

# Healthy Workplaces

# **MANAGE DANGEROUS SUBSTANCES**



## Healthy Workplaces Good Practice Awards 2018-2019

Awarded and commended examples



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# Introduction

The Healthy Workplaces Good Practice Awards are organised by the European Agency for Safety and Health at Work (EU-OSHA) as part of its pan-European Healthy Workplaces Campaigns. The 2018-19 campaign — Healthy Workplaces Manage Dangerous Substances — has a focus on managing exposure to substances that can cause harm to workers. It promotes the importance of raising awareness of dangerous substances, practical solutions for addressing risks and a culture of prevention among Europe's workplaces.

The Good Practice Awards play a key role in demonstrating the benefits of good safety and health practice and provide a platform for sharing knowledge and experience. The 2018-19 awards have a particular focus on companies or organisations that demonstrate an outstanding commitment to actively identifying and managing the risks posed by dangerous substances, and implementing innovative solutions that protect workers.

EU-OSHA received 42 applications from 25 countries for the 2018-19 awards. These applications were submitted by organisations and companies of many different sizes and from a wide variety of sectors. The pan-European tripartite jury responsible for judging the entries comprised representatives from various organisations and bodies — the European Commission's Directorate-General for Employment, Social Affairs and Inclusion, Business Europe and ETUI (the European social partners) — and was chaired by Mats Ryderheim from the Swedish Work Environment Authority. Of the 42 applicants, six organisations were awarded and another four were commended.

## Why should workplaces manage dangerous substances?

Dangerous substances are a major occupational safety and health (OSH) issue at many workplaces across Europe, and are more commonly used than most people realise, with no sector being completely free of dangerous substances:

- almost 40 % of enterprises report that chemical or biological substances in the form of liquids, fumes or dust are present <sup>(1)</sup>
- 18 % of workers report being exposed to chemical products or substances for at least a quarter of their working time <sup>(2)</sup>

- dangerous substances are particularly prevalent in certain sectors — around 60 % of businesses in the agriculture sector and around 50 % in the manufacturing and construction sectors report using dangerous substances <sup>(3)</sup>
- workers in growing sectors — such as health and social care, green energy production, waste management and recycling, and transport — may also be exposed to high levels of dangerous substances.

What's more, workers and employers are often unaware that not only manufactured and clearly labelled chemicals can be dangerous, but apparently harmless substances such as flour dust and substances generated by work processes such as exhaust fumes, welding fumes and dust produced from drilling, cutting and grinding can also pose risks to health.

Exposure to dangerous substances is responsible for a large proportion of occupational diseases including cancer. In fact, more than 120,000 people are estimated to develop cancer each year in the EU as a result of occupational exposure to carcinogens, resulting in almost 80,000 deaths <sup>(4)</sup>. Other health problems occurring among workers exposed to dangerous substances include respiratory diseases such as asthma, harm to the inner organs including the brain, skin disorders, reproductive problems and allergies. Furthermore, many dangerous substances put workers at risk of fire, explosion and suffocation.

It is vital therefore that employers assess risks and take appropriate measures to protect worker safety and health. This is of benefit not only to individual workers, but also to companies: reduced sickness absence and increased productivity make businesses more competitive.

A great deal of legislation aimed at protecting workers from dangerous substances is in place, and there is a wealth of guidance and support information available. Nonetheless, awareness of the issue remains low and an unacceptable number of workers across Europe are still exposed to dangerous substances. The examples described in this booklet demonstrate what can be achieved when an organisation recognises the importance of occupational safety and health and takes a proactive approach to eliminating or reducing worker exposure to dangerous substances by setting appropriate measures and instilling a culture of prevention.

<sup>(1)</sup> <https://osha.europa.eu/en/tools-and-publications/publications/reports/esener-ii-summary.pdf/view>

<sup>(2)</sup> [https://www.eurofound.europa.eu/sites/default/files/ef\\_publication/field\\_ef\\_document/ef1634en.pdf](https://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef1634en.pdf)

<sup>(3)</sup> <https://osha.europa.eu/en/tools-and-publications/publications/second-european-survey-enterprises-new-and-emerging-risks-esener/view>

<sup>(4)</sup> <https://www.rivm.nl/en/news/burden-of-disease-and-societal-costs-of-work-related-cancer-in-european-union>

## Recognising good practice — what the jury was looking for

Applicants had to demonstrate innovative and effective management of the handling and use of dangerous substances. The jury were looking for clear examples of how the good occupational safety and health practices were implemented and what was achieved, for instance how risk assessment was organised to cover all groups of workers and how an approach to prevention prioritising collective over individual measures and respecting the hierarchy of control measures stipulated in OSH legislation was taken — that is, how the STOP principle (substitution followed by technological measures then organisational measures and finally personal protective measures) was followed.

The jury addressed the following questions when selecting the awarded and commended examples:

- Is the example directly relevant to reducing risks caused by dangerous substances in the context of work?
- Does the example demonstrate a holistic approach to workplace safety and health?
- Do the measures implemented result in real and demonstrable improvements to practices for protecting workers from dangerous substances?
- Are collective measures prioritised over personal protective measures?
- Is there clear evidence of worker participation and the involvement of workers and their representatives, and of the commitment of management?
- Is the intervention sustainable over time?
- Could the intervention be transferred to other businesses, sectors or Member States?

Particular emphasis was put by the jury on ensuring that the intervention complies with legislation and exceeds minimum legislative requirements, adding value to existing practices in the Member States, while taking account of the needs of the majority of European enterprises, that is, small and medium-sized enterprises (SMEs).

## Awarded and commended entries

This booklet showcases the awarded and commended examples of good practice, providing a brief description of each intervention or initiative implemented. The issues faced by each organisation, the actions taken to address them and the results achieved are described.

The examples presented could inform any organisation's or company's OSH strategy, regardless of size, sector or Member State, by tailoring aspects of the interventions described to individual business characteristics and needs.

## More information

A wealth of information on OSH — available in more than 20 European languages — is available through the EU-OSHA website.

You can access more information on the Healthy Workplaces Manage Dangerous Substances campaign at [healthy-workplaces.eu](https://healthy-workplaces.eu), where you will also find a database of practical tools and guidance <sup>(5)</sup>, other useful resources and details of how to get involved in the campaign.

The dangerous substances e-tool <sup>(6)</sup>, for instance, provides easy-to-understand background information and practical advice on managing dangerous substance, tailored to the needs of individual businesses. This user-friendly tool is free and can be accessed through the campaign website.

## Acknowledgements

EU-OSHA is very grateful to its national focal points throughout Europe for the instrumental support they offer to the Healthy Workplaces Campaigns and other awareness-raising activities, and particularly for nominating and assessing applicants for the Good Practice Awards.

EU-OSHA wishes to thank the members of the 2018-19 Good Practice Awards jury: the chair, Mats Ryderheim (Swedish Work Environment Authority), and the members of the panel, Kris de Meester (Federation of Enterprises in Belgium), Rob Triemstra (Netherlands Ministry of Social Affairs and Employment), Wim van Veelen (Netherlands Federation of Trade Unions) and Laura Vicente (Directorate-General for Employment, Social Affairs and Inclusion).

<sup>(5)</sup> <https://osha.europa.eu/en/themes/dangerous-substances/practical-tools-dangerous-substances>

<sup>(6)</sup> <https://eguides.osha.europa.eu/dangerous-substances/>



# Detoxikon — minimising harm to public order and safety personnel from microdoses of illegal narcotics



**ORGANISATION/COMPANY**

VAKOS XT, a.s.

**COUNTRY**

Czechia

**SECTOR**

Public sector, public order and safety services (e.g. police, fire and ambulance services, customs authorities, intelligence services)

**TASKS**

Narcotics operations, handling of samples and evidence, analysis of samples



Source: VAKOS XT, a.s.

## Background

Illegal methamphetamine production is an issue in Czechia. Public order and safety personnel — such as those of the national police, fire and rescue service, customs authorities, intelligence services, and municipal police and ambulance services — are at risk of being exposed accidentally to such psychoactive substances through their work.

Exposure at even very low levels ('microdoses') to aerosols or through skin contact with contaminated surfaces can lead to skin irritation, respiratory problems and headaches, and affect cognitive processing and autonomic nervous system functioning. Despite these ill effects, standard operating procedures for personnel that may come into contact with narcotics were not fit for purpose or were missing altogether, there is a lack of awareness of the risks and how to identify hazards, and suitable protective equipment or clothing is often not used.

The Detoxikon project, resulting from a long-term collaboration between VAKOS XT, a.s., CBRN (Chemical, Biological, Radiological and Nuclear) Division, and the Department of Specialised Methods, Service Facility of the Ministry of the Interior, addresses these shortfalls.

## Aims

The project aimed to minimise the exposure of some public order and safety service workers to hazardous psychoactive substances, by facilitating the implementation of collective and individual preventive and protective measures and to reduce the observed effects in already exposed workers.

