

'Inspection Topic Pack'

Control of isocyanate exposure in motor vehicle repair (MVR) bodyshops Disease Reduction Programme



Version 7, October 2007

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0.0 KEY MESSAGES

Vehicle Paint Sprayers

- Spraying 2-pack isocyanate products can cause severe occupational asthma and vehicle paint sprayers are at greatest risk
- If you get occupational asthma caused by isocyanate paints you will not be able to continue working as a paint sprayer
- The risk happens because paint spraying produces a lot of invisible airborne mist that you can breath in. Never spray paint outside the booth or room
- Your booth/room takes time to clear of mist, so know the clearance time and make sure everyone else does too.
- Always wear air-fed breathing apparatus (BA) and know how to safely leave or enter your booth or room during the clearance time
- Your employer should check the controls are working by measuring your exposure to isocyanate
- You need regular health surveillance

Bodyshop owners/managers

- Spraying 2-pack isocyanate paints creates fine, invisible, airborne mist that can cause occupational asthma
- It spreads through the air like invisible smoke
- Your spray booth or room takes time to clear of fine paint mist.
- Measure the “clearance time” using a smoke/fog generator, put it on the entrance door(s) in large type and make sure everyone who uses the booth/room knows what to do
- Make sure the booth or room runs at slight negative pressure so that it cannot leak fine mist during spraying
- Make a list of simple daily and weekly checks to be done on the booth/room, appoint someone to do them, record the findings and act if things are wrong
- Check exposure is properly controlled by measuring it using biological monitoring
- Arrange regular health surveillance for those potentially exposed to isocyanate paints such as sprayers

1.0 INTRODUCTION TO MVR BODYSHOP TOPIC PACK

HSE has established a Disease Reduction Programme (DRP) as part of the FIT3 Strategic Programme. The DRP aims to achieve a reduction in the incidence of work-related ill-health caused by exposure to hazardous agents, this includes the common causes of occupational asthma.

1.1. MVR businesses

About 170,000 people are employed in MVR in about 44,000 businesses spread across the UK, including about 8000 bodyshops. The vast majority are micro-businesses, which are particularly hard to reach and influence. The MVR Project has been developed to directly and indirectly influence bodyshops to improve isocyanate exposure control.

1.2. Topic Pack

Like other Topic Packs for HSE inspectors this Pack is designed to be relatively self-contained, but please also read the latest SIM 03/2006/04

The Pack:

- outlines a basic description of the industry;
- the risk in MVR bodyshops, from exposure to substances;
- how the risk occurs;
- the MVR national Project aim, objectives and outline plans;
- further resources;

- A fairly detailed set of notes on how best to conduct bodyshop inspections and complete the IRF;
- guidance on enforcement, including an enforcement guidance table plus some model IN wordings and Schedules.

1.2.1 Topic Pack accompanying documents

This Topic Pack refers to an Action Plan for MVR bodyshops to use and instructions on how to measure test for clearance time and leakage. If you have not got the Plan, or clearance time documents, in Word format email: Alison.lillis@hse.gsi.gov.uk

1.3. Occupational asthma and isocyanate

Over a thousand people contract occupational asthma each year in the UK. The single biggest causative agent is isocyanate, which, in 2001 – 2003, accounted for about 16% of the total. The highest risk group exposed to isocyanates is “**vehicle spray painters**” in the motor vehicle repair (MVR) industry. Most of the people who contracted asthma are sprayers but about 10% of people diagnosed with occupational asthma do other work such as body preparation.

1.4. MVR population at risk

According to HSE’s Epidemiology Medical and Statistics Unit (EMSU) the Labour Force Survey (LFS) data suggests that there are about 21,000 “**vehicle spray painters**” in the UK. The Institute of Occupational Medicine (IOM) study of isocyanate usage suggests that there are about 6200 MVR bodyshops in the UK. Allowing for some underestimation and including the existence of a significant number of ventilated spray rooms, an upper estimate of the number of MVR bodyshops in UK would be around 8,000.

1.5. Occupational asthma (OA) risk amongst “vehicle spray painters”

The most recent OA estimates are given in “Occupational Health Statistics Bulletin 2003/04”¹ showing the overall risk to “**vehicle spray painters**” is roughly 80 times the average OA for the UK working population. The population size and average OA rate for vehicle spray painters indicates that up to 50 sprayers, working in MVR, per year may contract OA.

1.6. Current awareness of isocyanate risks.

The evidence from 100 visits to MVR bodyshops in the London and South East by HSE field scientists in 2003-2003, and work done by others in CHSD3 and HSL on the knowledge of micro-companies, including MVR businesses, suggests that many employed or working in MVR bodyshops do not understand the risk that isocyanate paints pose or the health effects that can be caused. There would appear to be real confusion as to the potential health effects and harm. People think that isocyanate contains “**cyanide**” and can “**poison you**”, or it “**can give you cancer**”. This, and other factors, probably means that people do not identify early signs of respiratory sensitisation caused by over-exposure to isocyanate e.g. chest tightness (often in the evening/early morning) after work, persistent cough, flu-like shivers. Many people soldier on, still too exposed, with their symptoms getting worse, until they are forced to give up work.

1.7. What happens to MVR bodyshop workers who contract OA?

Once they have started to react and the longer their over-exposure continues, the worse will be the long-term outcome. For such people the initial occupational asthma caused by isocyanate becomes more-or-less permanent asthma. And the longer people soldier on the worse the asthma and the more permanent and debilitating the harm to their lungs. Some people will reach the “respiratory cripple” stage where they get asthma attacks from a whole range of non-specific respiratory insults such as the smell of paint or perfume or petrol or simply inhaling cold air.

¹ Average workforce OA rate is ~3/100,000 per year. For “**vehicle paint sprayers**” the rate is 246/100,000 per year (personal communication from Michael Ryan, EMSU). Note: 246/100,000 is higher than the figure of 165/100,000 quoted in the “**Occupational Health Statistics Bulletin 2003/2004**” but is more accurate as it includes actual rate estimates from SWORD and OPRA.

1.8. Prevention is better than cure

As with similar occupational health conditions, prevention is essential as there is no cure. And whatever the resultant health effect on the paint sprayer/bodyshop workers, even if there is some recovery of lung function, they will not be able to work in MVR bodyshops again. They will have lost their livelihood as a skilled worker.

1.9 How are bodyshop workers exposed and how can this be prevented?

Who's exposed? - Paint sprayers are the main group exposed but anyone, including the bodyshop manager, who may enter the spray booth/room can be. Also, some booth/rooms leak during paint spraying exposing others including body preparation workers. Finally, many bodyshops allow a 'small jobs' involving 2-pack isocyanate paint in the open workshop.

Sources of isocyanate exposure - Spray painting is the main and often the only source. Spray-gun cleaning, if done in an ad-hoc 'home-made' way can cause high exposures. In the past it was thought that paint mixing, rolling and brushing and dry sanding of newly applied 2-pack paint film could cause isocyanate exposure but HSL tests show that this isn't the case. These facts make the isocyanate exposure control task simpler; bodyshops need to concentrate on paint spraying and spray-gun cleaning.

Fine paint mist is virtually invisible - Paint spraying creates clouds of very fine paint aerosol particles that are not visible in normal lighting and the same applies to sprays from ad-hoc gun cleaning. Most sprayers and bodyshop managers are not aware of this. See SHAD or Band 4 training CD and SHAD posters for further information.

Fine paint spray takes time to clear - Almost all paint spray booths and all spray rooms take at least a minute to clear of fine paint mist. Many take several minutes and some take tens of minutes to clear. As with the invisibility of fine paint mist most bodyshops do not know that their spray booths/rooms take so long to clear. They therefore lift up the visor on their air-fed breathing apparatus or remove it before the air has cleared (see SHAD/Band 4 CD)

What control measures will work?

- People working with 2-pack isocyanate paints (which includes most (all?) bodyshops) should know the risks and the control measures.
- People need to spray 2-pack isocyanate paint in a spray booth or room which doesn't leak.
- They should wear air-fed breathing apparatus.
- Usually this will be an air-fed visor.
- The sprayer should not lift the visor until the booth/room has cleared (current practice is to raise the visor straight after spraying has finished to check on paint coverage, quality etc).
- The sprayer doesn't need to stay in the booth/room until it's cleared but should know, and be able, to leave safely.
- Anyone else who has to enter the booth/room e.g. bodyshop manager, during the clearance time, should wear air-fed BA, or should wait until it's clear.
- The employer/manager should check that the control measures work by, occasionally, checking that isocyanate exposure is well controlled, by measuring exposure using biological monitoring via a end-of-spray-shift urine sample.
- All people exposed to airborne isocyanate should be under appropriate occupational health surveillance. Usually the people who need the surveillance include the sprayers and, maybe, the bodyshop manager as he needs to enter the spray booth/room. Not **all** people in a bodyshop need to be under surveillance, only those likely to be exposed.

1.10. Other MVR bodyshop substance-related health risks- occupational dermatitis

According to the Epiderm reporting scheme (part of the THOR system of reporting, financed by HSE) vehicle paint sprayers are one of the top ten occupations suffering occupational contact dermatitis. In practice paint sprayers are often involved in body preparation work and the limited list of substances/circumstances, recorded as causing the risk, indicates that the dermatitic risk mainly results from body preparation, and associated, work although some paint sprayers are clearly affected. All at risk need to know how to look after their skin and the training and facilities to be able to do this.

What causes dermatitis in MVR bodyshops?

Substances in body filler preparations and, on occasions, isocyanate hardener in 2-pack paints, can cause dermatitis as can irritation caused by body filler dust and damage to the skin from regularly using thinners and strong cleaners to clean the skin.

Exposure occurs mainly by direct physical contact with the skin of the hands, and perhaps the forearms, and control measures should focus on reducing direct skin contact and caring for the skin of the hands and, perhaps, the forearms. Some of the fine mist created during spraying can settle out on the sprayer's skin but the dose will be very low and unlikely to cause irritant or allergic dermatitis².

What dermatitis control measures will work?

- People at risk, primarily body preparation workers and paint sprayers, should know about the dermatitis risk and the measures and procedures needed to control it.
- Gloves suitable for the bodywork tasks to be undertaken e.g. thin nitrile gloves or low protein powder-free latex.
- Sinks with soap and hot and cold running water so that people can wash their hands clean in **warm** (not hot) water
- Clean towels to allow people to dry their hands before applying re-moisturising cream
- Re-moisturising cream should be readily available and applied after **each** washing of the person's hands.
- "Strong" hand cleaners should not be used and should be removed from the washroom
- Clear and simple instructions on how to look after your skin
- Clear and simple instructions on self-examination of skin and what to do if a problem arises
- Appointment of a "responsible person" to do regular skin checks, record the findings and take action if necessary.
- Formal records of skin inspection findings

² If a person's skin is already highly sensitised to isocyanate then the fine paint mist might trigger an allergic response but a person in this state is unlikely to be able to continue working as a sprayer/body preparation worker.

2.0 MVR BODYSHOP NATIONAL PROJECT

This section explains the Project background, plans and progress so far. If you are familiar with this material please skip to sub-section 3.0 .

The Project builds on the impetus created by the launch of new guidance on the control of isocyanates in MVR in 2003 and the past work of operational colleagues throughout the 1990s and early 2000, see, for instance, SIM 3/2001/11 “Report on 2000/01 SSP reducing exposure to isocyanates in motor vehicle repair”

As the Project started in 2004 and has been actively run throughout 05-06 it's fair to say that the campaign has now moved beyond simply awareness raising to focus on improved control measures and enforcement.

2.1. Some background on influencing small/micro businesses to change their behaviour

HSE has examined and commissioned research into how best to influence small/micro-businesses. Such businesses often have a verbal culture, they don't often contact HSE for advice but they do look to suppliers and competitors for help. In the case of MVR, many people who have set up business have learnt their trade as a vehicle paint sprayer or panel beater or mechanic in larger MVR companies and have picked up the control culture of those businesses. In the case of vehicle paint sprayers their understanding of the risk and what constitutes adequate control measures, in many cases, will have come from the 1980s or early 1990s.

