardous materials is most effective when reducing risks. Early evidence from Australia suggests that the ban has already resulted in innovations by the sector to develop new products with no or very low silica content.[16]

We support the idea of regulators in Europe and elsewhere introducing a phased ban on artificial stone containing high proportion of crystalline silica. For example, there could be an initial ban on products containing more than 30% crystalline silica, moving to a ban on more than 5% after 5 years. The 5% content is arbitrarily chosen and our suggested stepwise approach should allow for further evidence to be collected to determine at which per cent the actual safe cut-off level should be. In the meantime, all possible control measures should be taken to keep exposures to RCS as low as possible. We believe that this proposal is proportionate and would protect the health of European workers and other workers from across the globe, while encouraging the industry to continue to develop safer products. In the UK, work with engineered stone could be banned under the Control of Substance Hazardous to Health (COSHH) Regulations and in the European Union it may be possible to use Annex III of the Chemical Agents Directive (Directive 98/24/EC). In the absence of any statutory ban, we strongly urge the industry to develop and use safer products and control exposure to RCS as low as possible.

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