## What was done and how?

The project is split into three parts:

1. **Decontamination of workplaces and vehicles:** this includes gradual adjustments to everyday standard operating procedures, and training personnel in how to implement them.
2. **Training:** raising awareness among staff that microdoses of psychoactive substances can cause clinical symptoms and what the effects on human health are, of how psychoactive substance contamination can spread and the range of spread, and of how to identify and prevent risks, particularly through the use of appropriate personal protective equipment and clothing. A range of audio-visual materials, info sheets and practical training exercises is used. Because of the nature of the operations carried out by personnel at risk of exposure to microdoses of narcotics, collective measures may be difficult to implement at some sites and therefore personal protective measures are essential. The hands-on training programme raises awareness of the risks and promotes good safety and health practices for the handling of evidence, the care of service vehicles and clothing, and procedures carried out before, during and after narcotics operations. There is a particular emphasis on improving the level of individual protection and training personnel in the appropriate use of personal protective equipment through practical examples, creating training laboratories and professional consulting.
3. **Specific therapy:** this combines techniques aimed at detoxifying the human body, promoting physical fitness and helping individuals to cope with stress. Trials are under way of a specific therapy aimed at enabling individuals to better handle the effects of exposure to microdoses of psychoactive substances. The therapy involves neuro- and audio-visual stimulation and a tailored nutrition plan. Affected individuals and their families are also offered psychosocial support.



Source: VAKOS XT, a.s.

Detoxikon also focuses on data collection and dissemination among the scientific community, and the practical application of the most up-to-date scientific knowledge.

## What was achieved?

More than 1,000 personnel, mainly from drug enforcement units, forensic services, and investigation departments of the customs authorities and mobile supervision units, both in Czechia and other countries, received training from 2014 to 2018.

The procedures for workplace decontamination led to a reduction in long-term damage to health.

Exposed workers showed a decrease in symptomatic indications of intoxication such as non-specific headache, gastrointestinal tract complications, muscle spasms and cramps, lack of concentration and mental imbalance, as well as an increase in the ability to handle work tasks and stress.



Specifically, there were measurable improvements — based on cognitive and cardiovascular system functioning and heart rate assessments — in the following areas:

- cognitive process stability
- ability to concentrate
- autonomic nervous system functioning
- body stress, measured by overall muscle tone and tension/subcutaneous structure spasms
- psychological stress resistance and ability to resist the influence of stress factors.



Source: VAKOS XT, a.s.

## Success factors

The project is strongly supported by the Ministry of the Interior and other public safety authorities, and involves collaboration with the Czech Labour Safety Research Institute.

## Transferability

The intervention could be transferred to other Member States and to other areas of work in which staff are at risk of exposure to psychoactive drugs, for instance healthcare workers, or workers who handle and transport such substances.

*'The intervention is innovative and addresses an increasing risk in a sector that needs attention.'*

## Costs and benefits

The non-specific symptoms associated with chronic exposure to microdoses of psychoactive substances — such as headache, inability to concentrate on the fulfilment of tasks, and changes in emotional and mental state related to dealing with workload and stress — are known to significantly reduce individuals' quality of life and ability to work. Reducing the incidence of these problems among staff involved in narcotics operations not only will benefit the individuals affected, but is likely to reduce absence from work and increase productivity, resulting in significant savings for employers and health and social care services.

The costs of developing and implementing Detoxikon were met by the individual services and the Ministry of Industry and Trade.

The processes implemented and the approach taken to educate personnel in identifying and eliminating risks contributes to improvements in occupational safety and health across the public health and safety authorities. It also reduces the risks to people living or working near narcotics operations.

## Key features of good practice example

- The project makes a relevant contribution to improving the working conditions of workers potentially exposed to psychoactive drugs.
- The intervention is innovative and sustainable.
- The measures have been successfully implemented in practice.
- The intervention goes beyond the minimum national legislative requirements and addresses a public sector that needs more attention.
- Project implementation has the clear commitment of management.
- The project results in real, demonstrable improvements and adds value to existing safety and health practices for narcotics operations.

## Further information

Further information can be found at [www.vakosxt.cz](http://www.vakosxt.cz)

# Eliminating hazardous solvents from the analysis of reclaimed material in the road repair and construction sector

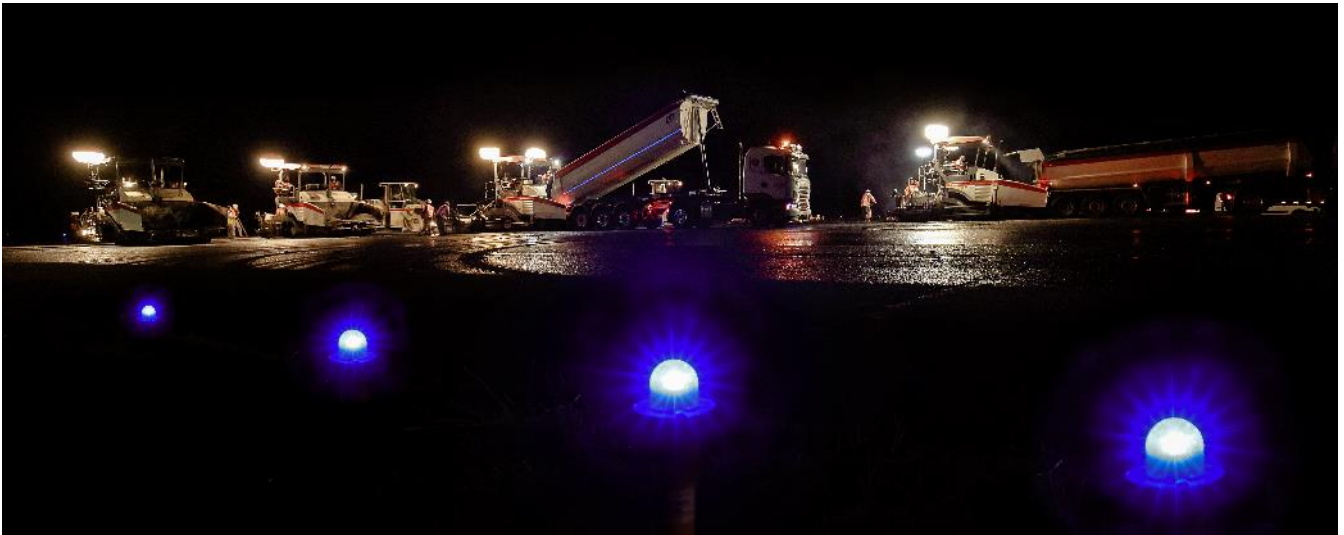


ORGANISATION/COMPANY  
Eiffage Infrastructures

COUNTRY  
France

SECTOR  
Road and motorway construction

TASKS  
Laboratory analyses of samples of asphalt-containing mixtures taken from French roads



Source: Eiffage Infrastructures.

## Background

Eiffage Infrastructures is responsible for maintaining the quality of the French road network and is involved in new road construction as well as renovating existing roads.

Each year, around 35 million tonnes of asphalt taken from French roads is analysed by Eiffage Infrastructures' laboratories to determine whether or not any of this material can be recycled and re-used. The standard analysis required the use of perchloroethylene, an organic solvent classified as carcinogenic, mutagenic and reprotoxic, putting thousands of laboratory workers at risk of exposure to this dangerous substance.

## Aims

To develop a procedure for the analysis of asphalt-coated road aggregates that eliminates the exposure of laboratory technicians to perchloroethylene in line with the prevention policy of Eiffage Infrastructures.



Source: Eiffage Infrastructures.

## What was done and how?

An innovative method — known as Analysis Safe — for the characterisation of reclaimed road materials was developed. This method is based on infrared spectrometry and completely eliminates the need for hazardous organic solvents. A simple infrared spectrometer with a diamond attenuated total reflection attachment is used to determine the oxidation indices of the reclaimed asphalt, which can then be used to characterise the physical properties of the material.

## What was achieved?

The Analysis Safe method eliminates the need for the use of solvents in the analysis of reclaimed asphalt. As a result, the thousands of laboratory technicians who analysed such road materials every day are no longer at risk of exposure to perchloroethylene. In addition, because the method uses only a simple infrared spectrometer, it also has the advantage of significantly reducing the amount of laboratory equipment required. Moreover, with the new method, asphalt-coated aggregates can be characterised in fewer steps, taking only 10 minutes rather than almost 2 hours. The elimination of the use of perchloroethylene also has benefits for the environment.

## Success factors

The method was developed in line with the prevention policy of EIFFAGE Infrastructures, which is to design and use products or methods that have the lowest impact on health, remove or substitute any product with carcinogenic, mutagenic or reprotoxic properties as soon as it is technically possible.

## Transferability

The method is fully transferable to other companies and Member States.

## Costs and benefits

Worker health and the environment are protected. Savings in terms of time and money are made in relation to the management, storage and disposal of an organic solvent. The new process involves less equipment and fewer steps, and takes less time. As a consequence, laboratory productivity has increased by 30 %. It also eliminates the negative environmental impact of this hazardous organic solvent.

## Key features of good practice example

- The innovative Analysis Safe method completely eliminates the use of the carcinogenic, mutagenic and reprotoxic solvent perchloroethylene in the characterisation of reclaimed road asphalt, thus eliminating risks to worker health and the environment.
- The new technique has not only improved conditions for workers but has resulted in savings in terms of time, money and resources, and an increase in productivity.
- This is an example of risk elimination — developed and successfully implemented as a result of the company's commitment to occupational safety and health — that is transferable to other companies and Member States.





Source: Eiffage Infrastructures.