Most micro-businesses will not use the 'expert' model of risk assessment followed by risk management followed by review (which is at the heart of much HSE regulation, including COSHH). What they will do is adopt the industry's control culture and apply industry informed 'common sense'. In some industries this is probably good enough and probably does minimise the risks. In the case of the MVR industry the evidence suggests that it isn't good enough and risks have been too high and uncontrolled. We are looking, by various means, to influence and change the control culture, including people's daily work habits in the MVR industry. In doing so our guidance and advice should take account of, and speak to, the culture of the industry we are trying to influence and change. In the broadest sense we are forming a partnership with this industry and, for such partnerships to be productive, we should listen as well as tell. In doing so we will learn and any further HSE guidance should become more practical, sustainable and workable for the industry. And that's exactly what we want.

2.2 Project target aims and plans

Project target

The ultimate aim of the Project is to reduce the number of OAs occurring by at least 20% but, ironically, the initial result of the Project will probably be a rise in the OA cases reported in the sector. This is because there is currently a lot of under-reporting (for a variety of reasons) and inspections and other influencing is likely to improve the coverage of occupational health surveillance. This, in turn, will detect more OA cases. Therefore the Project target is to ensure that **effective and sustainable isocyanate exposure control measures** are put in place in at least 20% of MVR bodyshops by 2008 compared to 2004.

To hit this target the Project has two broad aims, one mainly concerned with direct involvement with small MVR businesses and the other designed to influence the groups supplying, advising and training the industry.

Field Project overall Aim

The overall aim of the project is to significantly (20% reduction in risk of occupational asthma) and demonstrably improve isocyanate exposure control in MVR bodyshops by 2008, with a concomitant

and consequent reduction in the incidence of occupational asthma in this sector and further reductions in risk by 2010 (30% reduction) and beyond.

Project Third party stakeholders overall aim

To improve the training of employers/employees, design of equipment, instructions, maintenance and advice provided to the MVR sector concerning controlling exposure to isocyanate, by various stakeholders, thereby contributing to the project target contributions in prevented OAs.

2.3 Project process and evaluation

The Project runs over three years from 2004 to 2007 with 2008 for final evaluation. There is an overall evaluation plan which covers SHADs, inspection follow-up and Third Party influencing.

As regards SHADs, which are an essential element of the field part of the Project, four Pilot SHADs were run in 05-06. The evaluation report for these Pilots is on HSE's Website. Over 90% of the delegates who attended left committed to making control improvements. Later evaluation of the practical impact of the Bristol Pilot SHAD showed that at least 50% of bodyshops that had attended had made effective improvements in isocyanate exposure control which were likely to be sustained. This report is available on HSE's Website.

2.4 Project outcomes so far (04-05 and 05-06)

Direct influencing of MVR bodyshops

Four Pilot SHADs took place in 04-05 and 14 in 05-06 (plus one in Belfast). About 1000 delegates from MVR bodyshops attended the events together with goodly numbers of HSE and LA inspectors and teachers from various colleges. Feedback from delegates (via Before and After Forms) and HSE personnel was used to rejig and improve the SHAD contents. This process of feedback and improvement continued throughout 05-06.

The first SHAD event (at Thatchams) of the 05-06 SHAD 'season' was recorded and DVDs plus the CD of all Powerpoint presentations, were sent to about 60 trainers about 2/3 of whom were bodyshops. The recording and copying exercise was repeated in February 2006 (Cardiff) to capture the modified and improved version of the SHAD. This too has been distributed to a mix of bodyshops and colleges and other trainers. All-in-all over 90 CD/DVDs have been dispatched. The CD/DVD combination is available to anyone wishing to train bodyshop personnel though it is probably best if they've attended a live SHAD event. Contact Andy Manns on 510 6135 or andy.manns@hse.gsi.gov.uk

Follow-up inspection of a proportion of bodyshops invited to SHADs but who did not attend has been done. The follow-up has been patchy and incomplete but probably 80 visits have been done so far with many INs and some PNs being issued. The findings of these visits are being analysed and the results will be fed back to the industry via the two main trade magazines "Bodyshop" and "Body". There is a need for more complete and robust inspection of MVR bodyshops, on the Project's key priorities, isocyanate and dermatitis control measures.

Indirect Third Party influencing

The third parties, likely to have maximum influence on the industry, have been identified by the Project Team and prioritised in a standardised and fairly objective way. They are:

First and Second rank

- Booth suppliers and maintenance organisations 1st
- Paint suppliers 2nd
- Motor Factors 2nd
- RPE suppliers/manufacturers 2nd

Third rank

- Trainers (in bodyshops and colleges)
- Trade Associations
- Industry publications

Third Party Actions so far:

Booths

A booths and maintenance company seminar was held in April and a Working Group to agree guidance on booth use, checking and maintenance met in May. Guidance will be published within the year.

Paints

We have worked with the British Coatings Federation (BCF) to improve paint Safety Data Sheets (SDSs), one-third were found by HSE to incomplete/poor using BCFs own guidance as a standard. Also, a joint HSE-BCF leaflet has been agreed which will be published on HSE's MVR and BCF's Websites in 2006. Some problems with SDS generating software have been identified and this is being followed up via a chemicals information trade association.

Factors

Motor factors were invited to a seminar but few agreed. We will be writing to them spelling out their suppliers duties with targeted follow-up visits.

RPE

We will meet the main suppliers this year and agree improved user guidance on selection and use, in particular of air-fed BA.

Trainers

Over 90 CD/DVDs have been supplied to trainers in bodyshops and colleges. We intend to target the 15 or so Centres of Vocational Excellence (COVEs) that train MVR personnel and follow-up those that have received the CD/DVD combination.

Trade Associations

They support and publicise HSE's campaign but could probably be more active.

Publications

Articles have been published in both Bodyshop and Body and there's more to come including a feedback article on inspection findings.

Beyond awareness

The Project has been actively targeting the MVR bodyshop sector for over a year and is now moving beyond awareness raising and looking for improved control standards. Workplan year 06-07 will focus on effective exposure control measures with more emphasis on inspection and enforcement.

3.0 MVR NATIONAL PROJECT SOURCES OF INFORMATION AND RESOURCES

Guidance

The Manufacturing sector launched a leaflet & poster 'Safe working with 2-pack isocyanate paints' – INDG388 in 2003. A new series of COSHH Essentials sheets dedicated to the control of isocyanates in MVR was published in 2004. See HSE MVR web site³ See also the "From Experience" material on people affected by isocyanate painting. Further guidance will appear on the web site in 2006.

SHAD event CD/DVDs

Apart from the sources of guidance identified the CD/DVD combination showing and containing the MVR bodyshop SHAD material, mentioned in sub-section 2.4, is available for inspectors to use as briefing material for themselves or others. Contact Andy Manns on 510 6135 or andy.manns@hse.gsi.gov.uk

SHAD posters for use during inspections

To brief bodyshops during visits, and to leave to reinforce key messages, six posters from the SHAD events are available. Each Band 4 inspector will receive sets of six posters for their personal use during inspection visits and to leave at each bodyshop visited, (see also Inspection Hints and Tips). Please note: The SHAD posters will not be put on sale but will be downloadable items on HSE's MVR webpages fairly soon.

"Fog machines"

One of the key messages from the SHAD events is that bodyshops need to know the "clearance time" of their spray booths and rooms. Until recently few booth suppliers or maintenance companies measured, or knew of, clearance time. In the SHADs, and in articles in the industry press, we suggest that the simplest way for bodyshops to find out the clearance time of their booth/rooms is to do it themselves using a party "fog machine". These are relatively cheap devices which should work in most bodyshops. The smoke can also be used to test for air leakage from the booth and ductwork and has an important educational role for all bodyshop personnel. You are provided with simple instructions for bodyshops to use to measure clearance time. HSL has tested a selection of fog machines. Probably the easiest way for a bodyshop owner/manager to find a fog machine is to search the Internet for UK suppliers using the search term "fog machine".

Dermatitis control measures

See summary in sub-section 2.10, also The Work-Related Contact Dermatitis Topic Pack contains a very clear summary of the issues and there's further useful information on the Skin at Work website

³ "Safety in Motor Vehicle Repair – working with 2-pack isocyanate paints" <http://www.hse.gov.uk/pubns/indg388.pdf>
COSHH Essentials Sheets are as follows:
Motor Vehicle Control Guidance Sheet MR01 Isocyanate from mixing 2-pack paints <http://www.coshh-essentials.org.uk/assets/live/MR01.pdf>
Motor Vehicle Control Guidance Sheet MR02 "Isocyanate – Spraying two-pack products in a spray/bake booth" <http://www.coshh-essentials.org.uk/assets/live/MR02.pdf>
Motor Vehicle Control Guidance Sheet MR03 "Isocyanate from cleaning 2-pack spray guns" <http://www.coshh-essentials.org.uk/assets/live/MR03.pdf>
Motor Vehicle Control Guidance Sheet MR05 Isocyanate – small tasks (Flatting, SMART repair, welding etc) <http://www.coshh-essentials.org.uk/assets/live/MR05.pdf>

4.0 INSPECTION OF MVR BODYSHOPS

4.1 Inspecting and influencing MVR bodyshop businesses and recording findings

The information extracted from your visits will be used to influence and feedback to the industry what HSE has found and what HSE has done. Please complete the IRF form after every visit with more detail of what you required if the RCI score is 3 or 4.

4.2 MVR Bodyshop Action Plan

Apart from information to be collected by HSE, we wish to make compliance with the law and review of the control of isocyanate exposure as easy as possible for MVR bodyshops, and have developed a simple Action Plan (which accompanies this Pack). Please give the owner/manager of the bodyshop a copy of the Plan and work with them to get it completed by the end of your visit. As you will be announcing your intention to visit it might help focus the owner/manager's mind if you sent him/her the Plan before you visit.

4.3 COIN Work Recording

Topic category - Please record your visits and associated work on COIN under the topic category occupational asthma. It is very important that FOD records correctly all topic activity time. Also, follow the general guidance in OM 2006/08 on COIN recording.

4.3.1 Incumbent Inspection Rating

You will need to form a judgement on the general management of health and safety risks and enter scores in the Risk Rating System using the Inspection Rating Form (IRF) following the usual scoring system

4.3.2 Health Priorities – Occupational Asthma

There are three priority areas to give an RCI score, "a", "b" and "c" and these follow the generic model in the Asthmagens Topic Pack. Table 1 lists the three priority areas and outlines the elements that need to be considered when coming to a judgement. See also Table 2 on Enforcement Guidance.

4.3.3 Health priorities – Dermatitis

Follow the guidance in the Work-Related Contact Dermatitis Topic Pack. Some of the key control measure elements are listed in sub-section 1.10 of this Pack

Table 1 Risk Control Indicators for MVR bodyshop control of isocyanate exposure	
RCI	Elements to consider in scoring RCI
a. Asthmagen management system	There is evidence of effective organizational arrangements including adequate COSHH assessments, provision of information, instruction, training and supervision. There is evidence of management commitment to effective control and arrangements for review.
b. Control strategy	There is evidence that substitution has been considered and effected where possible (Note: In the case of MVR bodyshops substitution of non-isocyanate based paints is not currently practical, therefore you should concentrate on adequate exposure control). Adequate engineering controls are provided, used, checked and maintained, at suitable intervals. That the eight Principles of Good Practice (PGPs) can be shown to have been applied to achieve effective control (see Schedule 2A, COSHH Regs). Suitable PPE is selected, provided, worn and stored correctly, cleaned and well maintained. Appropriate instruction and training in proper use of engineering controls and PPE provided Methods of working, which minimise exposure, are defined, followed and checked
c Checking and maintaining control measures	The “hardware” and “software” of control measures should be regularly checked by the employer and records kept. The hardware should be checked regularly and thoroughly examined and tested, by a competent person, at least every 14 months. The employer should be able to show that exposure control measures are effective by reference to control standards and/or exposure measurement. Where there may be residual risk of occupational asthma, appropriate and competent occupational health surveillance should be undertaken, records kept and action taken where indicated. The dutyholder should be able to demonstrate that control measures are being kept in an efficient state and in efficient working order and are reviewed on a regular basis.

