

SCENARIO

'Coopers' is a motor vehicle repair (MVR) workshop located on a small industrial estate just off the public highway. The workshop carries out repairs and paint re-sprays on motor vehicles (including cars, vans, minibuses and trucks) involved in minor accidents. The workshop comprises of the following three main areas:

- **Preparation area** – activities in this area include the removal and replacement of body panels, bumpers and damaged parts, welding, flame cutting, body filling, sanding, and degreasing.
- **Paint shop** – this is a spray booth in which final preparation takes place, this includes spray-painting, heating and curing of newly sprayed paintwork and cleaning.
- **Paint store** – paint products are mixed and prepared in this area. Paint, cleaning products and equipment are stored here.

Most of the building is constructed of steel-reinforced, concrete sectional panels within a frame of connected steel beams. These steel beams are insulated with sprayed concrete for extra protection in a fire. Some of the recently extended parts of the building still have exposed steel beams. The roof is made of a fragile plastic corrugated sheeting. There are no fixed automatic fire detection, warning, or suppression systems on the MVR workshop premises. There is only a manually-operated fire alarm and portable fire extinguishers.

The MVR workshop is in an area of poor mobile phone reception. There is a public telephone (land line) 500 metres away on the public highway. Access to the MVR workshop is down an access road of about 100m, which connects directly to the public highway. The turn into the access road from the highway is very easy to miss, as it is quite narrow and on a bend in the road. Emergency services are 20 minutes away, but can be delayed due to busy traffic routes.

The MVR workshop is usually very busy. Occasionally, workers need to work overtime after closing hours, sometimes on their own. Oily rags can be found discarded all around the whole workshop. Smoking and use of mobile phones on the MVR workshop site is prohibited, but this policy is often ignored, and rarely enforced. Workers also often listen to loud music on the radio throughout the day.

Layout, equipment and activities in each area

Preparation area

The preparation area covers a floor area of 10m x 10m, and is 5m high. The entrance is fitted with a large steel roller shutter door that is kept open for most of the year, and only shut when it is too cold, or the weather is bad (ie mainly the winter months). The roller shutter door is raised or lowered manually using a steel chain pulley. Workers bring to work their own electric heaters during the winter months to keep warm.

There are also two inspection pits (2.5m deep by 1.0m wide and 3.5m long). These pits, below ground level, are used to access the underneath of the vehicles. Vehicles are often left idling while the workers carry out engine, exhaust condition and emission checks. Vehicles are driven over the pits and the wheels are secured to stop them rolling. The access steps into the pits are currently awaiting repair due to loose grip coverings. When in use, barriers are put around the pits to stop workers falling in, when not in use, the pits are fully covered.

The MVR workshop mainly carries out work on cars, but also on taller commercial vehicles such as minibuses and vans. To access the tops of the minibuses a mobile work platform was recently purchased. This consists of a 3m x 1m fixed height platform with guardrails, accessed by steps with a handrail. The mobile work platform is on four castors that have brakes, although the brakes do not work reliably. The mobile working platform can be manually moved around the workshop. It was much larger than expected so is stored outside and brought in when needed. Workers have not yet been trained on its safe use, but this has been planned for the coming months.

A number of power tools are used in the preparation area, but there is no system for regularly testing them. Compressed air blow guns are used for various tasks within the workshop. These air blow guns

are often mis-used where mischievous workers insert them into overalls and activate them to startle those concentrating on work tasks. Most of the tools provided are designed for light duty domestic use, rather than for heavy duty industrial use.

Cars arriving at the MVR workshop can have petrol or diesel fuel tanks that need to be drained when repair work is to be carried out near to a vehicle's tank. In the preparation area, fuel tanks are emptied into open containers and fuel is mixed with waste oils. Where necessary, seatbelt tensioners, airbags and airbag curtains (which all contain explosive charges) are removed using metal hand tools. Inspection lamps are also used during the removal of vehicle parts, as the general lighting in the area can be poor.