## Further information

Further information can be found at

<https://www.eiffageinfrastructures.com>

Eiffage Infrastructures is an official campaign partner of the Healthy Workplaces Campaign:

<https://healthy-workplaces.eu/en/campaign-partners/eiffage-infrastructures>.

*'Company policy is to remove or substitute any carcinogenic, mutagenic or reprotoxic product as soon as technically possible.'*

# Safe and economical procedure for handling asbestos-containing putty in the glazing trade



## ORGANISATION/COMPANY

Federal Association of Glazier Trades  
(*Bundesinnungsverband des Glaserhandwerks*)

## COUNTRY

Germany

## SECTOR

Construction, glazing

## TASKS

Removal and renovation of glazing/handling of asbestos-containing glazing putty



Source: Federal Association of Glazier Trades.

## Background

The Federal Association of Glazier Trades represents the interests of all glass specialists and professional groups in Germany, including glaziers, finishers and designers. It cooperates with its affiliated members — the Institute for Glazing Technology and Window Construction (*Institut für Verglasungstechnik und Fensterbau e. V*) and the Technical Competence Centre (*Technische Kompetenzzentrum*) — in developing industry standards, compiling technical guidelines, and providing advice on technical issues

and complying with laws and regulations. It also disseminates industry-relevant information through journal articles, events, trade fairs and seminars.

Asbestos is found at low levels in some glazing putty — used for several decades before 1993, when the asbestos ban came into force. Typically, asbestos-containing putty was used with the single glazing of wooden windows, box windows, shed roofs, greenhouses and industrial buildings, as well as with the insulating glass of early aluminium-framed windows.



In 2016, the Federal Association of Glazier Trades consulted the German occupational safety and health authorities on how to deal with asbestos-containing putty. The authorities stipulated similar measures to those required for work involving much higher concentrations of asbestos in materials and corresponding exposure levels, including heavy-duty protective clothing and sealing off affected sites. These measures were considered disproportionate to the level of risk associated with removing asbestos-containing putty from glazing, and their implementation would require significant time, effort and money, making compliance difficult for many enterprises.

## Aims

To develop practical measures for the removal of asbestos-containing putty that protect the health of glazing industry workers and customers, but that are proportionate, in terms of costs and resource use, to the risks involved.

## What was done and how?

A three-part approach was taken:

1. **Establishing a technical procedure for the removal of asbestos-containing putty:** a simple procedure was developed in collaboration with the Institute for Occupational Safety and Health of the German Social Accident Insurance (*Institut für Arbeitsschutz der deutschen gesetzlichen Unfallversicherung* (IFA)) and the Institution for statutory accident insurance and prevention Building Trade (*Berufsgenossenschaft Bau* (BG Bau)). The key principles are as follows:
  - only manual tools can be used, no machines
  - work must be performed outdoors
  - heat can be used only if the putty does not contain bitumen
  - a vacuum cleaner adapted to use with asbestos must be used
  - personnel must demonstrate certain qualifications.
2. **Training:** glaziers must be suitably trained and certified in the abovementioned procedure before handling asbestos-containing putty. Training is supported by the Technical Competence Centre. Glaziers throughout Germany who successfully complete the training are presented with certificates of competence.
3. **Awareness-raising actions:** comprehensive information about the safe removal of asbestos-containing putty, and other dangerous materials, is widely disseminated by the Federal Association of Glazier Trades and the Technical Competence Centre in numerous publications.



Source: Federal Association of Glazier Trades.

## What was achieved?

The procedure was assessed and approved by the Institute for Occupational Safety and Health of the German Social Accident Insurance, as its application was found to result in only low-level emissions of asbestos, well below the maximum exposure limit, thus effectively protecting workers from this hazardous substance. At the end of June 2018, the Federal Association of Glazier Trades received permission to train glaziers throughout Germany in the newly developed and approved method. Since then, more than 300 glaziers have been trained and certified, enabling them to professionally renovate glazing with asbestos-containing putty in a safe and economical way. The procedure is now an official requirement for every glazier according to a regulation of the German Statutory Accident Insurance (DGUV — *Deutsche Gesetzliche Unfallversicherung*) — DGUV 201-012 'Removal of asbestos-containing putty in the glazing rebate by hewing and cutting with and without heating'.

In recognition of the successful implementation of this intervention, the Federal Association of Glazier Trades received a prize at the 12th German Hazardous Substances Protection Awards in the category 'Successful against asbestos'.

## Success factors

A key factor in the successful development of this technique and the implementation of training and awareness-raising actions was the effective collaboration between the glazing industry's associations and institutions. In addition to the Federal Association of Glazier Trades, which initiated the project, the following organisations also played a prominent role:

- affiliated state guilds
- the Institution for statutory accident insurance and prevention for the Building Trade (BG Bau — *Berufsgenossenschaft Bau*)
- the Institute for Occupational Safety and Health of the DGUV (IFA — *Institut für Arbeitsschutz*)

- the Federal Institute for Occupational Safety and Health (BAuA — *Bundesanstalt für Arbeitsschutz und Arbeitsmedizin*).

The technique is inexpensive and simple to implement by following straightforward instructions, and — with appropriate training — anyone in the glazing industry can become qualified in safely handling asbestos-containing putty.



Source: Federal Association of Glazier Trades.

## Transferability

The procedure to safely renovate glazing with asbestos-containing putty and the approach to training and information dissemination could be applied in other Member States. There is also potential for the procedure to be applied to products containing low levels of other dangerous substances.

## Costs and benefits

The solution described — how to safely yet easily and economically remove asbestos-containing putty in glazing — is clear and easy to implement, and could have a huge impact on the sector by protecting glaziers and customers from asbestos without the need to implement costly, resource-intensive and time-consuming measures.

Raising awareness of the presence of dangerous substances such as asbestos in glazing products and how to handle them safely is beneficial to the health of workers in the industry and their customers.

## Key features of good practice example

- The procedure developed and training offered have the potential to make an important contribution to ensuring the safety of workers handling asbestos in the glazing industry.
- The technique is simple to apply and cost effective, making it feasible to implement even for small businesses.
- The successful implementation of the intervention demonstrates the benefits of collaborative working between trade associations and occupational safety and health authorities and organisations.
- The intervention is sustainable and transferable to other Member States.

## Further information

Further information can be found at <http://www.glaserhandwerk.de>

## References and resources

Details of the procedure (German): [https://www.dguv.de/medien/ifa/de/prg/asbest/bt\\_42.pdf](https://www.dguv.de/medien/ifa/de/prg/asbest/bt_42.pdf)

German Hazardous Substances Protection Awards: <https://www.baua.de/DE/Themen/Arbeitsgestaltung-im-Betrieb/Gefahrstoffe/Gefahrstoffschutzpreis/Gefahrstoffschutzpreis.html?pos=1>

***'The solution could have a huge impact by protecting glaziers and customers from asbestos without the need to implement costly measures.'***



# Reducing worker exposure to harmful dust in the arable farming sector



## ORGANISATION/COMPANY

Mansholt BV in collaboration with Stigas

## COUNTRY

Netherlands

## SECTOR

Agriculture

## TASKS

Potato handling in arable farming

## Background

Mansholt BV is a family-run farming business based in Westpolder, Vierhuizen, the Netherlands. The company's main activity is cultivating seed potatoes. From October to March, potatoes are sorted in a shed and prepared for delivery to clients. At this processing stage, the material adhering to the potatoes is dry, forming a dust consisting mainly of soil and vegetation. Inhalation of this dust can be harmful to health, particularly if it contains crystalline silica, which can cause chronic lung disease and lung cancer.

Periodic risk assessments carried out by Stigas — the occupational health services provider for the agricultural sector in the Netherlands — have highlighted that the company's workers were at risk from exposure to such dust. The company was committed to addressing this problem and has worked closely with the sectoral body over the years to develop an action plan for minimising exposure.

## Aims

The company aimed to reduce the exposure of workers in its potato-sorting shed to potentially harmful dust and to provide a clean, safe and healthy working environment for all workers.

## What was done and how?

Through collaboration with Stigas, Mansholt BV has identified practical ways of reducing worker exposure to dust. A combination of technical, organisational and personal protective measures have been implemented in stages, following the hierarchy of control measures foreseen in legislation.

In 2003, the company purchased an electric forklift truck for the potato-sorting shed to minimise the amount of dust blown about, while also eliminating exhaust fumes and reducing noise from formerly fuel-powered engines.



Source: Mansholt BV.

In 2007, the company installed a new potato-sorting unit in a specially designed 'reading room' with a low ceiling and positive pressure system, meaning that dust is forced down at the sides. Before the potatoes enter this room for sorting and processing, they pass over a special conveyor belt that removes most of the dust. A sweeper vacuum machine was also purchased. This is used to clear the floor of dust in the morning before work begins and at various intervals throughout the day.

In 2012, a large dust extractor was installed. All points of the potato-sorting conveyer at which the potatoes fall from one level to another are enclosed and connected to a large central air extraction point to prevent dust from escaping into the air.

reduce risks and improve working conditions, through effective collaboration with Stigas and with the active participation of workers.



Source: Mansholt BV.

The company also implements a daily cleaning and vacuuming regime, to keep the level of dust in the air as low as possible.

