

## Preventing exposures to diesel engine emissions and other exhaust gases during car inspection

### Database information

**Country:** France.

**Available language:** English.

The **sector covered** in this case study is the automotive repair industry, and more specifically vehicle inspection pits in technical inspection centres for light vehicles.

**Task covered:** exhaust emission tests and car repair.

**Worker groups covered (vulnerable groups):** all workers (no specific groups).

This case study covers micro and small enterprises in particular, as they make up the majority of enterprises in the automotive repair industry.

The **purpose of this example of good practice** was to improve the working environment of car mechanics carrying out exhaust tests.

In France, about **800,000 workers** are currently exposed to exhaust fumes from diesel engines.

The **target groups** are employers in and managers of car workshops.

## 1 Initiator/organisations involved

Cramif (Caisse régionale d'assurance maladie d'Île-de-France) is a French statutory social security organisation in the Paris region.

DEKRA (the German Motor Vehicle Inspection Association) is a vehicle inspection company founded in Berlin, Germany, in 1925. In total, the group has more than 186 subsidiaries, and holdings in over 50 countries. The DEKRA inspection service in Asnières-sur-Seine in the Hauts-de-Seine department has three employees. It is an independent company that runs a franchise under the DEKRA brand.

## 2 Description of the case

### 2.1 Introduction/background

In 2015, Chihab Aguetouille took over the management of the DEKRA workshop in Asnières-sur-Seine (INRS, 2016). One of the main tasks carried out in the workshop is the inspection of vehicles. Mr Aguetouille realised that his workers were at particular risk of exposure to diesel and gasoline exhaust fumes. The walls of the workshop were black with diesel soot and the workshop was polluted. He contacted Cramif to ask for support in improving the working conditions. French micro and small enterprises can benefit from subsidies called Simplified Financial Aid (Aides financières simplifiées — AFS). AFS is used to support the development of occupational risk prevention in small enterprises with fewer than 50 employees. AFS support is granted as part of national and regional prevention programmes designed by occupational health insurance providers and approved by the social partners. It aims to encourage the implementation of specific prevention measures that are important for

preventing specific risks. Each subsidy is capped at €25,000 and granted under certain conditions laid down by Cramif <sup>(1)</sup>.

A safety inspector from Cramif, Pascal Poiron, visited the workshop and provided advice on appropriate ventilation. Together with Cramif, Mr Aguetouille started to design an exhaust extraction system.

Workers in charge of maintenance or technical inspections of motor vehicles may be particularly affected by emissions from motor vehicle exhaust fumes. Vehicle exhaust fumes can irritate the eyes and respiratory tract, and are a risk to health when breathed in. The four main emissions from diesel engines are carbon monoxide, a toxic gas and asphyxiant; hydrocarbons; particulate matter, including soot; and nitrogen oxides. The International Agency for Research on Cancer (IARC) has classified diesel engine exhaust as carcinogenic to humans, based on sufficient evidence that exposure is associated with an increased risk of lung cancer (IARC, 2012). Gasoline exhaust fumes are classified by the IARC as a possible carcinogen.

## 2.2 Aims

Mr Aguetouille understood clearly that exposure to exhaust fumes was a risk to his workers, himself and the business. Therefore, he started, with Cramif, to develop a local exhaust ventilation system with the aim of eliminating air pollution in the workshop.

## 2.3 What was done and how

With input from Cramif, Mr Aguetouille designed an exhaust extraction system that was in line with occupational safety and health regulations. The basic idea was to develop a system that fitted the most common tailpipes, was easy to use and was simple to set up in the workshop. Mr Aguetouille said, 'I had worked as an employee before. I know that if something is too complicated or takes too much time it will not be used' (INRS, 2016). The extraction system was designed to convey fumes outside the workshop, ensuring that they were not drawn back inside and that they did not affect other premises or people nearby'.

Experts from Cramif's Physical Measurements Centre participated in the development and testing of the extraction system. Cramif carried out measurements of the residual engine fumes. Various improvements were necessary, as exhaust fumes escaped into the workshop. The flow sensor was cut open laterally and equipped with additional brushes to solve the problem (INRS, 2016).

A suction flow rate of 1,000 m<sup>3</sup>/h is recommended to prevent hot gases from being emitted at high speeds and escaping the extraction system.

In the summer of 2015, the development of the extraction system was successfully finalised. The installation consists of three wheeled devices equipped with exhaust sensors connected to 4-m long corrugated pipes of 150 mm in diameter. The first sensor, shaped like a shovel, is for gasoline vehicles. The second device is a prototype sensor called 'Gazel'. It is designed for diesel fumes and is extended by 8-cm brushes. The third sensor, identical to the second one is designed to cover vehicles with two tailpipes. In addition, the workshop is equipped with a ventilation system and the engine fumes are expelled from the building.

## 2.4 What was achieved?

The exhaust extraction system reduced exposures to diesel fumes and gasoline exhaust drastically. The workers are no longer exposed to high levels of carcinogenic exhaust fumes.

The workers are satisfied with the improved working conditions.

Other advantages of the new system are that it doesn't require any adjustment to the tailpipe position and remains efficient in any situation. It can be handled easily because the system is fitted with wheels

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<sup>(1)</sup> <https://www.cramif.fr/aides-financieres-simplifiees>

and easy to move. In addition, the system is relatively quiet and can be used all day with little exposure to noise.

The GAZEL exhaust extraction system (photograph courtesy of Pascal Poiron, Cramif).



The extraction system was awarded a Cramif Trophy for occupational safety and health (Cramif, 2016) in 2016. Every year, Cramif gives these awards to companies that have implemented prevention measures or improved the working environment to ensure the safety and health of their workers.

Several other workshop managers have used the exhaust system as a model for improvements to their inspection pits.

## 2.5 Problems faced

The main challenge was to design the exhaust system so that it fitted all vehicle types and different tailpipes. Furthermore, it was important to ensure that the system had no leaks.

## 2.6 Success factors and challenges

### ***External support***

The company was supported financially by a grant and Cramif provided advice through their experts on the design of the device.

### ***A holistic and practical approach***

Not only the technical and exhaust performance of the system were taken into account but also ergonomics and noise.

The high performance of the system in daily work is the result of its simplicity — no adjustments or resetting are required.

### ***Participation of workers***

The project was also supported by the workshop's employees. They were all very interested in developing an effective system to better protect their health.

Application of the exhaust extraction system (photograph courtesy of Pascal Poiron, Cramif).



## 2.7 Transferability

The exhaust system is transferable to other car repair workshops. It has already been used as a model for improvements to other vehicle inspection pits. Similar systems can be designed for truck workshops.

## 2.8 Further information

### Contact

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Cramif, Trophées Cramif 2016: société DEKRA. Available at: <https://youtu.be/uCESkMxjlx4>

## 3 References and resources

Cramif, 2016, 'Trophées 2016', <https://www.cramif.fr/trophees-2016>

IARC (International Agency for Research on Cancer), 2012, 'Diesel engine exhaust carcinogenic', press release No 213, World Health Organization, 12 June 2012. Available at: [http://www.iarc.fr/en/media-centre/pr/2012/pdfs/pr213\\_E.pdf](http://www.iarc.fr/en/media-centre/pr/2012/pdfs/pr213_E.pdf)

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