Welding and flame cutting are carried out where required (with the exception that **no** welding or flame cutting is carried out when inside the inspection pits). Welding is carried out using ageing portable electrical tungsten inert gas (TIG) equipment, that has been somewhat neglected. While TIG welding, the alternating current supply to the workshop is notoriously troublesome and frequently blows associated circuit board fuses. In addition, the portable DC generator associated with TIG welding has some poorly-conducting electrical connections and some frayed rubber insulation. Despite all this, the welder (with 30 years' experience) manages to get the greasy TIG welding equipment to work, although the experienced welder occasionally receives an electric shock in the process. Nonetheless they carry out delicate welding repairs to thin stainless steel car exhaust systems. Flame cutting is occasionally carried out, with an oxy-acetylene torch set up, where required.

Body fillers are used in this area to fill dents; this is then smoothed by powered mechanical sander, before proceeding to the paint shop. The total quantity of body fillers stored at any one time is 25kg. Empty body filler containers, without their lids, are stored with full ones.

Repairs in this area are carried out by two experienced workers along with an 18-year-old apprentice. The apprentice usually works alongside the experienced workers but is occasionally expected to carry out small repairs alone during busy times. A third worker has just returned from leave following a knee operation. This third worker is only taking on light administration duties until they are back to full fitness. All relevant personal protective equipment (PPE) is provided at the workshop, although the condition of the equipment varies.

Before moving to the paint shop for spray-painting, car body panels are degreased using solvents. These solvents are transferred into small open trays from large containers. Workers routinely leave two or three large containers open while working, only closing them at the end of the working day.

Paint shop

The 4m x 8m x 2.5m spray-painting booth has a forced ventilation system, drawing in air at ground level through dedicated grills. The ventilation system removes any vapours that are generated during the spraying process, that are filtered through an exhaust point. This has not been maintained for several years, and the workers believe that the filters need changing.

Solvent materials are kept in closed containers, but there are lots of open, partly-used 5 litre containers stored in different places around the paint shop. These solvents have multiple uses, including being used as hardeners. Rags are used to apply solvent and cleanse surfaces before spray-painting. Paint products are mixed and prepared in the paint store before being brought into the paint shop. The booth is illuminated with large filament bulbs at ceiling height.

A large number of paint colours are used in the paint shop. They are of a 2-stage type (known as a 2k process) requiring a base paint and a separate paint hardener. The total amount of base paint stored on site is 2 tonnes with a further 100kg of hardeners and solvents. Paint is sprayed from a high volume, low pressure (HVLP) spray gun, which is operated by an air compressor set at 2 Bar pressure. To reach the tops of taller vehicles, ladders are used. When fully sprayed, the paint is cured using electric heaters, that typically take two hours to complete.

Paint store

The paint store is a very confined area. It has one narrow access route and a single domestic wooden door. The door remains closed except when accessing the store. Ventilation is by a very small basic 0.25m x 0.25m wooden framed window to the exterior.

Many 2.5 litre containers of base paint are stored on shelves in the paint store, some of the higher shelving is old and in need of repair. Paint cleaning and solvent-based paint cleaning materials are also to be found in the store. A high proportion of the containers have not been properly closed after use. Spray guns are cleaned by passing solvent under pressure through the spray nozzle. Coopers has chosen not to buy a dedicated spray gun cleaning machine, which are readily available and inexpensive. Waste materials are stored in enclosed containers which are removed once every two weeks by a waste contractor. There are a small number of electrical devices in the paint store, including inspection lamps, pumps to transfer waste to containers, and electrical paint stirring devices.

Car Park

The car park is compact, with limited room to manoeuvre, especially when the MVR workshop is at its busiest, and customers are often waiting for spaces. Cars often need to reverse to be able to exit the car park. Visitors have complained in the past that when leaving the site, large trees and bushes at the site entrance obscure the view of oncoming traffic. The car park also has an open-sided shed that houses new tyres. Once new replacement tyres are delivered, they are safely stored in purpose-built tyre storage racks. A recent accident occurred when a visitor was hit by a reversing delivery vehicle; as a result, nominated people are now used to help direct tyre delivery vehicles. Waste tyres are piled high to the back of the store, due to limited space, until they are collected for recycling. Lighting in the evenings is limited as there is no external lighting or security lighting. The car park has separate spaces marked out for 'customer parking' and 'collection'. The apprentice moves customers' cars to the 'collection' spaces once they are ready to collect.