Importantly, the above technical and organisational measures are very effective at minimising worker exposure to dust, meaning that personal protective equipment is rarely needed. For any activities that are likely to lead to exposure to particularly high levels of dust, masks with exhalation valves are provided.

In addition to these measures to reduce exposure to dust, the company has also taken other steps to improve working conditions; for instance, the installation of LED lighting and a skylight has created a more pleasant working environment in the potato shed.

## What was achieved?

The combination of measures implemented by Mansholt BV has substantially reduced the amount of dust in the air in the potato-sorting shed and has considerably improved working conditions. This is appreciated both by workers and by clients. Moreover, the company's achievements have been recognised by Stigas, with one prevention advisor highlighting that its efforts to invest in a healthy workplace make it a leader in safety and health in the agricultural sector in the Netherlands.

However, despite these achievements, the company is not complacent and continually looks for ways to

## Success factors

The company is committed to ensuring safe and healthy working conditions for its employees, recognising that worker well-being is key to ensuring satisfied customers and a successful business.

With the support of the sectoral body for occupational health, it has implemented the hierarchy of control measures to address the risks posed to workers by hazardous dust in its potato-sorting shed: although substitution is not possible, as the handling of potatoes cannot be avoided, the company has reduced risks first and foremost through the implementation of collective technical measures at as early a stage in the processing chain as possible.

The workers value the company's efforts and actions to improve working conditions, and are actively involved in finding solutions and implementing changes. Management and workers work together when purchasing new equipment and updating production processes to ensure that occupational safety and health are priorities.

## Transferability

The approach taken by Mansholt BV is a good example to other companies, including those outside the agricultural sector, of how a small business with limited resources can make real improvements to worker safety and health through cooperation with a sectoral





Source: Mansholt BV.

body and by changing equipment and processes gradually.

## Costs and benefits

In total, the forklift truck, sweeper vacuum machine and dust extractor cost more than EUR 100,000, which is a considerable investment for a small company. However, this expenditure was manageable because it was spread over a period of several years. Moreover, the costs are outweighed by the benefits, that is, a decrease in the risk that workers will develop dust-related health complaints and low rates of sick leave.

## Key features of good practice example

- The company systematically addresses workplace risks with the support of the sectoral occupational safety and health body, Stigas.
- Despite being a small company with limited resources, Mansholt BV has successfully implemented a range of collective technical and organisational measures to protect workers from potentially hazardous dust, leading to improved working conditions for workers.

- The measures taken go beyond legislative requirements and are sustainable.
- This example of good practice is transferable to other small businesses, including those outside the agricultural sector.

## Further information

Further information can be found at [www.stigas.nl](http://www.stigas.nl)

## References and resources

<https://www.hseactueel.nl/nieuws/mansholt-en-volandis-winnen-competitie-goede-praktijken/>

*'The company's efforts to invest in a healthy workplace make it a leader in safety and health in the agricultural sector.'*



# Substituting hazardous chemicals and ensuring safe, healthy and sustainable working conditions in the hairdressing sector



## ORGANISATION/COMPANY

Peluquería Elvira

## COUNTRY

Spain

## SECTOR

Hairdressing and other beauty treatment

## TASKS

Hairdressing, beauty treatments, colouring, shampooing, preparing hair dyes and bleaches



Source: Peluquería Elvira.

## Background

Peluquería Elvira is a small hairdressing and beauty business in Villanueva de la Serena, Spain. Workers in this sector are commonly exposed to hazardous chemicals in, for instance, hair dyes, bleaches and shampoos. Such exposure can lead to skin and eye irritation, and respiratory problems.

The company was inspired to improve working conditions for its employees — and become a ‘healthy hair salon’ — by the efforts of Esther Martí Barrios, a former hairdresser who has been developing ways of improving working conditions in the sector since she gave up her job in 2009 because of asthma developed as a result of workplace exposure to persulphates and heavy metals.

By adopting the healthy hair salon philosophy, the company is committed to ensuring safe, healthy and

sustainable working conditions and environmentally friendly practices that differentiate it from other salons in the market.

## Aims

- To substitute synthetic chemicals that are harmful to health and the environment with safer plant-based alternatives.
- To implement preventive measures that ensure healthy and sustainable working conditions.

## What was done and how?

The company has substituted products containing harmful chemicals with plant-based products. It found through experience, however, that not all plant-based hair colours entering Europe are pure, and some customers are allergic to or intolerant of some of the poorly controlled substances that are used. Therefore, the company now uses only those plant-based mixtures produced in Europe with phytosanitary certificates, to ensure that mixtures do not contain any toxic substances.



Source: *Peluquería Elvira*.

To ascertain what other improvements were needed to transform the business into a healthy hair salon, the company used a self-assessment instrument and employed an external occupational health and safety service to perform a comprehensive occupational risk assessment. This led to the implementation of several measures in addition to the substitution of dangerous chemicals — including technical, organisational and personal protective measures — and a training programme:

- There is now an area with localised extraction equipment for the occasional preparation of dyes containing harmful substances to eliminate bad odours and harmful vapours.
- Although most products used are now plant-based, when dangerous chemicals are used nitrile or vinyl gloves and activated carbon masks are worn.
- The salon is cleaned with lemon, bicarbonate and vinegar, rather than with products containing hazardous chemicals, and waste is sorted and recycled where possible.
- Effective and natural ventilation and temperature control is ensured and comfortable cotton clothing is provided.
- Wash basins are height adjustable and water-flow regulators and mixer taps have been installed. Height-adjustable equipment and trolleys are provided.
- Glare has been reduced by using LED lighting.

- Floors are slip-resistant and non-slip footwear is provided.
- Plugs, cables and equipment are monitored daily to ensure that they are in a good state of repair.

A 60-hour training programme is provided in close collaboration with the external occupational health and safety service, with the full involvement of the salon manager. This practical training is key for implementing and consolidating good practice: staff not only are trained in workplace preventive measures, but are also advised on good nutrition, physical exercise and healthy lifestyles.

The company raises awareness of the issues identified among staff, including by providing face-to-face sessions with hair professionals who have been affected by health problems as a result of exposure to hazardous chemicals at work; staff find these sessions particularly motivating.

The company consults workers on all decisions taken and changes adopted, and has taken steps to generate a climate of dialogue, trust and cooperation. Competitive behaviour is discouraged by providing clear and transparent information. Tasks are shared out in relation to skills, and work is organised in a fully cooperative way, with breaks being taken at least every 2 hours. Efforts are also made to ensure that all workers can balance their work and family lives.

## What was achieved?

Becoming a healthy hair salon meant a change in the salon's philosophy — substituting dangerous chemicals, and making worker and customer health and the environment top priorities for the business. This is highly valued not only by staff but also by clients.

Although the use of synthetic dyes could not be completely eliminated, it has been substantially reduced, by 90-95 %.

Workers report improvements in skin, eye and throat irritation, fatigue and headaches. A survey of 18 other salons with which the company shared this good practice shows that:

- The majority have introduced organic and plant-based colour products to their salons and are fully satisfied with the results.
- More than two thirds have implemented a package of preventive measures and the remainder have almost completed the implementation of such measures.
- In over 90 % of cases, symptoms such as itchy throat, headaches, teary or itchy eyes, and fatigue have completely disappeared.

Substituting dangerous chemicals and implementing the measures described also benefits the environment, as salons no longer pollute wastewater with toxic products.

## Costs and benefits

The costs involved in substituting hazardous products with less hazardous ones and implementing changes to salons are minimal. The economic returns were more than 200 %, partly as a result of reductions in electricity and water consumption: the installation of LED lighting cut electricity bills by 60-80 % and flow regulators reduced water bills by 40 %.

What's more, there are notable improvements in worker health and well-being, resulting in less sick leave and improved customer service.

## Key features of good practice example

- This example makes a valuable contribution to eliminating the use of dangerous substances and improving the safety and health of workers in the hairdressing sector, and adds value to existing practices in Spain.
- The use of dangerous substances has been largely eliminated, and collective, sustainable measures to improve working conditions and reduce harm to the environment have been successfully implemented.
- The management is fully committed to and workers actively participate in implementing improvements.
- The company has shared its good practice with other companies in Spain, with demonstrable results.
- The majority of workers in the hairdressing sector are women, so this good practice example is particularly relevant to this group with particular risks.

## Further information

Further information can be found at <https://www.facebook.com/PeluqueriaElvira>

## References and resources

Prevención 10 programme  
[https://www.prevencion10.es/p10\\_front/](https://www.prevencion10.es/p10_front/)

*'This good practice example is particularly relevant to women who are particularly at risk in this sector.'*



Source: Peluquería Elvira.

## Success factors

- The company carried out a workplace risk assessment to identify areas for improvement and effectively raised awareness of the need for and value of change among staff. It used tools and services provided through a cost-free programme designed for small and medium-sized enterprises with less than 25 workers and self-employed workers — the Prevención 10 programme designed by the Ministry of Labour and Social Affairs together with the national institute for safety and health at work (INSST) — and a simple self-assessment tool.
- In addition to the substitution of hazardous chemicals, the company also introduced a package of wide-ranging complementary measures to transform its workplace into a healthy hair salon.
- Staff actively participate in all decisions, and undergo practical training in preventive measures. Measures are revisited when problems, for example health complaints, occur.