Make a judgement against each of the three RCIs in Table 1 using the following criteria:

RCI score - 1	RCI score - 2	RCI score - 3	RCI score - 4
Full compliance in areas that matter	Broad compliance in areas that matter	Some compliance in areas that matter	Limited or no compliance in areas that matter

An RCI score of 1 should only be allocated where all relevant elements are in place. A score of 4 would indicate that enforcement action would probably be appropriate. For scores of 3 and 2 enforcement action **may** be appropriate

5.0 MVR BODYSHOP INSPECTION, PROCEDURES PLUS HINTS AND TIPS

Summary inspection procedure

- Bodyshop address and contact detail lists covering SHAD non-attendees plus additional Divisional premises
- Book visit with bodyshop and send Action Plan with short covering letter
- Targeted inspection – health effects from substances (isocyanate and dermatitic agents/causes)
- Use posters, Action Plan, smoke generator
- Speak to (most) of bodyshop personnel
- Run through key messages (using posters)
- Demonstrate and show smoke clearance
- Use Action Plan with owner/manager and leave with stakeholder
- Offer BM kit.
- Complete Instant Visit Report and agree Actions (inc formal enforcement)
- Complete IRF inc Actions, clearance time and observations

SIM 03/2006/04

As well as the information in this Pack also see the guidance in SIM 03/2006/04 and the Band 4 training Powerpoint presentation. Please note that the SIM is a publicly available document, agreed with the industry's trade associations. It represents agreed good control practice.

Common paint and hardener names

Almost all bodyshops use 2-pack isocyanate paints although some may not be aware, or may deny, they are. The isocyanate component of a 2-pack paint is contained in the hardener, which is mixed with the other paint component before spraying. Ask to see the paint store and Safety Data Sheets (SDSs) and look especially at the hardener/activator SDS and /or tin for Risk Phrases R42 "**May cause sensitisation by inhalation**" and R43 "**May cause sensitisation by skin contact**". To help you common paint and hardener names are listed in [Appendix 1](#), and as a separate Word document. These were prepared by Andrew Garrod and if you come across other examples please tell him. He's taking the lead on improving Safety Data Sheet (SDS) quality and if you come across poor or misleading SDSs please contact him, (VPN 523 4667 or Andrew.garrod@hse.gsi.gov.uk).

5.1 Using bodyshop address lists

Not all Divisions will hold an MVR bodyshop SHAD this year (06-07) although there will be lists of non-attendees for SHADs from last year. Please select bodyshops to visit in this order of priority:

- Firstly, non-attendees at SHADs (either last year or this year) if the SHAD covered the areas in which you are located.
- Secondly, bodyshops not visited in the last two years and/or with an RCI score of 3-4. This second group relies upon bodyshops being registered with HSE and having been inspected and RCI scored. In practice the majority of bodyshops are not registered with HSE and are not on COIN. HSAOs and other admin staff are drawing up bodyshop lists covering each of HSE Divisions using internet sites such as Yell.com.

Please make pragmatic decisions over the bodyshops you choose to visit. If there has been a SHAD which covers your area choose bodyshops from the non-attendees list. If there is going to be a SHAD covering your area then plan to inspect after the event. If the SHAD is very late in the workplan year (e.g. March) don't wait but select bodyshops from the geographical area not covered by the SHAD. HSAOs and other admin staff will have a list of bodyshops in your Division including all the relevant SHAD non-attendees, if there has been a SHAD in your area.

Choose MVR businesses geographically so that you can conveniently visit. Many bodyshops are micro-businesses and it isn't convenient, or sometimes, possible, for them to accommodate an

unannounced inspection. Phone, or if possible, write beforehand to warn them you'll be visiting and on what day. Include a copy of the Action Plan.

5.2 Visiting MVR bodyshop businesses

Start with management questions and initially you'll be finding out how big the business is, how many it employs, how long it's been trading and what the manager/owner knows about and does about the risks from 2-pack isocyanate paints and the risk of dermatitis. Once the basic business and management information have been obtained use the six SHAD posters to take the owner/manager through the key messages and issues. If possible, involve the sprayers, body preparation workers and bodyshop manager in this briefing.

5.2.1 SHAD posters and other guidance

There are currently six posters illustrating the key points from the SHAD events. You will be sent sets of these posters. Use them to explain the key points and messages about 2-pack isocyanate paints and give a set of posters to each bodyshop you visit. They serve an important reinforcing and reminder role and, in our experience, are well received. Also, have available copies of "Safety in Motor Vehicle Repair – working with 2-pack isocyanate paints"

5.2.2 On-site tests

The only test you are being asked to do this year is to measure the clearance time of any spray booth/rooms you come across, using the Colt 4 smoke generator. Basic instructions on how to do this test are given in the next sub-section and there's more detail in [Appendix 2](#), which is available as a Word document so that you can send/give it to the bodyshops you visit. The test you are being asked to do is a shortened, truncated version of the procedure in Appendix 2 but is good enough. To spot any leakage you'll need someone outside the booth/room to check. Ask for a volunteer.

The test should be done with all the relevant bodyshop people present. These will include the owner/manager, the bodyshop manager (if different) and the sprayers. Most of them should be inside the booth/room when the test is done so they can see just how long their workplace takes to clear, with their own eyes. Almost always they are surprised at the time it takes for the booth/room to clear. They almost always assumed that it cleared more-or-less instantly!

Inspector safety

The glycerine smoke is of low toxicity and for occasional and short-term exposure the respiratory risk is very low. But, if you have a pre-existing respiratory condition (e.g. asthma) or suffer discomfort, wear the disposable respirator selected during your RPE selection and fit-testing exercise. If you have to wear a respirator, explain why to the audience.

5.2.3 Assessment of clearance time and booth/room leakage

Each SG has three Colt 4 smoke machines which can be loaned. Please coordinate MVR bodyshop inspection with your colleagues so that each of you has a Colt 4 smoke machine when you do your inspections.

The smoke should not be used with a vehicle in the booth/room as it may deposit glycerine on the vehicle. Ask the bodyshop to move any vehicle out of the booth/room before doing the test.

- Read the Colt 4 instruction booklet and try out the machine in the car park at work or your garden at home
- The device needs to be plugged into the mains and turned on and takes about five minutes to heat up.
- To perform the test ask for the booth/room ventilation to be turned on and then fill the booth/room with smoke. To do this you'll need to open the discharge valve of the smoke generator to maximum by turning the valve control to wide open (screw anticlockwise). To generate smoke hold down the control button.

- To fill the booth/room walk up and down and ‘spray’ the smoke into the entire volume of the booth/room. Once filled, start your stop-watch, wait for the booth/room to clear and note down how air moves in the booth/room.
- The smoke involved is glycerine based and, to all intents and purposes, is very low risk. Be aware that when the booth is full of smoke, and you can’t see the walls or ceiling, it can be a bit disorientating.
- If you can get a volunteer ask that person to stand outside and report any smoke leakage

The demonstration of “clearance time” leads onto a conversation about the need to keep the air-fed visor down until the “clearance time” is finished and how to leave and enter a booth/room safely before clearance is complete. We believe that the smoke generator tests have a strong educational/awareness raising role and means that the bodyshops are much more likely to follow the correct exposure control measures after you’ve left the premises. And this is what’s needed, sustained impact on exposure control measures.

5.2.4 Isocyanate exposure measurement

The only practical way of measuring the exposure of people, especially paint sprayers wearing air-fed BA, to isocyanate is by biological monitoring (BM). It is important to be clear with every one in the bodyshops you visit that biological monitoring is being used to measure a person’s **exposure** to isocyanate. It isn’t being used to measure any potential health effect but simply as a means to an end – exposure measurement. This point may seem a bit laboured but people do get confused about the role of biological monitoring in exposure measurement and HSE needs to be clear with bodyshop personnel as to its role.

As with the MVR bodyshop SHADs HSE is offering bodyshops visited free wee sample bottles, forms and a Jiffy bag (postage paid) to return the samples to HSL for analysis⁴. This is so that the bodyshops can check that isocyanate control measures are effective and, at the same time, we remind them that they have a duty, under Regulation 10, to check that effective exposure control is maintained. Currently we recommend that this is done at least annually, (see SIM 03/2006/04). As this is new advice to the bodyshop sector inspectors are not expected to take formal enforcement action to require it. Also, if a bodyshop can show that exposures, as measured by BM are well controlled and the control measures are well managed and maintained, there may be no need to keep measuring exposure.

5.2.5 Spray room exhaust filtration retrofit

Until recently HSE has allowed spray rooms to continue to be used without any filtration of the exhaust air. With the new evidence on just how high the airborne isocyanate concentration can get and the risk that the fine isocyanate mist will recirculate back into the bodyshop or into adjacent premises, we now require that spray room exhaust air is adequately filtered and discharged at reasonable height. This is a new requirement and it is HSE’s intention to provide practical advice based on work done by HSL which is currently in progress. In the meantime we will circulate some provisional advice on how spray room owners can retrofit their rooms with filters etc.

5.2.6 Common “Matters of Evident Concern”

Some matters of evident concern

House keeping and slipping/tripping hazards

Bodyshops can be fairly chaotic in their organisation with vehicles parked awkwardly and leads and air-supply hoses for handheld powered tools left lying around. Also, if not well controlled, the dust from the dry sanding of bodywork filler can coat the floor and other surfaces and is particularly slippery. HSE has produced generic guidance on managing slipping and tripping hazards. And there is MVR industry-specific guidance on falls with poster.

⁴ Contact HSL Kate Jones (kate.jones@hsl.gov.uk & (VPN 524) 01298 218 435 and/or John Cocker (john.cocker@hsl.gov.uk & (VPN 524) 01298 218 429) for details

Storage and decanting of flammable/highly flammable liquids

Many paint thinners consist of mixtures of industrial xylene and toluene and are therefore highly flammable (HFL). In practice the main risks are from poor storage and arrangements for decanting of thinners. There is some MVR specific guidance on control of flammable risks in HSG 67 (page 32) and general guidance is also available. Simple preventative measures, taken from HSG 67, include:

- Minimise the amount of HFL stored in the work shop; 50 litres or less is the advisable maximum
- Store HFL in a 30 minute fire resistant receptacle, for example, a metal dust bin with a tight fitting lid or a metal cabinet with tight fitting doors
- Quantities in excess of 50 L should be stored in a fire resistant store with spillage retention and good general ventilation. This is typically provided by high and low level air bricks.
- Keep contaminated waste rags and paper in a metal, lidded bin.
- Ensure adequate ventilation where paints are mixed
- Treat containers emptied of HFL the same as full ones
- Use a workbench with a lip fitted to contain spills

5.2.7 Some Questions

You will be asked a lot of questions the answers to most of which will be in this Pack and the MVR bodyshop presentation SHAD material. Some other questions include:

Q1 - Can people with pre-existing asthma work with isocyanates?

Before answering the question it's important to be clear that people with a tendency to respond to allergens and/or with a history of allergy in the family (a condition called "**atopic**") are **not** at greater risk of responding to airborne isocyanate. The evidence suggests, whether a person is atopic or not, they are at equal risk of responding to airborne isocyanate. Back to the answer which comes in two parts.

A1 - It depends upon how severe is their existing asthma . If it's mild and/or caused by one of the common allergens in the home, for instance, cat or dust mite dust, then there's no reason why a person should not work in a bodyshop. The employer and the individual should take extra care to make sure that all the exposure control measures are in place and used.

If the individual has severe asthma it's probably unwise for them to work in an MVR bodyshop as their condition might be triggered by even quite low levels of exposure to airborne dust and/or paint mist.

Q2 - Is the risk of getting occupational asthma, from breathing in airborne isocyanate-containing paint mist, related simply to the length of time someone's exposed and to the exposure levels or is it pot luck whether you get it or not?

A2 - It's both. The higher your exposure and the longer you are exposed the greater the risk but there's also probably an element of individual susceptibility involved. But as there's no way of knowing who is going to respond or how severely, the only way of protecting people is to minimise their exposure to airborne isocyanate.

6.0. ENFORCEMENT GUIDANCE

EMM - The following is a guide to when enforcement action may be appropriate and is based upon operational version 2.0 of the Enforcement Management Model (EMM) and the general guidance on the application of EMM principles to health risks, available on the intranet. Action taken by inspectors should reflect any subsequent changes to the EMM. **The final decision on enforcement action should also take account of local factors.**

This guidance applies to all forms of spraying with isocyanate-based paints.

Risk - Exposure to isocyanates used in MVR bodyshops can lead to a person being sensitised to the substance and contracting occupational asthma, a permanent and usually irreversible condition which can restrict work capabilities and reduce quality of life⁵.