The MVR workshop has recently installed closed-circuit television (CCTV) and a perimeter gate to deter trespassers following previous incidents. The manager locking up also has a checklist to complete to help ensure everything is secure before they leave for the day. However, the perimeter gate can be climbed over quite easily. Discarded packaging is stored in two wheelie bins, situated just outside of the paint store.

Recent Events

The insurance assessor has recently visited the MVR workshop. They are dissatisfied with the fire risk assessment, particularly over the controls for the use of highly flammable paints and hardeners. They have asked for a review, believing that there is a significant risk of an explosive atmosphere forming. There have been several minor fires during the last three years.

SUPPORTING DOCUMENTS

1. Site plan of Coopers

Task 1: Transport management

- 1 (a) Explain the good aspects of traffic management in the car park. (8)
Note: You should support your answer, where applicable, using relevant information from the scenario and the supporting document.
- (b) What realistic improvements could be made to the traffic arrangements on-site? (12)

Task 2: Hazardous area zoning

- 2 Explain why the hazardous classification for the preparation area can vary during different times of the year. (12)
Note: You should support your answer, where applicable, using relevant information from the scenario.

Task 3: Risk of substances forming an explosive atmosphere

- 3 The spray-painting could form an explosive atmosphere.
What should be considered when assessing the risk of an explosion occurring during the spray-painting activity in the booth? (20)
Note: You should support your answer, where applicable, using relevant information from the scenario.

Task 4: Recognising confined spaces and adopting safe working practices

- 4 (a) Why is the inspection pit a confined space? (15)
Note: You should support your answer, where applicable, using relevant information from the scenario.
- (b) What possible safe working practices could minimise confined space risks when working in the inspection pit? (15)

Task 5: On-site emergency planning

- 5 Even though the law does not require it, the insurance assessor advises the organisation that it may be beneficial to prepare an *on-site* emergency plan.
- (a) Based on the scenario only, explain why an *on-site* emergency plan may be beneficial. (12)
- (b) What elements would form part of a suitable and proportionate *on-site* emergency plan for the MVR workshop. (15)
Note: You should support your answer, where applicable, using relevant information from the scenario.

Task 6: Risk of using portable pneumatic equipment

- 6 The workers use compressed air blow guns for various activities.
- (a) Based on the scenario, what would you expect these activities to be? (3)
 - (b) What injuries could you foresee with using these compressed air blow guns **AND**, for **EACH** injury, briefly describe how it could occur? (7)
 - (c) Based on hazards and risk, what specific aspects of using compressed air blow guns would you prioritise in a training session for those in the MVR workshop? (5)
 - (d) Other than training, what control measures would you consider for compressed air blow guns? (15)

Task 7: Electrical risks with TIG welding equipment

- 7 Comment on the electrical risks associated with the TIG welding electrical equipment in the MVR workshop. (16)
- Note:** You should support your answer, where applicable, using relevant information from the scenario.

Task 8: The behaviour of materials in a fire

- 8
- (a) Outline the effects of fire on the following structural materials in the MVR workshop
 - (i) steel beams (5)
 - (ii) concrete panels (5)
 - (iii) wooden window frames and doors (5)
 - (iv) plastic roof. (5)
 - (b) Comment on improvements that could be made to prevent failures of these materials in the event of a fire. (10)
- Note:** You should support your answer, where applicable, using relevant information from the scenario.

Task 9: Working at height

- 9 (a) What would you need to consider when choosing appropriate access equipment for work at height tasks? (10)
- (b) (i) What are the strengths and weaknesses of the existing controls used for work at height in the MVR workshop? (15)
- (ii) Suggest additional controls to improve safety when working at height. (20)

Note: You should support your answer, where applicable, using relevant information from the scenario.

End of examination

Now follow the instructions on submitting your answers.