## Transferability

The healthy hair salon project was extended to and successfully implemented by other salons.

This example of good practice is therefore transferrable, particularly to other small enterprises in the hairdressing sector. The company has in fact shared this good practice with other salons throughout Spain, with demonstrable results.



# Protecting workers from potentially hazardous carbon nanotubes in the manufacturing sector



**ORGANISATION/COMPANY**

Atlas Copco Industrial Technique AB

**COUNTRY**

Sweden

**SECTOR**

Manufacturing

**TASKS**

Drilling and testing materials containing carbon nanotubes



Source: Atlas Copco Industrial Technique AB.

## Background

Atlas Copco Industrial Technique manufactures industrial drills for a range of advanced applications, including for the aerospace and automotive sectors. The tools produced must be of the highest quality and, consequently, extensive testing is required. In-house testing is carried out in a purpose-built lab at the company's premises in Sweden.

In recent years, carbon-fibre-based materials have become more widely used by the company's customers because of the benefits they offer for many industrial applications, such as mechanical strength, and electrical and thermal conductivity. Therefore, the drilling of such materials has become commonplace in

the testing lab, contaminating the air with potentially hazardous carbon nanotubes.

Because the health risks associated with such nanoparticles are not fully understood, it is important that worker exposure, particularly by inhalation, is minimised. However, the company recognised that the testing lab was not adequately equipped to deal with hazardous fumes and nanoparticles, with workers relying solely on personal protective equipment and particles remaining in the air and contaminating surfaces and potentially spreading to other facilities.

## Aims

- To create a safe working environment for engineers in the testing lab, protecting them from the potentially harmful effects of carbon nanotubes.
- To raise awareness of the risks among clients and other visitors to the company's premises.

## What was done and how?

A comprehensive workplace risk assessment was carried out to identify potential risks associated with the drilling of materials containing carbon nanotubes. On the basis of this assessment, preventive measures to manage risks and specifications for new testing facilities were developed. All testing engineers — along with managers, safety representatives, the company owner and external experts — participated in the risk assessment process, and in developing measures and facilities to minimise risks.

This led to the installation of ventilated fume cupboards, to extract carbon nanotubes emitted during the drilling process and prevent air and surface contamination in the testing lab. The effectiveness of the ventilation system was assessed and adapted to ensure adequate airflow, and an external occupational safety and health consultant was contracted to measure nanoparticle contamination following drilling before and after the installation of the new facilities.

These tests also made it clear that it was important to keep doors closed for a certain period of time after drilling, to enable the complete removal of any nanoparticle contamination.

On the basis of these results, a safety routine was developed. This is visible to all personnel and visitors

to the facility, thus raising awareness of the risks of nanoparticle contamination and the need to manage them.

## What was achieved?

The company followed the precautionary principle in its approach to tackling the potential risks posed by carbon nanotubes, going above and beyond national legislative requirements and involving stakeholders at all levels to ensure the safety and health of its workers. As a result, workers can now work safely in the testing lab without the need for personal protective equipment.

Before installation of the new facilities, the level of nanoparticles in the air after drilling in carbon-fibre material was about 12,000 nanoparticles/cm<sup>3</sup> with a background exposure of only 700 nanoparticles/cm<sup>3</sup>. However, after the new facilities had been installed, the level of nanoparticles in the air did not increase above background levels during drilling, indicating that the new extraction system was highly effective at preventing nanoparticle contamination of the air.

The company makes considerable efforts to raise awareness among clients and other visitors of the risks posed by carbon nanotubes and the measures it uses to minimise them. These efforts to share knowledge and good practice have the potential to contribute to reducing the risks posed by nanomaterials across the manufacturing and other sectors.



Source: Atlas Copco Industrial Technique AB.





Source: Atlas Copco Industrial Technique AB.

## Success factors

The company has successfully implemented measures to improve the working environment and protect engineers from potentially hazardous carbon nanotubes in the testing lab. This is largely thanks to the structured, systematic, holistic approach taken, starting with a comprehensive risk assessment and involving the participation of workers and other stakeholders at all levels. The close collaboration between management, workers and experts was key: high-level and local management, the local safety representative and workers worked together to find solutions, contributing to a positive working culture.

The company clearly demonstrates its commitment to the consultation of workers: time is set aside for safety representatives to research issues related to carbon nanotubes, and everyone's views are listened to and considered. Awareness raising, among not only its workers but also its clients and other companies, is also a critical and highly commendable element of the company's approach to safety and health.

## Transferability

The approach taken by Atlas Copco to minimising the risks posed by carbon nanotubes is transferable to other workplaces, in both Sweden and other Member States.

## Costs and benefits

The company invested EUR 39,000 in the project, but has eliminated risks to workers posed by inhaling dust containing potentially hazardous carbon nanotubes and contributes to raising awareness of the risks among other companies.

## Key features of good practice example

- The approach taken by the company is a relevant example of a proactive approach that could be transferred to other workplaces to eliminate emerging workplace risks from nanomaterials, in Sweden and in other Member States.
- The company actively raises awareness of the steps it has taken to protect workers.
- The intervention is sustainable, exceeds legislative requirements and focuses on collective measures, eliminating the need for personal protective equipment.
- The company has fostered a culture of collaboration and participation, with good communication between managers, safety representatives and workers playing a key part in the successful development and implementation of measures to protect workers from potentially hazardous carbon nanotubes.
- The measures taken also raise awareness among the many visitors to the testing lab of the need to manage the potential risks posed by dust containing carbon nanotubes in their own workplaces and how to go about this.

## Further information

Further information can be found at <https://www.atlascopco.com>

*'This is a relevant example of a proactive approach that could be transferred to other workplaces to eliminate emerging workplace risks from nanomaterials.'*

# A disinfectants database — substituting hazardous products in hospitals, schools and other public facilities



## ORGANISATION/COMPANY

Vienna Ombuds Office  
for Environmental  
Protection

## COUNTRY

Austria

## SECTOR

Public sector

## TASKS

Disinfecting floors, work surfaces, furnishings, medical equipment and skin

## Background

Every year, the City of Vienna purchases around 400 tonnes of disinfectants for use in city facilities, including in schools, hospitals and nursing homes. The use of such products — on work surfaces, floors, furnishings, medical devices and the skin — is essential for preventing the spread of infection and protecting health. However, many disinfectants pose risks to human health and the environment: many have allergenic or toxic properties, and some even contain ingredients that are carcinogenic, reprotoxic or mutagenic, such as formaldehyde. Pregnant workers in particular should not be exposed to disinfectants containing harmful substances.

The City of Vienna is committed to 'green' public procurement and, in 1998, it introduced a sustainable public procurement programme — *ÖkoKauf Wien* — aimed at selecting products with minimal risks to workers and the environment. Under this programme, a working group with a specific focus on disinfectants — led by the Vienna Ombuds Office for Environmental Protection — was established to support the selection of disinfectants that do not contain allergenic or toxic ingredients.

Unlike other products containing chemicals, however, the harmful properties of disinfectants are often not immediately apparent, and only recently have the ingredients of such products been subject to systematic recording in the EU, under the Regulation for the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) and the Biocidal Products Regulation.

Therefore, to support the selection of safer disinfectants for the City of Vienna's public facilities, it was important to ensure that accurate, up-to-date information on the hazardous properties of such products is available.



Source: Wiener Umweltschutzanstalt.

## Aims

To provide systematic support and advice to public service organisations of the municipal administration on the selection of effective and affordable disinfectants with minimal toxicity to human health and the environment.



Source: Wiener Umweltschutzamt.

## What was done and how?

The Vienna Ombuds Office for Environmental Protection — in collaboration with international and national experts from the Austrian Worker's Compensation Board (AUVA — *Allgemeine Unfallversicherungsanstalt*), the Austrian Society for Hygiene, Microbiology and Preventive Medicine, the Vienna Hospital Association, the Bureau for Chemical Engineering TB-Klade and other institutions — developed the Viennese Database of Disinfectants, WIDES.

This database is freely available online, in both English and German, and has two functions. First, it provides structured information on disinfectants and their ingredients, including information on efficacy, hazard classification, properties, uses, activity, material compatibility and toxicity/eco-toxicity. Second, it provides an assessment of hazardous properties, ranking ingredients from low to high risk. The hazard categories are as follows: 'Acute toxicity (respiratory tract)', 'Irritation and corrosivity', 'Allergenic potential', 'Mutagenic, carcinogenic, toxic for reproduction, chronically toxic', 'Behaviour in surface water — acute' and 'Behaviour in surface water — chronic'. Thus, the hazardous properties of more than 200 disinfectant ingredients are compiled in an overview table and are easily accessible and comparable using WIDES.

The database is maintained and updated regularly with financial support from the City of Vienna (the Vienna Municipal Department for Environmental Protection and the Vienna Ombuds Office for Environmental Protection), the Austrian Worker's Compensation Board and the Federal Ministry for Sustainability and Tourism. Staff in the City of Vienna's procurement

departments are trained in how to use the database, and training videos are publicly available online in English and German.

## What was achieved?

All municipal departments of the City of Vienna are now legally required to use the WIDES database to identify safe disinfectants. This has led to a significant reduction in the use of substances that are harmful to human health and the environment.