Immediacy of risk - A failure to adopt appropriate control measures can result in exposure to isocyanate vapour/aerosol and the possible risk of a serious health effect. Where the risk of a serious health effect is identified, inspectors should consider issuing a PN as discussed in Section 2 of the EMM.

Benchmark standards - In MVR, for spraying with isocyanate-based paints the benchmark set should be considered as a nil or negligible risk of serious health effect. The benchmark can be achieved by a package of measures including risk control systems (spraying in booths or enclosures under effective ventilation and adequate maintenance, suitable RPE and methods of working), work place precautions (training) and management arrangements (exposure measurement and health surveillance).

Risk gap - The risk gap, as derived from EMM, for common tasks is summarised in Table 1. Inspectors may use the control measure problems as a guide to making their assessment of actual risk and the subsequent risk gap. However, they must ensure that they base their assessment of risk on the factors they find at the site.

Recording enforcement actions

Please record your enforcement actions on the IRF Form, or in the Case raised against a Service Order, on COIN.

⁵ The longer someone continues to be exposed to an asthmagen, like isocyanate, to which they have started to respond, the worse their occupational asthma and general respiratory health will get, and the worse their prognosis. Some people get to the stage whether they respond to a wide variety of non-specific respiratory insults/stimuli such as perfume or diesel exhaust or cold air.

6.1. CONTROL MEASURES ENFORCEMENT GUIDANCE

Reasonably practical measures for controlling exposure to isocyanate in MVR, and the control of dermatitic risk, are described in Table 2 along with indicative actions.

Table 2 Enforcement Guidance				
Activity	Benchmark	Control measure problem	Risk Gap	Indicative Action
Management standards	Employer should know the risks from use of 2-pack isocyanate paints Employer should have formally explained the risks, how they can occur, what control measures exist, how they work and what employees (self-employed) need to know to check they're working	Poor knowledge of health effects and necessary control measures leading to inadequate, knowledge, briefing and training e.g. paint sprayers	Substantial / Moderate	Letter & leaflets & SHAD posters and use of "Bodyshop Action Plan"
Spray painting	<ul style="list-style-type: none"> 2 pack isocyanate spray paints should only be used in an enclosed and adequately ventilated spray booth / room maintained under negative pressure. Emissions should be filtered and/or discharged to a safe place in the open air. sprayers (and others entering the booth/room) should wear air-fed breathing apparatus (BA) during spraying and afterwards during the "clearance time" sprayers and others should know how to leave the booth/room safely after spraying but before paint mist has cleared 	Spray painting in open workroom, no RPE or other PPE	Extreme	PN
		Spray painting in open workroom, good RPE, but others present	Extreme	PN
		Spray painting in open workroom, good RPE, no one else present (eg self employed person)	Extreme	Letter informing not permitted if other people employed/exposed
		Spray painting in ventilated booth/room – poorly designed or maintained, good RPE / PPE	Substantial	IN
		Spray/bake booth not under 14 monthly examination	Substantial / Moderate	IN
		Spray painting in a booth/room not maintained under negative pressure and leaking badly	Extreme	PN

Table 2 Enforcement Guidance				
Activity	Benchmark	Control measure problem	Risk Gap	Indicative Action
		Spray painting in a booth without a working negative pressure indicator	Substantial / Moderate	IN/Letter
		Spray painting in an effective booth, unsuitable RPE (e.g. no air-fed BA or device in a poor state)	Extreme	PN
		Spray painting in an effective booth, RPE/PPE OK but maintenance is inadequate	Substantial / Moderate	IN/Letter
		Spray painting in a spray room without adequately filtered exhaust air (increasing the risk of recirculation of fine paint mist into workplace and adjacent premises) Guidance on retrofitting of spray rooms to follow)	Substantial / Moderate	IN / Letter
Baking	Booths take time to clear of vapour after baking has finished. There may be a very small amount of isocyanate vapour present and it would be prudent to allow a purge time after baking has finished similar in length to the paint spraying "clearance time"	No purge of isocyanate vapour at the end of the bake cycle and/or inadequate "clearance time". Risk of people entering the booth before it has cleared	Moderate/ Low	Advice in Letter or recorded in "Bodyshop Action Plan"
Dry sanding/ flatting	It is good practice for the fine dust from the sanding/flatting of new 2-pack isocyanate paint film to be effectively extracted or the work should be done in a segregated area with the worker wearing adequate and suitable RPE. On-tool extraction can be very effective and is the preferred control option.	Inadequate control of fine dust from dry sanding or flatting of new 2-pack isocyanate paint film	Moderate/ Low	Advice in Letter or recorded in "Bodyshop Action Plan"

Table 2 Enforcement Guidance				
Activity	Benchmark	Control measure problem	Risk Gap	Indicative Action
Methods of working	<ul style="list-style-type: none"> Air fed RPE and other PPE should be worn during spraying and during the booth/room clearance period For rooms the clearance time maybe long>10 mins. For booths it will be 1 – 5+ mins. RPE should not be raised/removed during the booth/room clearance time Sprayers and others must know the “clearance time” of the booth/room and how to leave and enter safely. Plug in point for RPE should be located so that the user can walk to the pedestrian door and unplug the air-fed BA just before leaving. Note: For spray rooms, it would probably be best if the BA was connected to the air-supply outside the roomso that people can enter and leave without disconnecting the air-fed BA 	<ul style="list-style-type: none"> Air-fed BA not worn during 2-pack isocyanate paint spraying Air-fed BA not worn throughout the booth/room “clearance time” BA visor raised in spray booth/room during “clearance time” Air-fed BA users do not know the correct procedure for safely leaving and entering a booth/room during the “clearance time” 	<p>Extreme</p> <p>Substantial</p> <p>Substantial</p> <p>Substantial</p>	<p>PN</p> <p>IN/Letter</p> <p>IN/Letter</p> <p>IN/Letter</p>
Spray gun cleaning	Clean guns etc in dedicated, enclosed gun washing equipment or in the spray booth/room with extraction and air-fed BA	Gun cleaned in open workroom with no controls, or some other ad-hoc arrangement	Substantial / Moderate	IN/Letter
Paint Mixing	Work should be undertaken in either a well-ventilated (10 air changes/hour) mixing room with doors closed or a well ventilated booth/enclosure (Note: Potential isocyanate exposure is minimal; main risk is solvent exposure which will be well controlled by the general ventilation).	Paint mixing in general work area	Moderate	Letter
Exposure monitoring	Effectiveness of control measures should be checked by measuring the exposure of all potentially exposed people i.e. the sprayers and anyone else who may need to enter the spray room/booth e.g. bodyshop manager. In reality the	Unclear whether exposure control measures are effective enough for those exposed	Substantial / Moderate	IN/Letter

Table 2 Enforcement Guidance				
Activity	Benchmark	Control measure problem	Risk Gap	Indicative Action
	only practical way of doing this is by biological monitoring done on urine samples			
Training	Sprayers, and others potentially exposed, should know the health risks from using isocyanates and be able to recognise the early symptoms of response to isocyanate exposure and how to report them. They should also be familiar with the proper use, and basic checks, of control measures including any LEV, PPE and Methods of Working	Inadequate knowledge and training	Substantial/ Moderate	Letter (brief during visit-leave leaflets & posters. Get employer to complete "Bodyshop Action Plan"
Health surveillance	* High level health surveillance is required covering all those potentially exposed (usually the paint sprayers and, perhaps, the bodyshop manager) ⁶ . It should be provided by a competent person, for instance, an occupational health nurse or a medical practitioner or other suitable provider familiar with the risks of working with isocyanates and experienced in assessing early signs of occupational asthma. Normally tests include lung function by spirometry. * Skin examination for early signs of dermatitis by a "responsible person" is needed. The person should be properly trained properly	Absent or inadequate occupational health surveillance Absent or inadequate skin surveillance	Substantial Substantial / Moderate	IN Letter/IN
Skin care	Adequate and suitable skin care scheme (PPE (thin nitrile or low protein powder-free latex), hot and cold water sink(s), towels and moisturising cream). Risk of dermatitis amongst bodyshop sprayers and body preparation staff is high	Inadequate skin care scheme including training and/or facilities	Substantial	IN/Letter

⁶ If a bodyshop is well managed and can show, by measuring exposure using biological monitoring, that isocyanate exposure is well controlled and that this is consistently done, then low level health surveillance may be permissible.

The following are relevant to deriving the authority of standards for use in Table 5.1 of the EMM and therefore deciding the initial enforcement expectation.

Title	Authority
Control of Substances Hazardous to Health Regulations ACoP	Defined
Safety in Motor Vehicle Repair – Working with 2-pack isocyanate paints INDG388	Established
Guidance Note EH16 (REV 9/99) Isocyanates: health hazards and precautionary measures	Established
COSHH Essentials: Easy steps to control chemicals. HSG193 (second edition) 2003 – MVR sheets.	Established
The selection use and maintenance of respiratory protective equipment HSG53	Established
EIS 18 Isocyanates: Health Surveillance in Motor Vehicle Repair	Established
“Safety in Motor Vehicle Repair – working with 2-pack isocyanate paints”	Interpretive
SIM 3/2000/11 Mobile Paint Spraying in Motor Vehicle Refinishing	Interpretive
SIM 03/2006/04 Reducing ill-health in the motor vehicle repair industry- Developing Issues	Interpretive
MVR Website Guidance and Key Messages re control of substance-related occupational ill-health	Interpretive
"Health surveillance for occupational asthma"	Interpretive
"Urine sampling for isocyanate exposure measurement"	Interpretive

The EMM considers COSHH assessment as an administrative measure. The standard for COSHH assessment is a defined standard found in the Control of Substances Hazardous to Health Regulations 2002 (as amended). Any absence or inadequacies of an assessment should be considered using Table 5.2 of the EMM.

6.2. NOTICE TEMPLATES

NB. The following notices are examples to cover some of the circumstances inspectors are likely to encounter. The wording of the Notices may need modifying according to the circumstances found on site.

COSHH Regulations 7(1), (Prohibition Notice). Inadequate control of exposure
COSHH Regulation 6, Assessment
COSHH Regulation 7, Control of residual risk, RPE
COSHH Regulation 7(3) Control by means other than RPE
COSHH Regulation 7.7 Control of asthmagen exposure as far as is reasonably practical below the Workplace Exposure Limit (WEL)
Workplace (Health, Safety and Welfare) Regulations 1992 (Regulation 21) Washing facilities
COSHH, Regulation 7, Control (for failure to provide/inadequate PPE)
COSHH Regulation 9, Maintenance, examination and testing of control measures
COSHH Regulation 10, Monitoring exposure at the workplace
COSHH Regulation 11, Health Surveillance
COSHH Regulation 12, Information instruction and training

Generic Notes

The standard "Notes" section, at the end of each Notice, has been omitted to save a little space. Here are the generic Notes and References:

Further information relevant to this Notice is contained in various HSE publications including:

- L5, COSHH ACoP, Control of Substances Hazardous to Health 2002 (as amended) (ISBN 0717629813)
- L55, "Preventing Asthma at Work, How to control respiratory sensitisers" (ISBN 0717606619). Contains questionnaire examples and describes practical ways of controlling asthmagens.
- "Respiratory Sensitisers and COSHH". IND(G) 95 (Rev 2)"
- "Safety in motor vehicle repair – working with 2-pack isocyanate paints"

The books can be purchased from HSE Books. Phone 01787 881 165

I attach the following free information leaflets: Isocyanates: Health Surveillance in motor vehicle repair," Engineering Sheet No 18 and "Respiratory sensitisers and COSHH" INDG 95.

Prohibition Notice (PN) template

For insufficient control and/or uncontrolled exposure to isocyanates

COSHH Regulation 7(1)

The Health and Safety at Work etc. Act 1974, Section 2 (& 3, where members of the public may be affected)

The Control of Substances Hazardous to Health Regulations 2002 (as amended), Regulation 7(1)

Activity: The spraying of 2 pack isocyanate paints in motor vehicle repair.

Matters giving rise to risk:

Insufficient steps have been taken to prevent persons from being exposed to mists containing isocyanates and, under current circumstances, there is a significant risk that people will be excessively exposed to airborne isocyanate

Improvement Notice (IN) templates

COSHH Regulation 6, Assessment

Page 1

Control of Substances Hazardous to Health Regulations 2002 (as amended), Regulation 6(1)

Health and Safety at Work etc. Act 1974, Section 2(1)

You as an employer are carrying out work which is liable to expose your employees to a substance hazardous to health namely **isocyanates** and you have not carried out a suitable and sufficient assessment of the risks created by that work and identified the steps that need to be taken to control those risks.

