

# Healthy Workplaces Good Practice Awards 2018-2019

## CASE STUDY



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



#### ORGANISATION/COMPANY

Atlas Copco Industrial Technique AB

#### COUNTRY

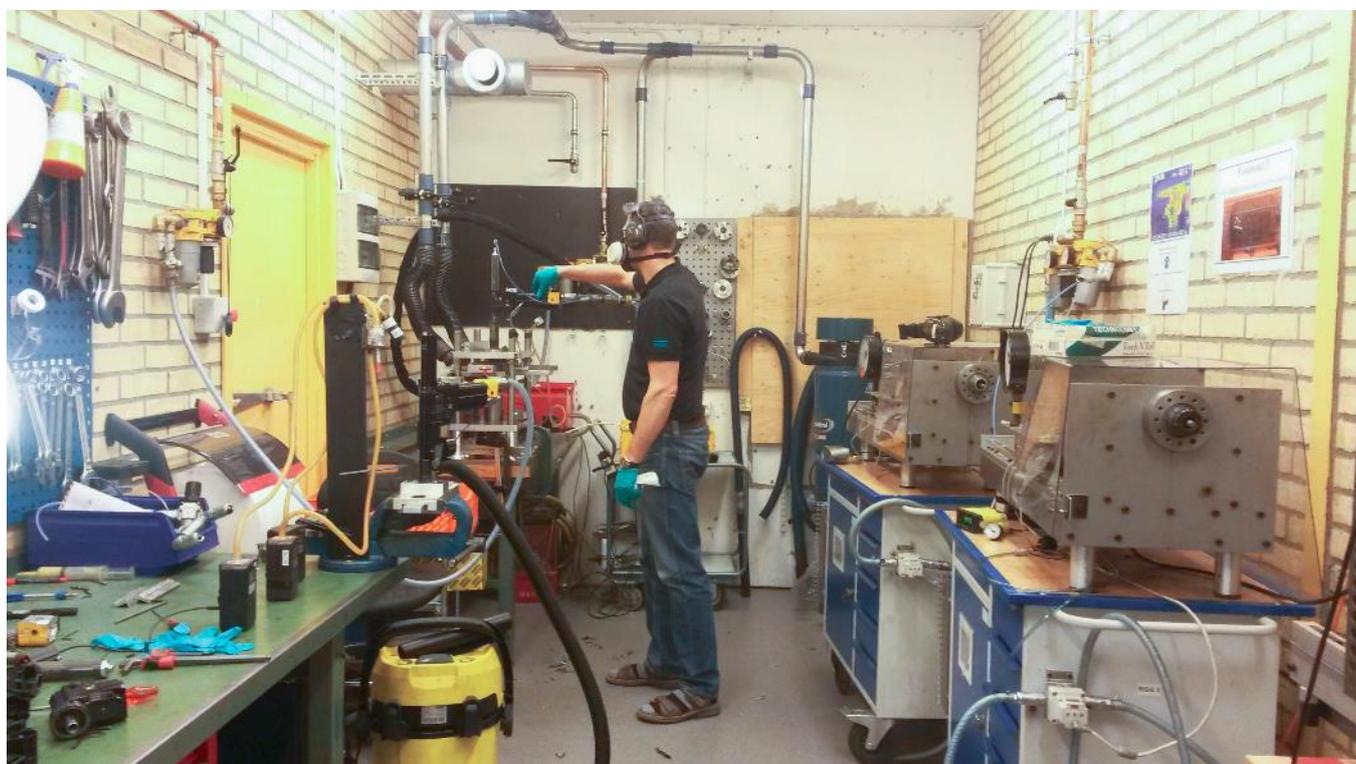
Sweden

#### 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.

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.



Source: Atlas Copco Industrial Technique AB.

## 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.

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.

## 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.'*