For example, in Vienna hospitals:

- The use of surface, instrument and hand disinfectants containing carcinogenic, mutagenic or reprotoxic substances has been largely eliminated, being reduced from approximately 1 tonne to almost zero.
- The amount of allergens in disinfectants used has been reduced from around 1.5 tonnes to almost zero.
- The amount of a potentially carcinogenic substance used in floor scrubber machines has been halved.
- Microbial soaps containing triclosan have been replaced with safer alternatives.

In 2015, the Austrian Federal Ministry for Labour, Social Affairs and Consumer Protection published a decree to protect pregnant workers from exposure to hand disinfectants containing substances classified as carcinogenic, mutagenic, reprotoxic, sensitising or toxic (with chronic or highly acute toxicity). The decree specifically recommends using the WIDES database to select safe products and this has been highly influential in reducing the use of harmful disinfectants in Austrian hospitals.

Because the database is freely available online and is available in two languages, purchasers of disinfectants anywhere in the world can use it to quickly and easily identify products on the market with few or no hazardous properties, based on up-to-date, reliable information. It now has users from every continent and receives approximately 1,500 visits per month.

## Success factors

The successful development and implementation of the WIDES database is largely thanks to the collaborative, multidisciplinary approach taken, involving input from the Vienna Ombuds Office for Environmental Protection, Austrian institutes for hygiene and preventive medicine and occupational safety and health, the national labour inspectorate, disinfectant manufacturers and toxicologists. Financial support for maintenance and updating is ensured.

Procurement staff are well trained in the use of the database and are encouraged to consult database operators for advice on choosing the safest, yet still affordable and effective, disinfectants.

The WIDES database is actively promoted and endorsed nationally and internationally. It receives





Source: Wiener Umwelthanwaltschaft.

high-level support from local government, being recommended in decrees enacted by the City of Vienna, the Vienna Hospital Association and the Ministry for Social Affairs.

The database is also endorsed by the European Commission, the Austrian Action Plan for Sustainable Procurement and the Austrian Study Group on Indoor Air Quality, and is actively promoted at international meetings and conferences.

The successful implementation of the WIDES database has increased demand for disinfectants that present minimal risks to users and the environment. This, in turn, has encouraged manufacturers to develop safe, effective and affordable products, and apply for their inclusion in the database.

## Transferability

The WIDES database and training materials are freely available online in both English and German, so the database is easily transferable to other public and private sector organisations, not only in Austria but worldwide.

## Costs and benefits

The WIDES database costs around EUR 50,000 per year to maintain and update. However, this is less than the cost associated with, for instance, a single case of occupational illness resulting from exposure to allergens in disinfectants. Therefore, the benefits of using WIDES far outweigh the associated costs.

## Key features of good practice example

- The WIDES database has been successfully implemented in the City of Vienna, leading to substantial reductions in the use of disinfectants containing harmful substances and a shift towards the production of safe disinfectants by manufacturers.
- It provides an example of a sustainable, collaborative approach to occupational safety and health that focuses on collective measures to reduce or eliminate risks from dangerous substances.
- The database is free, available in two languages and fully transferable to other organisations, in both the public and private sectors, and elsewhere in the world.

## Further information

Further information can be found at:

<https://www.wien.gv.at/english/environment/ombuds-office/>

<https://www.wien.gv.at/wuawides/internet/Inhaltsstoffsuche/Bewertungen>

## References and resources

[http://ec.europa.eu/environment/gpp/pdf/news\\_alert/Issue\\_81\\_Case\\_Study\\_158\\_Vienna.pdf](http://ec.europa.eu/environment/gpp/pdf/news_alert/Issue_81_Case_Study_158_Vienna.pdf)

[www.procuraplus.org/fileadmin/user\\_upload/Procura\\_case\\_studies/Procuraplus\\_case\\_study\\_Viennese\\_WIDES\\_Database.pdf](http://www.procuraplus.org/fileadmin/user_upload/Procura_case_studies/Procuraplus_case_study_Viennese_WIDES_Database.pdf)

*'This is a successful and sustainable example of systematic substitution to reduce or eliminate risks from dangerous substances which goes beyond the public sector.'*

# Eliminating risks from respirable crystalline silica dust in the construction sector



|  |                                   |                                       |  |
|--|-----------------------------------|---------------------------------------|--|
| <p>ORGANISATION/COMPANY<br/><b>BAM Ireland</b></p> | <p>COUNTRY<br/><b>Ireland</b></p> | <p>SECTOR<br/><b>Construction</b></p> | <p>TASKS<br/><b>Construction activities, such as drilling and cutting, involving silica-containing materials</b></p> |
|--|-----------------------------------|---------------------------------------|--|



Source: BAM Ireland.

team responsible for two large construction projects with carrying out a comprehensive assessment of the potential for exposure to RCS dust and identifying ways of addressing the risks. The team identified several areas of concern:

- **Traditional blockwork:** construction designs often involve blockwork with materials containing silica.
- **Coring and cutting of openings:** traditional, onsite coring and cutting techniques that produce RCS dust were used.
- **Tiling and cutting of tiles:** these activities produce large amounts of RCS dust in enclosed areas.
- **Suppression or extraction of dust:** when the production of RCS dust was unavoidable, techniques to suppress or extract the dust were inadequate or not used at all.
- **Personal protective equipment (PPE):** PPE was often not used correctly or at all.

## Aims

To identify and implement measures to eliminate risks to construction workers from RCS dust.

## Background

Construction workers are at risk of exposure to respirable crystalline silica (RCS), which causes silicosis and other lung diseases and is classified as a carcinogen. Tasks that may result in the production of RCS dust include drilling and cutting materials that contain silica, such as tiles or concrete blocks. Not only are individuals carrying out such tasks at risk, but any workers on a construction site could be exposed to harmful RCS dust.

To ensure that its workers are protected from RCS dust, the construction company BAM Ireland tasked the



## What was done and how?

Changes were implemented following the hierarchy of prevention measures:

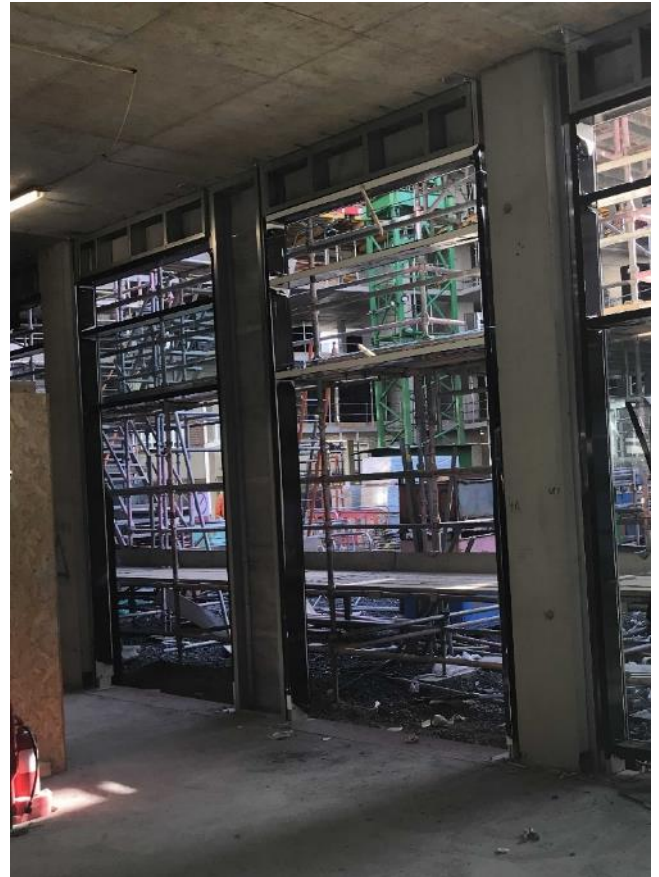
- Elimination and substitution:** the project team worked closely with designers to identify construction solutions that do not involve silica. Silica-containing blockwork was replaced with Metsec walls (light-gauge metal infill walling) and plasterboard, and other dust-generating procedures were also replaced (for instance the use of MDF floors) to reduce general dust levels. Moreover, pod bathrooms, assembled in a controlled factory environment, were used, so no onsite tiling or grouting was required. Shot-fixing was used instead of overhead drilling, significantly reducing the amount of dust produced, and any units made of silica-containing materials were pre-cast, eliminating the need to cut into these materials on site. This pre-casting was informed by building information modelling, which allowed the project team to identify exactly where openings were required in concrete units. These adjustments to the traditional construction design significantly reduced the use of silica-containing materials and the need to carry out silica-generating activities on construction sites.
- Technical control measures:** the company stipulated to sub-contractors at the procurement stage that RCS dust extraction methods should be used. A partnership with a manufacturer of professional tools for the construction industry enabled 95 % of sub-contractors to purchase extraction units for their tools. Other measures to minimise dust included vacuuming, water suppression and the covering of lorries.
- Personal protection:** full face masks suitable for protection against RCS dust were provided. To ensure that these were used and fitted correctly, training was given and information boards explaining how to use them were placed at strategic locations on construction sites.

Training and awareness raising were critical to the success of the project. The issue of RCS dust was covered in online and site-specific induction materials, and further promoted on posters in canteens and on safety notice boards. The topic was also highlighted in toolbox talks — short safety discussions held daily before the start of shifts — and safety stand-downs, where normal work was paused so that everyone on the construction sites could focus on the risks posed by RCS dust and how to prevent them.