Schedule (page 2)

In order to comply with this notice you should:

Carry out a suitable and sufficient assessment of the health risks to employees from working with isocyanates which are respiratory sensitisers (they can cause occupational asthma). This assessment should include the following;

- the hazardous properties of the substance;
- information on the health effects provided by the supplier including information contained in any safety data sheet;
- the level, type and duration of exposure;
- the work circumstances including the amount of the substance involved;
- activities such as maintenance, for instance spray-gun cleaning, where there is the potential for a high level of exposure;
- the effect of preventive or control measures provided in accordance with Regulation 7;
- the results of any relevant health surveillance;
- the results of any monitoring of exposure in accordance with Regulation 10;
- any additional relevant information.

You should make provisions to ensure that this assessment is reviewed. Those provisions should extend to systems to ensure that changes are made where there is reason to believe that the assessment is no longer valid or there has been a significant change in the work to which the assessment relates and where as a result of the review changes to the assessment are required.

OR

You should take any other equally effective measures to achieve compliance with the Notice.

COSHH, Regulation 7, Control (for failure to provide/inadequate RPE)

Page 1

Control of Substances Hazardous to Health Regulations 2002 (as amended), Regulation 7(9)

Health and Safety at Work etc. Act 1974, Section 2(1)

You have failed to provide persons exposed to isocyanates with Respiratory Protective Equipment which adequately controls their exposure.

Schedule (page 2)

Isocyanates are respiratory sensitisers and are harmful by inhalation.

Where it is necessary to use Respiratory Protective Equipment (RPE) either solely or in addition to other control measures, you should ensure.

- that the RPE is suitable for purpose and capable of adequately controlling exposure
- that it is kept clean and regularly checked and maintained

OR

You should take any other equally effective measures to achieve compliance with the Notice.

You are reminded that persons who need to use RPE to control exposure should be trained in its correct use.

COSHH, Regulation 7, control of exposure

Page 1

Control of Substances Hazardous to Health Regulations 2002, Regulation 7

Health and Safety at Work etc. Act 1974, Section 2(1)

You have failed, so far as is reasonably practicable, to provide measures other than personal protective equipment to prevent or adequately control exposure to isocyanates.

Schedule (page 2)

Isocyanates are respiratory sensitisers that are harmful by inhalation

In order to comply with the requirements of this notice you should:-

Establish a system that ensures exposure to isocyanates is either prevented, or where that is not reasonably practicable, adequately controlled. So far as is reasonably practicable the control measures should involve process and engineering methods, for instance by the provision of compliant spray-guns and an effective ventilated spray booth

This does not form part of the notice

You are reminded that persons who need to use these above control measures should be trained in their correct use

Further information relevant to this notice is contained in various HSE publications including:

L5, COSHH ACOP, Control of Substances Hazardous to Health 2002 and guidance

L55, Preventing Asthma at Work, How to Control respiratory sensitisers.

“Safety in Motor Vehicle Repair – working with 2-pack isocyanate paints”

COSHH, Regulation 7, Control (for failure to provide/inadequate PPE)

NOTICE

Page 1

Control of Substances Hazardous to Health Regulations 2002 (as amended), Regulation 7(9)

Health and Safety at Work etc. Act 1974, Section 2(1)

You have failed to provide persons, exposed to substances that can cause occupational dermatitis, with Personal Protective Equipment which contributes towards adequately controlling their exposure.

SCHEDULE

Isocyanates and some body filler components are skin sensitiser and irritants

Where it is necessary to use Personal Protective Equipment (PPE) either solely or in addition to other control measures, you should ensure.

- a. that the PPE suitable for purpose and capable of adequately controlling exposure
- b. that it is kept clean and regularly maintained
- c. that it is on individual issue and specifically selected for individual employees

or

You should take any other equally effective measures to achieve compliance with the Notice.

Further information relevant to this notice is contained in HSE publication COSHH ACOP, Carcinogens ACOP and Biological Agents ACOP, Control of Substances Hazardous to Health 2002

You are reminded that persons who need to use PPE to control exposure should be trained in its correct use.

- Establish a system that ensures exposure to isocyanate-containing liquid paint and bodyfiller materials is either prevented, or where that is not reasonably practicable, adequately controlled and
- Where the measures taken above do not prevent or provide adequate control of exposure to cement employees/workers should additionally be provided with suitable personal protective equipment (PPE). In this case you should ensure
 - a. that PPE is suitable for purpose and capable of adequately controlling exposure
 - b. that it is kept clean and regularly maintained/replaced
 - c. that users are trained in putting on and taking off the PPE without contaminating their skin
 - d. that it is on individual issue and specifically selected for individual employees/workers

OR

You should take any other equally effective measures to achieve compliance with the Notice.

- Workplace (Health, Safety and Welfare) Regulations 1992 (Regulation 21) Washing facilities

Work involving substances and methods of work known to cause occupational dermatitis, a potentially serious health condition, is taking place. Any person using a material containing substances capable of causing irritant and/or allergic dermatitis or under taking work involving methods of work which can cause occupational dermatitis should have access to adequate washing facilities.

In my opinion the current facilities are inadequate... (Use Regulation 21(2) list to define the improvements necessary)

Note: Be aware that, to minimise the risk of occupational dermatitis in MVR bodyshops people will need access to appropriate skin care facilities and products over and above sufficient and suitable washing facilities (see sub-section 1.10)

COSHH, Regulation 9, Maintenance, examination and Testing of Control Measures

Page 1

Control of Substances Hazardous to Health Regulations 2002, Regulation 9(2)(a)

Health and Safety at Work etc. Act 1974, Section 2(1)

You have failed to have the Local Exhaust Ventilation system provided for the control of isocyanate which is a respiratory sensitiser and a substance hazardous to health thoroughly examined and tested within the previous 14 months.

Schedule (page 2)

To comply with this notice you should take the following action:

Either

A 1. The local exhaust ventilation system, provided to meet the requirements of Regulation 7 of COSHH 2002, should be thoroughly examined and tested and a suitable record kept. The record should contain at least the following particulars:

- a. The name and address of the employer responsible for the plant;
- b. Identification and location of the LEV plant, process and hazardous substance concerned;
- c. Date of last thorough examination and test;
- d. Conditions at time of test; normal production or special conditions (e.g maximum use, stood down);
- e. Information about the LEV plant which shows:
 - (i) its intended operating performance for controlling the hazardous substance for the purpose of Regulation 7 (e.g clearance time, air velocities, volume flow rate, maintenance of negative cabin pressure during spraying and baking);
 - (ii) whether the plant now still achieves the same performance;
 - (iii) if not, the repairs required to achieve that performance;
- f. methods used to make judgement at (e)(ii) and (e)(iii) (e.g. visual, smoke, pressure measurements, airflow measurements, dust lamp, air sampling, filter integrity tests);
- g. date of examination and test;
- h. name, designation and employer of person carrying out examination and test;
- i. details of repairs carried out.

2. The record should be completed by the employer responsible for the plant.

Or

B. You should take other, equally effective measures, to achieve compliance with the Notice.

Further information relevant to this notice is contained in HSE publications L5 '**COSHH ACOP, Control of Substances Hazardous to Health 2002**' and guidance ' and L55 '**Preventing Asthma at Work, How to Control respiratory Sensitisers**'

COSHH, Regulation 11, Health Surveillance

Page 1

Control of Substances Hazardous to Health Regulations 2002, Regulation 11

Health and Safety at Work etc. Act 1974, Section 2(1)

You have failed to ensure that employees exposed to isocyanate, a substance which is hazardous to health and is a respiratory sensitiser, are under suitable health surveillance.

Schedule (page 2)

To comply with this notice you should take the following action:

Either

A. Develop a system of health surveillance for those persons exposed to isocyanate, which is a respiratory sensitiser (can cause asthma).

Health surveillance for those exposed to isocyanate will normally need to be carried out by an occupational health nurse or medical practitioner who is familiar with the risks of the process and principles of occupational health surveillance.

This should allow for and include:

1. A self-reporting system for relevant symptoms;
2. Completion of suitable questionnaires;
3. Measurement of lung functions; and
4. The completion and review of health records, including monitoring of sickness absence.

It is recommended that health surveillance be conducted at pre-exposure examination; six weeks, six months and annually thereafter while exposure continues.

If any worker experiences wheezing, coughing, chest tightness, breathlessness during or after work with isocyanate, further exposure should be avoided and medical advice obtained.

Where health surveillance is carried out you must keep and maintain a health record for at least 40 years from the date of the last entry.

Or

B. You should take any other equally effective measures to achieve compliance with the Notice.

I suggest you obtain a copy of the following HSE publications:

- (i) **“Preventing Asthma at Work”** ISBN 0717606619 , which contains questionnaire examples and describes practical advice on controlling respiratory sensitisers;
- (ii) **“Isocyanates:Health hazards and precautionary measures”** number EH16 ISBN 0-7176-1701-7 a detailed guidance note;

Both these books can be purchased from HSE Books Telephone 01787 881165.

I attach the following free information leaflets:

“Isocyanates: Health surveillance in motor vehicle repair” Engineering Sheet No 18

“Respiratory sensitisers and COSHH”, INDG95;

“Understanding health surveillance at work an introduction for employers”INDG304.

COSHH Regulation 12, Information, instruction and training

Control of Substances Hazardous to Health Regulations 2002, Regulation 12(1)

Health and Safety at Work etc. Act 1974, Section 2(1)

Those employees who may be exposed to isocyanates have not been provided with suitable and sufficient information, instruction and training about the risks from exposure and the control measures to minimize them.

Schedule

In order to comply with this notice you should provide those employees (and people under your control) who may be exposed to isocyanates with information, instruction and training on;

- the names of the materials containing isocyanate and the risk they present to health;
- any relevant occupational exposure limit;
- access to safety data sheets and information on any other legislative provisions relevant to the hazardous properties of the substance(s);
- the significant findings of the risk assessment;
- the appropriate precautions and actions to be taken to safeguard themselves and others;
- training on the control measures adopted and how to use them properly;
- training in the proper use of PPE including requirements in relation to cleaning, storage and disposal procedures;
- the results of any exposure monitoring;
- the role of health surveillance, their duty to attend, arrangements for access to individual health records and collective results of health surveillance;
- training in emergency procedures.

Employees should also be informed about, and trained in the procedures to be followed in an emergency

OR

You should take any other equally effective measures to achieve compliance with the Notice.

NOTE:

Further information relevant to this notice is contained in HSE publications L5 'COSHH ACOP, Control of Substances Hazardous to Health 2002 and guidance' and L55 'Preventing Asthma at Work, How to Control respiratory Sensitisers.

Appendix 1 – Common paint and hardener names

Paint names The isocyanate component of a 2-pack paint is contained in the hardener, which is mixed with the other paint component before spraying. The table, based on information compiled by Andrew Garrod, lists the common makes and hardener names. He is working on improving the quality and accuracy of paint supplier Safety Data Sheets (SDSs) If you come across other makes and names or poor/inadequate SDSs please tell Andrew on VPN 523 4667 or Andrew.garrod@hse.gsi.gov.uk

Paint maker	Product name	Key words
Akzo-Nobel Lesonal	Hardener, MS hardener	hardner
Akzo-Nobel Masons	Superthane, QDP	hardener
Akzo-Nobel Sikkens	Autoclear, Autocryl, Autocoat, Autoflex	hardener
Ameron International	Mastercryl, Tekaloid, Tractol	cure
Anglo Dutch	Octoral hardener HS, MS	hardener
Avko	Avkote hardener, LE	hardener
BASF Coatings	Glasurit, RM Diamont	hardener, reducer
Baxenden Chemicals	Trixene, Isocyanate	crosslink additive
Churchill Paints	2K Standard, 2K Premium hardener	hardener
du Pont Spies-Hecker	Permasolid MS, Permacron, Raderal (?)	härter / haerter
du Pont Standox	Standocryl VOC, Standofleet, Motocolor(?)	hardener
HMG Paints	Acrythane, 2K	hardener
Lechler Coatings	Isoakryl, Isofan, Isocar, Macrofan, Induritore HS	induritore
Manor Coating Systems	Acrylic CV, Polyurethane	activator
MIPA Paints Limited	PU-900, WPU 9000, 2K-härter HS, MS; Binder-BC härter	
PPG Industries - Max Meyer	UHS Duralit Premium hardener, etc	hardener
PPG Industries - Nexa Autocolor	Autocolor HS hardener, etc	hardener
PPG Industries - PPG	Deltron HS Hardener, etc	hardener
Oval Industries	Mirror MS	hardener
Pronto Paints	QD PU spray hardener	hardener
Renault	Ixell Oxelia	durcisseur
Technico Surface Coatings	Unknown - to be investigated. No MSDSs	???
U-pol	2K System 20	Hardener

Appendix 2 – Spray booth/room clearance time & leakage test

- You need to know the clearance time of your spray booth or room.
- Check this just before changing the extract filters to give a 'worst-case' time.
- Include the clearance time test in the 14-monthly "thorough examination and test", as required by COSHH Regulation 9. Note that you may need to test more often than this.

Equipment

Fog or smoke machine; an extension lead (for mains powered machines); stopwatch or similar; high "candle-power" torch on a stand or tripod

Procedure

1. Measure the clearance time with the spray booth or room empty. You won't want greasy deposits on vehicles or body parts.
2. Do the test at the normal spraying temperature. Turn the lights on maximum to help show up the smoke.
3. During smoke tests, arrange for someone else to check for any smoke leaks outside the booth / room, or from the ductwork.
4. **Pre-test:** Turn the extraction off. Fill the booth/room with smoke. Turn the extraction on, and watch how the smoke clears. Some areas will take longer to clear. Then turn the extraction off again.
5. **Test:** Position the torch to shine through the area that clears slowest. Fill the booth/room evenly with smoke. You may need the extension lead to do this properly.
6. When you cannot see across the booth / room, it is full of smoke. If the fog machine cuts out, give it time to reheat once or twice to get the right smoke density.
7. Turn on the extraction and start the timer. Look towards the torch, 'up' the light beam.
8. The room is clear when you can see no smoke anywhere in the booth / room - especially those areas identified in the pre-test.
9. Round up the measured time to the next quarter minute.
10. Display this time on a large, clear notice on the entrances to the booth or room. Tell everyone who needs to know.

Note 1: Warn people - Warn your employees, and possibly your neighbours, about the smoke test so that they are not alarmed. It may be necessary also to warn the local fire service to avoid unnecessary call outs.

Note 2: Precision in clearance time measurement - The clearance time test is imprecise, relying on individual perception of when the booth/room is 'full' of smoke, and when all the smoke has gone. The method is fairly crude but it is good enough to give users the information they need to work safely. Using a high-powered torch to help estimate clearance can increase the measured time by about half a minute. If the booth fans take an appreciable time to run up to normal speed, you may need to make some allowance for clearance time during normal booth working.

Note 3: Respiratory protection may be needed - The smoke has low toxicity but if you have a pre-existing lung condition and/or do tests regularly (e.g. every day) and/or experience discomfort using smoke wear appropriate RPE. A well-fitting respirator with a combination A/P3 filter will be adequate.

Reference

HSL report Appendix 2. This report also reviews a selection of "fog machines". Get "fog machine" by searching on the Internet.

Also see SIM 03/2006/04. HSE is working with the spray booth suppliers to agree guidance on use and maintenance of booths including a standard procedure for clearance time measurement.

Appendix 3 - Motor Vehicle Repair Bodyshop, Substances and Health, Action Plan

YOUR NAME:	Minimise the risk of people getting asthma and skin disease <ul style="list-style-type: none"> ▪ Read the guidance and note what you think your business needs to do. ▪ Set yourself targets for change including who is going to do what by when. ▪ Make sure that your control measures actually work by minimising exposure to isocyanate and that they are being followed. ▪ Check that people have the knowledge and facilities to look after their skin ▪ Use this Plan to help with your risk assessment and to regularly review your control measures – send a copy to HSE by the agreed date.....
YOUR COMPANY:	
YOUR JOB:	
DATE: / /2006	

Topic	Things to cover...	Answer / thoughts...	What we need to do...	By when?
Paint	Do you have data sheets for your paints? Are they up to date? (Get them free from your supplier) Which ones contain isocyanate? (Note: Data sheets/suppliers will tell you)	Yes / No		
Danger	Does everyone know what harm 2-pack paints can cause? (Note: If not tell them and explain what early signs and symptoms might occur)			
Ventilation	Do you have a dedicated ventilated room or booth for spraying? Describe briefly (e.g. type of booth or spray room, where are the air inlets and outlets etc)	Yes / No		
	What, tests are done on the booth/room and how often? (e.g. smoke tests, air flow measurements) (To check for negative pressure and clearance time use a "smoke or fog machine" available via suppliers on the Internet)			
	Do you consider the ventilation controls to be adequate for your type of work? Why? (Note: List improvements needed if there are problems)	Yes / No		

Topic	Things to cover...	Answer / thoughts...	What we need to do...	By when?
Ventilation	Is the extracted air filtered? If yes, describe. How often are the filters changed?	Yes / No		
	How high is the exhaust outlet point? Describe it (e.g. above roof, straight out at fan height) (Note: All booths should have filtered inlet and extracted air. For “spray rooms”, if extracted air is currently not filtered it should be and it should be discharged above roof height)	Yes / No		
	What is the clearance time of your booth or spray room? (Use a smoke generator to find out, indicate the time clearly on the booth/room and tell people who need to know)			
Respiratory protection and other Personal Protective Equipment	What type of respiratory protection do you wear for spraying? (e.g. air fed visor / half mask or a device with a filter?). (Note: If you are not using an air fed breathing apparatus, stop spraying until you have got one)			
	Where do you store respiratory protection? (Note: It ought to be in a box, bag, or other suitable clean container)			
	Is the air-supply airflow rate to your RPE right? (Check it/pressure and compare with equipment manual or ask supplier)	Yes /No		
	Are air quality checks carried out on the compressed air? How often and who by? (Measure the volume-flow at the same time as the air quality and check against standards. See equipment manual or ask supplier)	Yes /No		
	Is your air-fed breathing apparatus fitted with a low flow alarm or flow indicator? (You need some way of checking that the airflow is adequate)	Yes / No		

Topic	Things to cover...	Answer / thoughts...	What we need to do...	By when?
	Where is your compressor supply air inlet? (It must take in air from a clean, unpolluted area).			
	Where, in the booth, is the airline plug-in point for your air-fed breathing apparatus? (Note: You must be able to take off the breathing apparatus just before leaving. For spray rooms, put the plug-in point outside the entrance door so that you can enter and leave with your breathing apparatus on)			
	What other Personal Protective Equipment is worn? (e.g. hooded disposable coverall; gloves, safety glasses, safety shoes)			
Information, Instruction and Training	What information is available to sprayers and other bodyshop personnel about isocyanates?			
	What training have the sprayers and others who use the booth/room had? (Do people know the clearance time for the booth or spray room? Do they know when it is safe to remove their breathing apparatus? Do they know how to safely leave a booth or spray room? Do they know the other potential exposure source— poorly controlled gun cleaning?)			
Isocyanate Exposure Measurement	Do you monitor people's exposure to isocyanates to check the control measures are working? (Note: If not, you should measure the exposure of all people, potentially exposed to isocyanate, by biological monitoring. Consider doing this at least once a year to check that the controls are adequate)			

Topic	Things to cover...	Answer / thoughts...	Answer / thoughts...	What we need to do...	By when?
Health Surveillance	Is Occupational Health Surveillance carried out at your company? If so, what is done and who is covered. (Note: Begin health surveillance immediately for the paint sprayers and any others who might breathe in isocyanate. Don't forget to do simple skin surveillance and appoint a "responsible person" too.)	Yes / No			
Looking after your skin	Do you have a skin care programme, washing & skin care facilities and the right gloves? (If not, develop and run a programme. People need to know what products harm their skin; which gloves to use (nitrile or 'low protein powder-free' latex), how to put them on and take them off, which skin care/conditioning products to use, when and how often).	Yes / No			

Appendix 4 – Paint Spraying of Large Vehicles

Introduction

HSE is extending its initiative on Motor Vehicle Repair (MVR) (SIC 50) to include, among other things, workplaces that spray larger vehicles. These are companies in SIC codes 34 (and some in SIC 50) that manufacture road vehicles such as lorries, coaches and semi trailers. Effectively, this is anything larger than a car. This is because there are as many cases of occupational asthma among paint sprayers in these industrial categories as there are in the motor vehicle repair category. We are calling this category vehicle paint spraying or VPS.

Most of the deficiencies in control in the spraying of large vehicles are similar to those encountered in the spraying of cars. However, there are some important differences which are covered in this note.

The main difference between a large vehicle spraying facility and a car spraying facility is one of size. The vehicles are larger with a greater surface area and the booth can be up to 5 times larger than a car booth (

Figure 1). This leads to 2 differences. The first is the greater amount of paint being sprayed and a longer time spent spraying any one job. The second is that small smoke machines will not fill a large booth.

Finding dutyholders - Information sources

Each region in HSE will be provided with a spreadsheet listing the companies in the region that may undertake this type of work (and also other sprayers of isocyanate). Hopefully there will be more places than you can visit this year but the list can be used in your long term planning of inspections. The list is derived from a commercial database of companies that manufacture/repair large vehicles and a list of companies that are registered to dispose of large volumes of paint waste. The database of companies that dispose of waste was current to the end of 2006 and is available on request. FOD offices and staff are free to supplement this list using local knowledge and expertise as they see fit.

If you find companies that manufacture but do not paint vehicles you should find out who the painting is subcontracted to and consider visiting them.

Messages from MVR

Most of the messages used in MVR concerning exposure to isocyanate based paints are applicable to larger vehicles and other items. This appendix builds on the main pack and associated documents.

SIM 03/2006/12 Motor vehicle repair: Spraying isocyanate-containing paints developing issues consequences of the 'paints' directive - Isocyanate paints are not being banned

SIM 03/2007/06 Motor vehicle repair: Spraying isocyanate-containing paints

In brief the main points to address with dutyholders in the MVR project were:

- Knowledge of health effects of isocyanates (asthma)
- Knowledge that an invisible aerosol is produced during spraying and this stays in the air.
- Knowledge that visors should be worn when spraying.
- Knowledge that lifting the visor before the booth has cleared will expose the sprayer to isocyanate aerosol.
- Knowledge that entering the booth during the clearance time will expose the sprayer to isocyanate aerosol.
- Having a 14 monthly examination and test of spray booth.
- Knowing the clearance time of the spray booth.
- Having a filter change programme for booth.

- If an overpressure alarm or shutdown switch is fitted, it needs to be tested as part of the 14 monthly thorough examination and test
- Having air fed breathing apparatus for the sprayer.
- Having a 3 monthly check on the suitability of the air supply to the breathing apparatus.
- Having a P3 standard respirator for dusty jobs such as rubbing down and flattening.
- Having built in extraction on powered rubbing down machines.
- Having a filter change regime for the P3 standard respirator.
- Maintaining all Respiratory Protective Apparatus.
- Storing all Respiratory Protective Apparatus in a suitable place.
- Having a face fit for applicable Respiratory Protective Apparatus.
- Having occupational health surveillance.
- Having extraction on the gun cleaning machine.
- Having good general ventilation in paint mixing and storage areas.
- Knowledge of dermatitis risks from paint and filler.
- Having, and using, gloves when using paint and filler.
- Having hand washing facilities.

Large vehicles (VPS) - specific issues

Clearance times

Small party-type smoke machines will not fill a large commercial paint booth. Such booths can be five times larger than a car booth. An example of a booth for semi-trailers is shown in Figure 1. However, a commercial smoke machine will adequately fill such a booth. An example of such a machine is the Colt 4 smoke generators used in the MVR campaign. Therefore, the smoke test of booth integrity and the clearance test are best carried out by the competent person who carries out the 14 monthly thorough examination and test of the paint booth. If inspectors carry out smoke tests they should take into account in their risk assessment that it is possible to become disorientated in a smoke filled booth. Therefore, the booth space should be filled with smoke from a position near a door and against a wall.

Because of the volume large vehicles occupy in a booth, they can significantly alter the flow patterns. This can lead to both shorter and longer clearance times depending on the booth ventilation design. We recommend that the clearance time is tested with and without a vehicle in the booth and the longer time used as the 'official' clearance time.