## What was achieved?

The measures implemented substantially improved the work environment: less dust was produced, and improved housekeeping meant that any dust present was captured by extraction units or vacuuming. This also prevented RCS dust from collecting on workers' skin and clothing. The measures also meant that less cleaning was required before handing the site over, thus reducing hand-over costs, and no complaints

were received from neighbouring communities, which is very unusual for inner city construction projects of this size.



Source: BAM Ireland.

## Success factors

The company implemented a variety of preventive measures prioritising elimination at the design stage and collective measures over personal protective measures to eliminate worker exposure to RCS dust. The approach taken was key to the success of the project:

- The initiative had support at all levels: from high-level management to the workforce on the ground.
- Cooperation with designers and the use of building information modelling at an early stage identified design features and materials that would eliminate onsite hazards from RCS and increase productivity.
- The partnership with a known tools manufacturer meant that sub-contractors could purchase high-quality extraction equipment for their tools at a favourable rate.
- Emphasising the topic of RCS dust at induction, on notice boards and through regular talks and meetings meant that all contractors were aware of the policies and procedures in place to prevent risks, creating a culture of prevention.
- Compliance with safety measures was routinely monitored.

## Transferability

RCS dust is a very common hazard on construction sites. The innovative approach taken by BAM Ireland is a good example to other large construction businesses and is likely to make a relevant contribution to improving safety and health conditions in the construction sector, not only in Ireland but also in other Member States.

## Costs and benefits

The measures resulted in a cleaner work environment, eliminating exposure to RCS dust and benefiting worker health and well-being. Moreover, productivity increased, labour costs were reduced by 35 % and cleaning costs at project hand-over were 18 % below average.

## Key features of good practice example

- Measures to eliminate worker exposure to RCS dust — a very common hazard on construction sites — were identified at the design stage of the project.
- The implementation of these measures led to real improvements in the work environment and an increase in productivity.
- The intervention had the full support of high-level management and workers and adds value to existing practices in the Member State.

- It is sustainable and fully transferable to other similar organisations in the construction section and to other countries.



Source: BAM Ireland.

## Further information

Further information can be found at <https://www.bamireland.ie>

*'The company implemented a range of innovative measures to eliminate worker exposure to harmful respirable crystalline silica dust, from the design stage to subcontractors.'*



# Controlling worker exposure to dangerous substances in the manufacture of household appliances



## ORGANISATION/COMPANY

Gorenje, d.d.

## COUNTRY

Slovenia

## SECTOR

Manufacturing

## TASKS

Plastic coating, chrome plating, other tasks in household appliance manufacture



Source: Gorenje, d.d.

## Background

Gorenje, d.d., Velenje, Slovenia, is the parent company of the Gorenje Group, a leading European manufacturer of household appliances. It is committed to a systematic and participative approach to safety and health and eliminating risks from dangerous substances. It uses an occupational safety and health management system and has in place committees and councils that provide a platform for discussing important guidelines, objectives and programmes for safe and healthy working, and suggesting improvements.

The company strives to replace hazardous substances with less hazardous ones, decrease the number of chemicals used and reduce worker exposure to hazardous substances in its workplaces. It performed a systematic analysis of potential workplace risks and identified several areas for improvement: the exposure of workers in the company's plastics facility to high levels of hazardous solvents; the use of carcinogenic hexavalent chromium ( $\text{Cr}^{6+}$ ); deficiencies in the monitoring and recording of the more than 1,200 chemicals used; the lack of consideration given to the effects of ototoxic substances; and inadequate biological monitoring.





Source: Gorenje, d.d.

## Aims

- To replace carcinogenic Cr<sup>6+</sup> with the safer, non-carcinogenic alternative trivalent chromium (Cr<sup>3+</sup>).
- To reduce the exposure of workers to hazardous organic solvents at the company's plastics facility.
- To implement a more systematic approach to monitoring chemicals in the company, incl. biomonitoring of exposures, and keeping records up to date.
- To identify ototoxic substances — that is, substances that can cause hearing disorders — used by the company and perform appropriate risk assessments.
- To ensure that appropriate biological monitoring is carried out.

## What was done and how?

The company explored possible solutions to the issues identified by taking a holistic approach involving management, workers and their representatives, and a multidisciplinary team of experts (including an authorised medical officer).

In the plastics facility, systems and work practices for printing were reviewed. This led to the removal of two of three conveyer belts for drying and the purchase of three closed and vented machines for automated printing to reduce worker exposure to organic solvents.

In addition, the company's chrome-plating method was reviewed and a process for replacing carcinogenic Cr<sup>6+</sup> with less harmful Cr<sup>3+</sup> was designed, costed and tested on a small scale.

The company recognises that keeping appropriate records and safety data sheets is essential for effectively assessing the risks posed to workers by hazardous substances. To ensure that it is well equipped to do this, it upgraded its software system to a comprehensive business information system. The environment, health and safety management (EHS) module of this software allows workers to actively participate in adapting processes to meet specific needs.

Using this module, and in line with EU and national legislative requirements, the company identified three ototoxic substances to which workers were exposed: styrene, toluene and xylene. When combined with noise, exposure to these solvents increases the risk of occupational hearing loss. The locations of substance use and workers potentially at risk were identified, and subsequent monitoring of noise levels and substance concentrations carried out.

In 2014, the company assessed that its occupational health provider had not been carrying out biological monitoring appropriately. Therefore, it appointed a new provider. Since then, several steps have been implemented to ensure that biological monitoring is carried out in a responsible, professional and systematic manner.

## What was achieved?

By adapting processes in its plastics facility, the company reduced the number of workers exposed to hazardous substances. By 2017, it had also reduced the concentration of toluene from 51.5 % of the Slovenian limit value to 18.3 %. This has reduced the risk not only of occupational illness but also of fire and explosion.

The EHS module of the new software was successfully implemented. This has allowed the company to gain a better overview of the chemicals it uses and introduce a procedure for the approval of new chemicals, providing traceable data on quantities, hazards, supply, storage, transport and waste management along the entire chain, taking into account national and European regulations. It has been able to cut the number of chemicals used from 1,200 to 840, and suitable safety data sheets can now easily be accessed electronically by all workers.

From its analysis of levels of and duration of exposure to ototoxic chemicals and noise levels, the company has been able to confirm that exposure at their workplaces has no adverse effects on workers' hearing. Moreover, by using its improved approach to biological monitoring, it has convincingly demonstrated that limit values are not exceeded for any worker. Systematic monitoring will continue to ensure that worker health is protected.

## Success factors and challenges

Worker exposure to hazardous substances was addressed in a systematic way that involved management, experts from relevant fields, and workers and their representatives, leading to the successful implementation of improved systems and processes, and demonstrable improvements in safety and health conditions.



Source: Gorenje, d.d.

To date, despite extensive investigation and testing, the company has not been able to replace  $\text{Cr}^{6+}$  with  $\text{Cr}^{3+}$ . However, the company did put a considerable amount of effort into finding an alternative, and involved workers and their representatives and trade unions in the process. It is still committed to finding a solution, even though workers are currently exposed to levels of this carcinogen that are far below the limit value specified in EU legislation. In the meantime, those workers who are exposed to  $\text{Cr}^{6+}$  are kept well informed of its potential hazards and how to manage them, and regular biological and concentration level monitoring is carried out.

## Transferability

The multidisciplinary and participatory approach adopted by the company to identify, monitor and address the risks posed to workers by dangerous substances is fully transferable to other companies in the manufacturing sector. The company actively shares its knowledge and experience with other Slovenian employers by visiting other companies and attending symposiums, conferences and roundtable meetings. The example is also transferable to other Member States.

## Costs and benefits

The measures taken by the company have minimised the number of workers exposed to dangerous substances and the level of dangerous substances used. In doing so, the company has reduced risks to worker safety and health.

## Key features of good practice example

- The company takes a holistic approach to monitoring exposure to hazardous substances in its workplaces.
- Solutions to problems identified are developed through collaboration between management, workers and their representatives, and a multidisciplinary team of experts.
- The company has successfully implemented technological solutions in its plastics facility, a software system for managing and monitoring chemical use, and a systematic approach to biological monitoring.
- Real improvements are demonstrated: reductions in the number of chemicals used, the number of workers exposed and the levels of exposure.
- The company continues to search for new ways to improve worker safety and health, going above and beyond legislative requirements, and shares its knowledge with other companies.

## Further information

Further information can be found at [www.gorenje.com](http://www.gorenje.com)

***'The company is committed to a systematic and participative approach to safety and health and eliminating risks from dangerous substances.'***

# Free web-based tool for selecting the best measures to protect workers from hazardous welding fumes



## ORGANISATION/COMPANY

British Occupational Hygiene Society

## COUNTRY

United Kingdom

## SECTOR

Manufacturing

## TASKS

Welding

## Background

The United Kingdom's Breathe Freely in Manufacturing campaign was launched in May 2017 to raise awareness of occupational lung diseases caused by welding fumes in the manufacturing industry. Although welding is one of the most commonly carried out activities in manufacturing, there is a lack of awareness about the need to control worker exposure to harmful fumes and how to go about this. As a result, welders are at particularly high risk of developing lung problems.