Spraying large areas

Spraying larger vehicle leads to longer spraying times. As such there is more dermal deposition of paint overspray. It is important that the sprayer wears overalls, gloves and an air fed visor. The amount of overspray can lead to paint spatter obscuring the visor of air fed breathing apparatus. To counter this it is good practice to attach several visor protectors to the front of the visor using adhesive tape (Figure 2). These protectors are flimsy transparent plastic sheets that fit over the visor. The protectors are removed as visibility becomes obscured. In this manner the paint finish can be checked without the operator lifting the visor. The protectors are readily available from suppliers of visors.

Spray booths with pits - risks

Booths can be either down draft or cross draft in construction. Essentially the booths can be larger versions of car spraying booths. Some of the booths have spray pits in the floor of the booth to facilitate spraying the underside of vehicles. Figures 3 and 4 show diagrams of the air inlet and extraction architecture that may be encountered. Vehicle pits, especially when a vehicle is in the booth, can constitute a dead space where isocyanate aerosol can linger after the main booth has cleared. In addition there is the possibility that solvent vapour could accumulate in the pit to form flammable concentrations. Figure 5 shows a vehicle spraying booth with a spray pit in the floor. Figure 6 shows the results of a smoke test where the smoke is cleared more slowly from the pit than the rest of the booth. However, some booths may be constructed to minimise the accumulation of spray mist in the pit.

There are different configurations for booths and pits that should be considered separately.

1. Cross draft booths: This is where air enters the booth from the top of one wall and is extracted at the bottom of the opposite wall. If a pit is orientated in the direction of the airflow the pit should clear at the same time as the rest of the booth. Figure 7 shows a diagram of such a booth. Figure 8 shows how the smoke marker is cleared from a crossflow booth with a pit orientated in line with the airflow.
2. Ventilated pits: When the booths have some type of extraction in the pit this will clear the aerosol from the pit but should be checked with a smoke test. Figures 9, 10 and 11 show the most common architectures of such pits. The pit can be extracted through the side of the pit or the floor of the pit. This extracts paint mist from the pit. Alternatively air can be introduced into the pit. The airflow carries the paint mist into the main body of the booth where it becomes entrained in the air that is extracted. Figure 12 shows a photograph of smoke being removed by extraction in the pit faster than it can be generated by the operator. Figure 13 shows a booth with floor and booth extraction.
3. Non ventilated pits: If the booth has downdraft ventilation of some type then air movement in the pit may be limited. This can be checked with smoke. In the case of poor clearance from the pit it may be necessary to recommend a retrofit of some type of extraction. In the case of downflow booths with floor extraction this should be relatively easy because the floor extraction for the downflow booth can be accessed through the side of the working pit. This should be carried out by a competent person and a commissioning report provided.

An alternative is the fitting of air movers in the pit. Air movers use compressed air to introduce air into the pit in order to mix and purge the air. This should be carried out by a competent person and the effect of the retrofit on airflows in the booth and the pressure of compressed air to the breathing apparatus should be taken into account.

Another alternative is the use of a Pit Jack to raise vehicles to head height in order to access the underside for spraying.

Pits should be covered when not in use to prevent injury by falls into the pit. Be warned that pit covers can make pits difficult to identify as the cover and the floor of the pit can be difficult to distinguish.

Isocyanate Topic Pack – work at height

What is work at height?

The Work at Height Regulations 2005 (WAHR) define work at height as work in any place, including a place at or below ground level, (including access and egress from such a place of work) where, if measures required by the Regulations were not taken, a person could fall a distance liable to cause personal injury.

What are the problems?

The upper part and roofs of vehicle have to be accessed to perform spraying operations. These pose a risk of a fall from height of the sprayer. A fall from height is the most common cause of fatal injury in the workplace. There were 43 deaths and 3351 major injures in 2005/06.

Things to look for

1. Planning – Regulation 4 requires all work at height to be properly planned and appropriately supervised.
2. Competence – Everyone who is involved in work at height, including those involved in planning the work and assessing the risks must be competent or, if being trained, be supervised by a competent person. (Regulation 5)
3. Risk Assessment – Regulation 6 requires that the employer take account of the risk assessment produced as per regulation 3 of the Management Regulations.

4. The Hierarchy – A simple hierarchy is also set out in Regulation 6

- How can work at height be **avoided** (a vehicle lift system is a good example of how this can be achieved.)
- Where you must work at height what can be put in place that would **prevent a person falling** (see figs. 15 , 16 & 17).
- If you cannot put measures in place that will prevent a fall occurring, think about what you can do to **reduce the distance and consequences of a fall** should one occur. (Mats or air bags are examples of this type of equipment.)
- If the risk of a fall remains think about **other measures** that will stop a person being injured (extra training or competence may be required)

Figure 14 shows a vehicle lift which can lower vehicles in booths to allow access to the upper part and roof of the vehicle.

Figure 15 shows a platform built into the side of the booth that allows the operator to access easily the sides of the vehicle. In this case the platform has attachment points for the airlines supplying the breathing apparatus and spray gun.

Figures 16 and 17 show platforms that can be used to access the sides of vehicles.

5. Ladders – should only be used for low risk, short duration work, or where site conditions (that cannot be changed) mean that a ladder must be used. See Schedule 6 for more information.

6. Inspection – Any access equipment exposed to conditions causing deterioration must be inspected at suitable intervals and following circumstances where the condition of the equipment could be jeopardised.

7. Access and Egress – Employers must take account of any risks associated with gaining access to or egress from work at height equipment.

Some common hazards

1. Open edges (including working from the roof of vehicles) – Work should not be conducted near open edges where a person could fall a distance liable to cause personal injury.

2. Fragile Surfaces – The top of a vehicle is often fragile. If work is to take place from the top of a vehicle evidence that the risks of falling through a fragile surface have been assessed and the results acted upon, should be available.

3. Over-reaching – An operative should be able to complete the task without having to over-reach from the access equipment in use. Over-reaching can result in a fall from the equipment or collapse of the equipment.

4. Moving aircraft steps with operatives on them – access equipment should not be moved with operatives on board unless the equipment is designed for this purpose. Aircraft steps and scaffold towers are generally not designed to be moved while occupied.

5. Using substandard equipment – damaged or substandard equipment should not be used. Look for damage to the feet or wheels, bent or broken supports, missing or loose rivets, bent, broken or contaminated steps or treads, damaged guardrails or toe boards. See Falls from Height Topic Inspection Pack, Section 7 for details of appropriate action.

Enforcement guidance

The enforcement guidance in section 6.0 of the topic pack should be applied. Additional guidance in particular circumstances follows:

Spray pits

The benchmark for ventilating a pit should be proof that a pit clears at the same time or quicker than the clearance time for the rest of the booth.

The control measure problem in this case is that there is a reservoir of isocyanate mist which can be inhaled if an operator enters the pit.

The risk gap is *moderate* and indicative action is a *letter/improvement notice*.

Evidence that consideration of visor obscuration by paint can occur.

This fits in with the management standards in section 6.1 'control measures enforcement guidance' of the pack and the guidance there should be followed.

Falls from height

For employees working on unsecured ladders, or near unfenced holes or edges, where a person could fall a distance liable to cause personal injury, a Prohibition Notice should be considered - stopping work until ladders are secured or edge protection is provided. The relevant legal requirements are HSWA Section 2(1), Work at Height Regulations 2005, Regulation 6(3).

The benchmark for EMM purposes is NIL when adequate edge protection is provided, and serious personal injury/remote for work on secured ladders.

Lack of planning, prior risk assessment, and training and supervision are common factors in investigated accidents and failure to address these areas would be suitable for consideration of an Improvement Notice. Annex 1 shows a model letter that could accompany an Improvement Notice.

Further information and contacts

The HSE contact for cross sector falls from height issues is the Setrvices, Transportation and Safety Unit, Manchester, VPN 516 8200. Sector specific falls from height queries should be addressed to the relevant sector. LA inspectors should address any queries via their ELO.

Free information sheets and leaflets quoted throughout the pack are available from the HSE Website – Falls from Height - Inspector briefing

HSE websites:

Motor vehicle repair

Asthma website

Working at height

Figure 1. A booth for a semi trailer



Figure 2. Several visor protectors attached to a visor using adhesive tape



Figure 3. A diagram of a generic commercial type downdraft booth with a working pit and floor extraction. Arrows indicate air direction

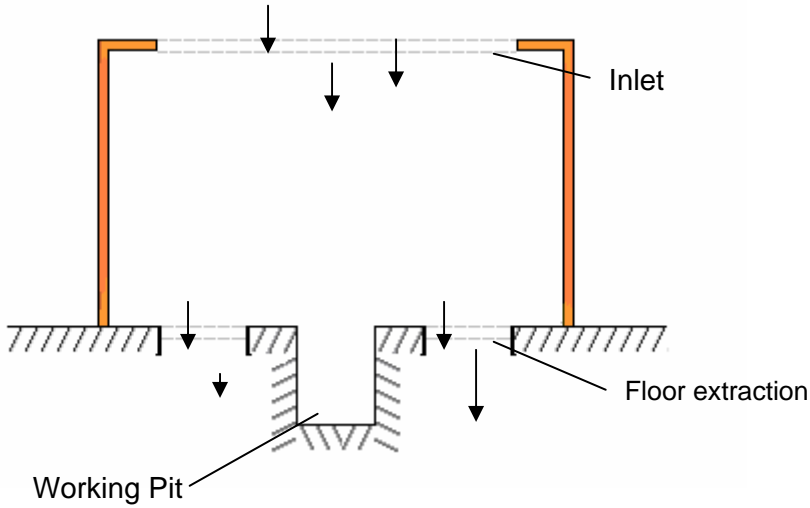


Figure 4. A diagram of a generic commercial type downdraft booth with a working pit and side extraction. Arrows indicate air direction

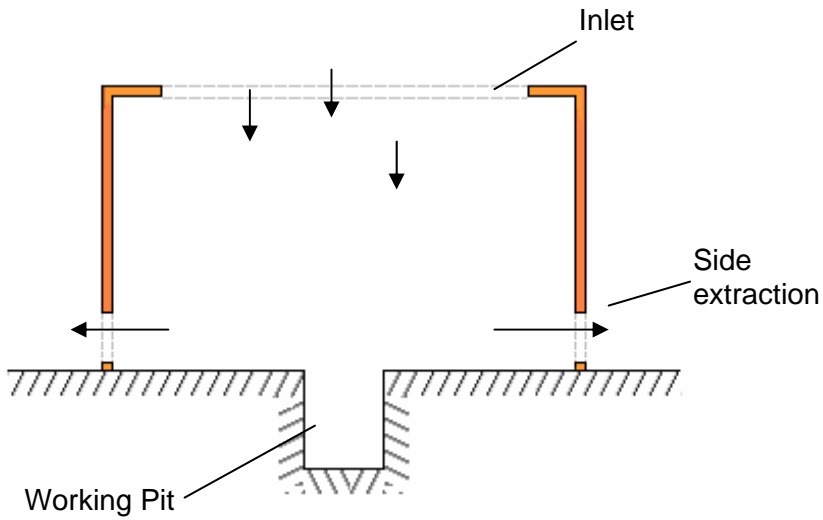


Figure 5. Photograph of a booth featuring double doors, personal operator door, open working pit, air inlet filters, floor air extraction filters and grille, strippable wall cover and fillet light panels. Normally the pit should be covered when not in use.



Figure 6. Photograph taken during a smoke test. The smoke clears much slower from an unventilated working pit compared to the rest of the booth



Figure 7. Longitudinal cross sectional diagram view of cross-draft booth with working pit. Air enters the booth through filters in the ceiling at one end of the booth (left of diagram) and is extracted through a grating and filter in the floor at the other end (right of the diagram). Arrows indicate general air direction

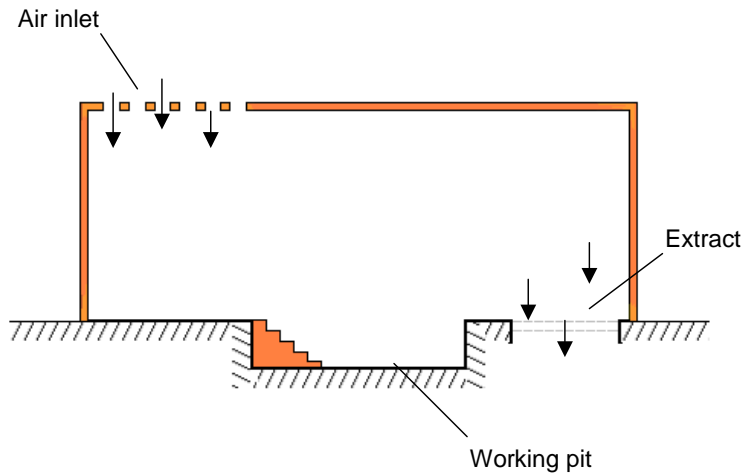


Figure 8. Air movement test using smoke in the working pit of a booth.