Along with the British Occupational Hygiene Society (BOHS), several other key organisations and manufacturing companies are involved in the campaign, including the Trades Union Congress (TUC), Unite the Union (a British and Irish trade union), Make UK (the Manufacturers' Organisation, formerly EEF (the Engineering Employers Federation)) and the Health and Safety Executive, and the private companies Toyota, BAE Systems, TWI and JCB. To encourage the active participation of employers and workers in controlling risks from welding fumes, these organisations consult with members to identify issues and concerns. This reveals that many in the industry perceive controlling welding fumes to be difficult and are unsure of whether or not the controls in place in their organisations are adequate or appropriate.

To address this lack of awareness, a website was developed with a wealth of information and awareness-raising materials about welding and welding fumes, including guidance documents and fact sheets. However, because there is no one-size-fits-all measure to control exposure to welding fumes, as solutions are highly dependent on the nature of the task, there is a clear need to offer workers and employers an easy way of selecting the most appropriate control measures on a case-by-case basis.



Source: British Occupational Hygiene Society.

## Aims

To develop a simple, easy-to-use online tool to help workers and their supervisors or managers select the most effective measures for controlling welding fumes and protecting health

## What was done and how?

A panel of experts — from industry, consultancies, academia and the Health and Safety Executive — with vast experience in preventing ill health in manufacturing developed the web-based Welding Fume Control Selector Tool and supplementary guidance.

Users of the tool are asked four simple questions that cover:

1. the type of welding
2. the material being welded
3. the duration of the welding task
4. the size of the piece of material being welded.



were implemented on the basis of feedback received. It was launched and actively promoted by BOHS, Make UK, TUC, Unite and industry representatives at a series of roadshows supported by EU-OSHA.

## What was achieved?

The Welding Fume Control Selector Tool is free and publicly available on the Breath Freely in Manufacturing website. Although designed with the manufacturing sector in mind, it is an invaluable resource for any workplace, in any sector, in which welding is carried out. The tool:

- raises awareness of the health risks associated with exposure to welding fumes and the importance of controlling risks
- promotes various ways of preventing exposure to welding fumes, appropriate for specific welding tasks
- provides key information on risk assessment
- targets welders who are at particularly high risk of exposure to hazardous fumes
- overcomes barriers to protecting workers by making it easy for managers and supervisors to identify and implement appropriate control measures.

The tool has been well received by the manufacturing industry and within the first 3 months of its launch in November 2018 was used more than 1,700 times, with guidance sheets being downloaded almost 200 times.

The screenshot shows the 'Welding Selector Tool Control Sheet' interface. At the top, it says 'BREATHE FREELY' and 'BOHS'. Below that, it reads 'Controlling exposure to prevent occupational lung disease in MANUFACTURING'. The main content area is titled 'Welding Selector Tool Control Sheet' and 'Fume Extraction: Local Exhaust Ventilation (LEV)'. It features a video thumbnail of a welder and a 'Control Sheet' with the following sections:

- On-torch Extraction at a glance:** Includes a video thumbnail.
- Effectiveness rating:** 5 stars.
- Appropriate workplace size:**
  - Small (up to 1.0m x 3.0m)
  - Medium (up to 2.0m x 1.0m)
  - Large (up to 2.0m x 4.0m)
  - Extra large (up to 2.0m x 4.0m)
- Purchase price and other costs:**
  - Simple installation: From £1400 (UK) per system including cost of torch
  - Other costs: This is an estimate of an initial cost only. It does not take into account the number of systems to be used.
  - Time: 15-20 minutes for installation, 2 years.

Source: British Occupational Hygiene Society.

Based on the answers to these questions, the tool produces a guidance sheet detailing the most appropriate control measures to use and including information on effectiveness, costs and limitations, and top tips. This guidance sheet is accompanied by a series of management documents that cover:

- the design of the control method
- the commissioning, installation, maintenance and testing of the control method
- the training and supervision of welders
- how to monitor the respiratory health of welders.

Because the optimal control solution is not always possible or affordable, the tool also suggests alternative measures. As part of the tool development process, the team explored the various options for controlling welding fumes and rated them — from one to five stars — based on their effectiveness at preventing exposure to fumes and their reliability. Control measures whose effectiveness is highly dependent on workers consistently adhering to good practice, for instance, have a low star rating, as such measures are deemed unreliable. This star-rating system makes it easy for workers and their supervisors to quickly establish how effective and reliable each of the control measures suggested by the tool is.

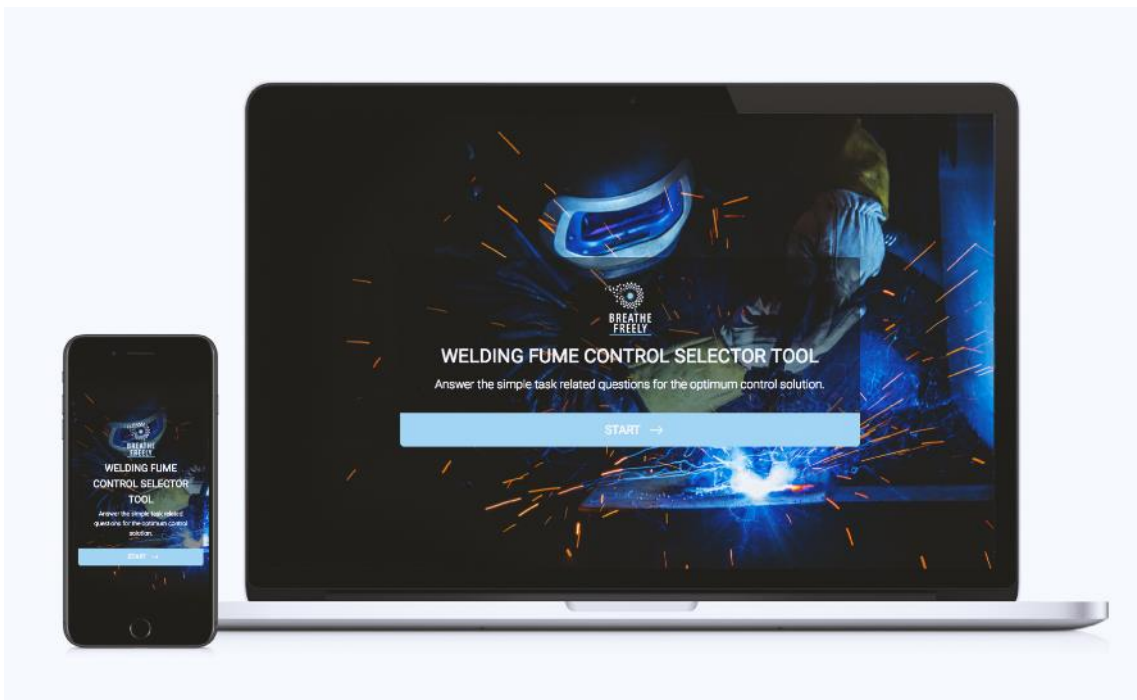
The tool was extensively tested by the development team and other campaign partners, and improvements

## Success factors

The tool was developed as a result of commitment and support from several influential manufacturing companies and organisations — including trade unions and safety and health authorities — in response to concerns raised by workers and employers. Consequently, it addresses a real need in the manufacturing sector.

The tool enables workers themselves to be involved in selecting the most appropriate control measures for welding fumes; such worker participation is key to successful prevention.

Although launched only recently, the tool has already received considerable interest and is being actively promoted and endorsed by, for instance, the United Kingdom's Health and Safety Executive and the Institute for Occupational Safety and Health. Key industry magazines also covered the launch of the tool and are promoting its use. Such efforts to publicise the tool and raise awareness of its benefits for businesses and workers are likely to lead to further significant uptake.



Source: British Occupational Hygiene Society

## Transferability

The tool is free to use and publicly available, so it is a useful resource for any business or organisation in any sector in which welding is carried out. Moreover, if translated into the relevant language, the tool has the potential to be used in any country.

## Costs and benefits

Occupational lung diseases, including cancer, bronchitis, emphysema and asthma, can be highly debilitating, affecting an individual's ability to work. This has financial implications for workers and their families, employers, health services and society. The tool itself is free and, by protecting workers from welding fumes, has the potential to greatly reduce the costs associated with occupational lung diseases. Not only that, by using the tool companies may avoid wasting money and other resources on inappropriate control measures.

## Key features of good practice example

- The tool is free to use and makes a relevant contribution to protecting workers from hazardous welding fumes, not only in the manufacturing sector but in any workplace where welding is carried out, and, potentially, in any country.
- The tool was developed in consultation with leading safety and health and trade union organisations and manufacturing companies, and in response to worker and employer concerns.
- Its implementation adds value to existing practices for controlling welding fumes and encourages worker participation in prevention.

## Further information

Further information can be found at <http://www.breathefreely.org.uk/wst/>

## References and resources

<http://www.bohs.org/>

<http://www.breathefreely.org.uk>

<http://www.hse.gov.uk/welding/index.htm>

<https://www.iosh.com/more/news-listing/employers-urged-to-protect-workers-from-cancer-causing-welding-fumes/>

*'This free tool contributes to protecting workers from hazardous welding fumes, not only in the manufacturing sector but in any workplace where welding is carried out.'*