Figure 9. Depiction of the downdraft booth with floor extraction and extraction in the side of the pit. Arrows indicate the air movement direction.

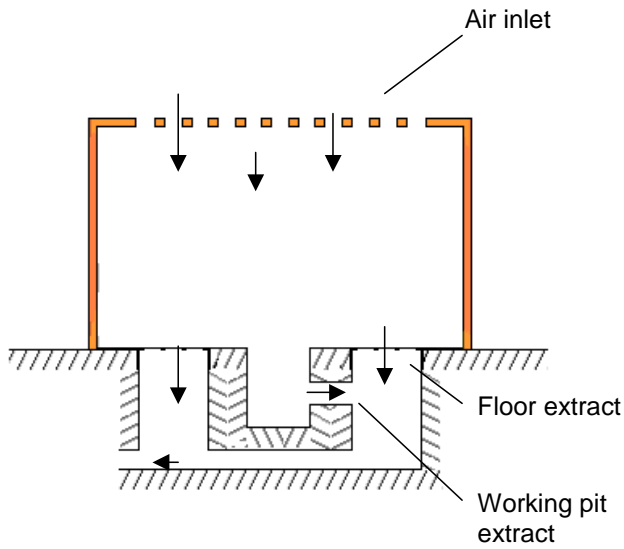


Figure 10. A diagram of a commercial type downdraft booth with extraction in the floor of the pit. Arrows indicate mean air direction.

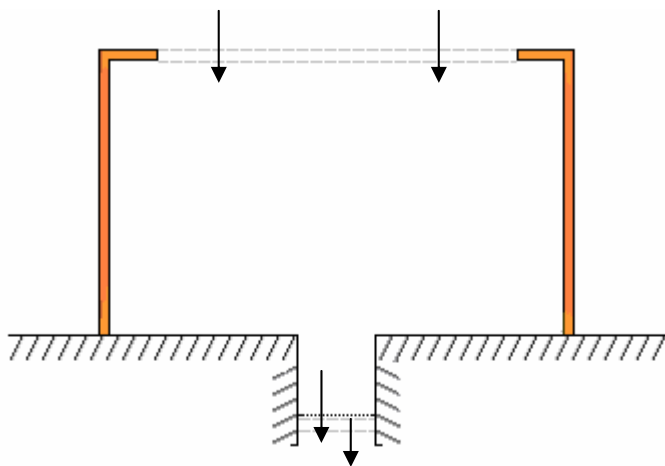


Figure 11 Cross sectional diagram of a booth with a ventilated pit. The direction of air movement is indicated with black arrows and shows the ventilation pathways.

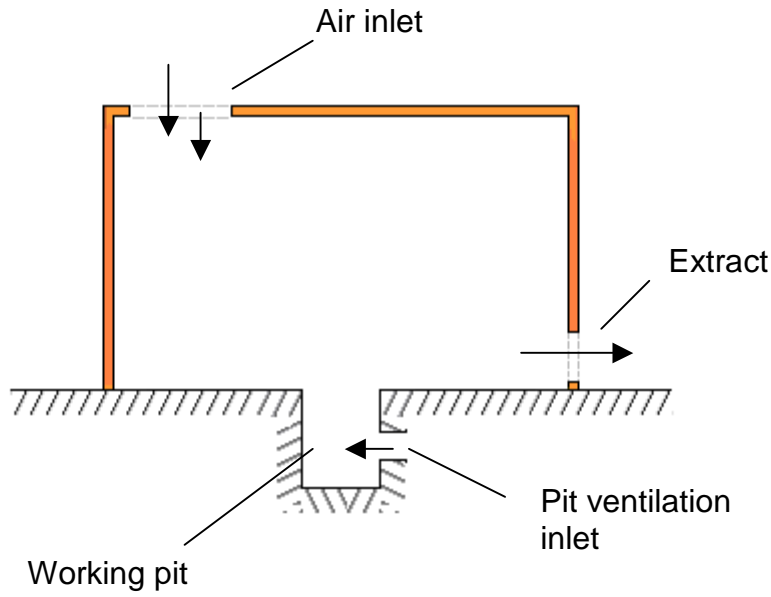


Figure 12. Photograph of the pit being filled by a smoke machine operator while extraction is turned on: as the operator traverses the pit the smoke behind him is rapidly removed from the pit



Figure 13. Photo of a working pit extraction vent and the booth floor ventilation

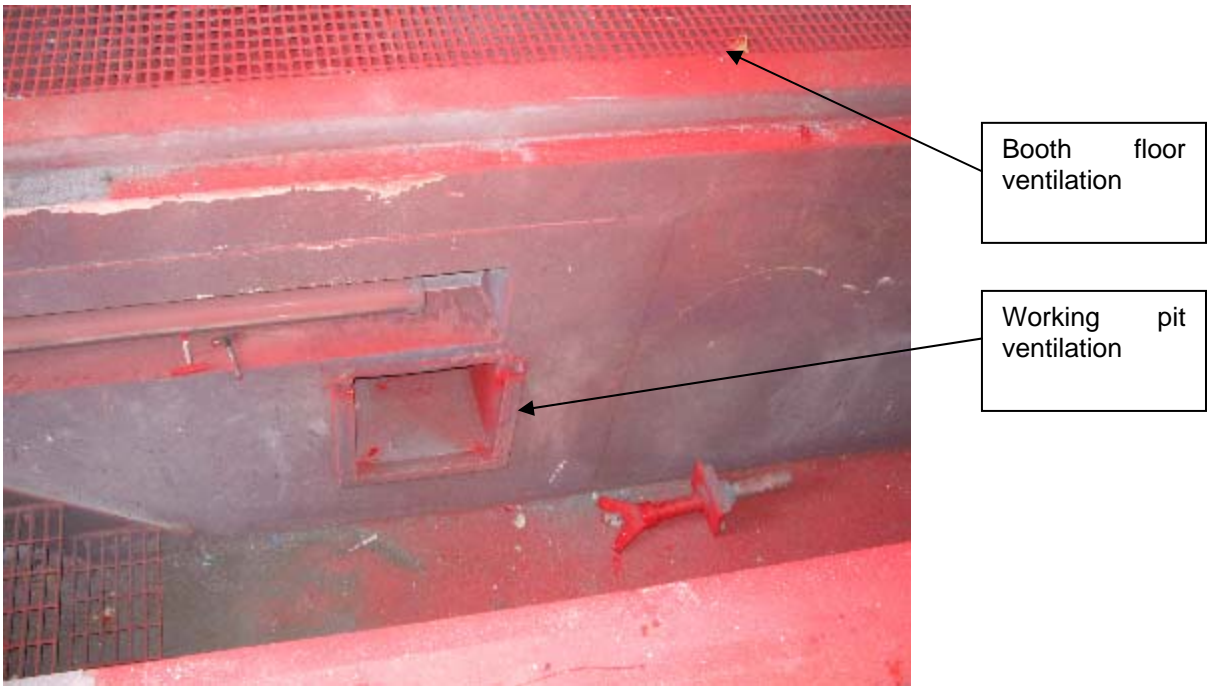


Figure 14. A vehicle lift system in a booth. The vehicle in question is a coach that has been lowered into the floor. The object in the centre of the booth is the coach roof.



Figure 15. Moving platform built into the side of a spray booth



Figure 16. A mobile platform used to access the sides of double decker buses. The platform allows the operator to move easily along the length of the vehicle.



Figure 17. A view of a similar platform to that in Figure 16 in a lower configuration.



Annex 1. Draft letter for to accompany improvement notice for work at height.

Field Operations Directorate

Tel:
Fax:

e-mail:
website:

HM Principal Inspector of Health and
Safety:

Date

Reference

Dear

HEALTH AND SAFETY AT WORK ETC ACT 1974

IMPROVEMENT NOTICE -----

I was concerned to find that the methods and equipment used by staff at ----- for working at height exposed them to serious risk of fatal or major injuries from a fall.

This letter refers to the enclosed Improvement Notice in relation to work at height at -----.

Improvement Notice requires -----, by -----, to take suitable and effective measures to prevent anyone being injured from a fall whilst working on or around buses and coaches. You should be aware that the Improvement Notice is a legal document and the notes on the reverse should be read carefully. You have the right to appeal against the Notice and an appeal form (*ETS19*) is enclosed, together with a booklet (*URN 05/998*) explaining how an appeal can be made.

It is essential that you contact me:

- if an appeal is being considered.
- if you experience any difficulty in complying with the Notice by the due date as it may, in certain circumstances, be possible for an extension to be granted.

In complying with the Notice, consideration should be given to *avoiding*, if at all possible, the need for work at height. However, where this is not possible, then you need to ensure:

- (1) that work at height is assessed for risks, properly planned, appropriately supervised and carried out safely;
- (2) that you provide work equipment or other measures to preventing a fall occurring; and
- (3) where these measures do not eliminate the risk of someone falling, that additional measures are taken to minimise the distance and consequences of a fall.

You also need to ensure that everyone involved in the work is competent and that you have planned for emergencies and rescue.

Information and guidance on complying with the Improvement Notice, together with examples of methods and equipment for work at height, can be found:

- in the *Height Aware* campaign pack, which was sent to you;
- on the HSE website, www.hse.gov.uk - in particular the information under *Falls from height* and *Work at Height Solutions*; copies from two of the HSE Web Community pages are enclosed:
 - *Repair to semi-trailer roofs* and
 - *Spray Painting Commercial Vehicles*,
- which you may find useful;
- on other websites via a search on the internet, for example those for the Access Industry Forum, which is the umbrella body for the UK Work at Height Industry (www.accessindustryforum.org.uk); the Work at Height Safety Association (www.wahsa.org.uk); the International Powered Access Federation (www.ipaf.org); the Prefabricated Access Suppliers' and Manufacturers' Association (www.pasma.co.uk); Fall Arrest Safety Equipment Training (www.faset.org.uk); the National Access & Scaffolding Confederation (www.nasc.org.uk); Specialist Access Engineering Maintenance Association (www.saema.org), etc;
- in the enclosed *Schedules* from the *Work at Height Regulations 2005*;
- in the enclosed extract (pages 14-33, paragraphs 116-240) of the HSE publication *Health and Safety in Construction (HSG 150)*; and
- in the enclosed copies of the ECA/SELECT leaflets:
 - *Practical alternatives to using stepladders – Part 1, Working at Height*
 - *Practical alternatives to using stepladders – Part 2, Practical alternatives to steps*

Although these leaflets are aimed at electricians and engineers, the information contained in them is general.

Pictures showing some examples of equipment that can be used for work at height are also enclosed.

In addition, you may find it useful to view the website www.suspensiontrauma.info, which gives some information about suspension trauma. This is an issue to be considered if you plan to use harnesses for work at height.

HEIGHT OF GUARD RAILS

Regarding your query about heights of guard rails, the *Schedules* and extract from *HSG 150* enclosed give detailed information but, in brief:

- For construction work, the Work at Height Regulations specify a top guardrail height of 950 mm, with an intermediate guardrail positioned so that any gap in means of protection does not exceed 470 mm.
- For non-construction work, there are no prescriptive dimensions for guardrail or toe board heights under the Work at Height Regulations. However, rails and toe boards should be of sufficient height for the purposes for which they are being used - this can be achieved by complying with current Building Regulations requirements, which are 1100 mm. For any guardrail heights below 950 mm, the chosen height must be justified on the basis of risk assessment.
- Toe board heights for both construction and non-construction should be suitable and sufficient, ie there is no prescriptive height, although 100 mm is considered an acceptable height.
- Edge protection should be rigid enough to prevent a person or load from falling.