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**An Observational Study of  
Motor Vehicle Repair Paint Sprayers**

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# EXECUTIVE SUMMARY

## OBJECTIVES

Isocyanate exposure is the biggest single known cause of occupational asthma in the UK and vehicle paint sprayers are the work group at particular risk. Specialist Occupational Hygiene inspectors in the Health and Safety Executive (HSE) Field Operations Directorate (FOD) have set up a three year national intervention plan aimed at improving the control of isocyanate exposure in Motor Vehicle Repair (MVR) by 2008, with a view to reducing the incidence of occupational asthma in this sector.

The aim of this project was to conduct an observational study of the daily practices of motor vehicle paint sprayers, in order to assist HSE in developing interventions to communicate its key messages on working with isocyanate paint.

The project objectives were:

1. To involve 6 MVR premises participating in a daylong observational study.
2. To conduct joint visits by HSL's human factors and occupational hygiene staff to the 6 MVR premises in order to observe and explore work practices.

## METHOD

Six MVR body shops were recruited; four were located in the East Midlands and two in the South West of England. Three of the participants were recruited through cold calling MVR body shops listed in [www.yell.co.uk](http://www.yell.co.uk). In total 100 businesses were called and 3 volunteered. Of the other three, two were recruited at a Safety Health Awareness Day (SHAD) and one was participating in another study being conducted by one of the researchers.

Of the six, four had attended an HSE SHAD event focussed on MVR paint spraying and the risks associated with isocyanate exposure. Two of the MVR body shops were small independent businesses managed by the owners. Two of the organisations would be classed as small businesses; two as medium sized enterprises and two of the companies were large. The number of sprayers in each company ranged from 2 to 9. The number of spray booths in each company ranged from 1 to 4.

15 sprayers were interviewed on an ad-hoc basis throughout the visits. Unstructured interviewing was utilised to support the visual observations and to gain more information about work practices and work related health issues, specifically the risk of isocyanate exposure.

## MAIN FINDINGS

1. Sprayers believed that health and safety was highly considered by management. All stated that they believed the facilities at work were good and they did not feel at risk from their work.
2. Awareness of health risks associated with isocyanate exposure was low, just over half of the sprayers were unaware of the actual health risks associated with isocyanates. 7 of the 15 sprayers were aware that isocyanate can cause occupational asthma.

3. Communication was perceived as good between management and employees, however there was a deficiency in the dissemination of information from the SHADs. Although most of the organisations had acted upon the information or had informed their employees of the main lessons from the SHAD, they had not communicated the reasons for changes or the importance of control measures, or the health risks associated with spraying paint containing isocyanate. (Note: More recent SHADs have been modified to take account of the need for attendees to cascade the information and messages to their colleagues, and the Action Plan is now used more actively throughout the events to encourage clear thinking and commitment to practical action on return to work).
4. Awareness of health risks appeared to be dependent to some extent on the original training of the sprayer. The more recently trained sprayers were better informed of the health risks of isocyanates than those less recently trained. The quality of the trainer knowledge is important, to ensure that trainees will receive the correct messages about the risks posed by isocyanates and the appropriate control measures.
5. The majority of sprayers expressed a high level of confidence in their organisations safety control measures, such as: work practices, RPE and RPE maintenance procedures. Although this appears to contradict the finding that awareness of isocyanate health risks was low this limited knowledge concerning health effects may influence the perception of the control measures such that sprayers have no reference point from which to judge the relative quality of the control measures, and so they may posit greater confidence in the organisation and control measures than is merited.
6. Lifting visors after spraying to inspect work was a widely accepted practice by sprayers and observed during visits. Two sprayers were observed lifting their visors immediately after spraying lacquer. The majority of sprayers admitted to doing so regularly in order to view their work clearly, although all of the sprayers that admitted this knew there were implications for their health.
7. Clearance times in all of the organisations were observed to be under 2 minutes. However there was a lack of knowledge as to what this meant and why it would affect the sprayers. The smoke tests conducted during the observational visit were the first for each company; so a lack of awareness was not unexpected. The awareness of the associated health risks of isocyanate exposure increased for the sprayers who observed the smoke tests.
8. Although the main risk messages had been conveyed to the organisations through attendance at the SHAD, none of the companies visited had conducted a smoke test and therefore were unaware of the appropriate clearance times for their booths.

## Conclusions

The following conclusions are based on the findings from the six MVR body shops observed. This is a very limited sample of the total MVR body shop population, and so the extent that these findings and their conclusions represent the wider population should be regarded tentatively.

1. Reinforcement is needed on the importance of cascading information to workers by management or representatives attending SHAD's. This communication needs to include the salience of risk and why various behaviours are necessary to control risks, as well as what sprayers should do to comply with health and safety procedures.

2. Further encouragement is needed for organisations to conduct smoke tests for clearance times. Of the four organisations that had attended the SHAD none had actually conducted a smoke test.
3. The HSE posters were well received by sprayers, although there was insufficient evidence to indicate that they had impact on behaviour. Further evaluation and feedback to explore their effectiveness in communicating key messages is needed.
4. Sprayers expressed a desire for more information about health risks. The sprayers stated that due to their experienced status, when starting work at a new organisation, it was assumed they were competent and were aware of health risks and control measures. Providing information on health risks and control measures that MVR body shops could use as the basis for an induction programme could address the problems associated with assumed competence, and could be one method of communicating messages directly to the sprayers. Such information could also be used to refresh existing sprayer's knowledge.
5. The sprayers proposed the use of a short DVD as a method of communicating health risk information from the HSE. There was a disagreement between management/employee opinion as to how this would be used. The potential exists to explore the usefulness of such an approach to risk communication within this sector.

# 1 INTRODUCTION

## 1.1 BACKGROUND

Over a thousand people contract occupational asthma each year in the UK. Amongst the agents responsible, isocyanate exposure continues to be the most frequently reported cause accounting for about 20% of the total (Piney, 2004). Two-pack paints containing isocyanates are used extensively in motor vehicle repair (MVR) for repainting/refinishing vehicles, mainly in primers and lacquers. Sprayed application produces the highest exposures and is one of the main causes of occupational asthma. MVR paint sprayers have an 80 times higher risk of getting asthma compared with the broader UK working population (HSE, 2005).

Specialist Occupational Hygiene inspectors in Health and Safety Executive's (HSE's) Field Operations Directorate (FOD) set up a three year intervention project across Great Britain, aimed at:

- Improving standards of control of isocyanate exposure in MVR by 2008, with a view to reducing the incidence of occupational asthma in this sector.
- Improving the design of equipment, instruction, training, maintenance and advice to the MVR sector on risk control.

The HSE MVR project seeks to reduce the number of people contracting occupational asthma in bodyshops by (at least) 20% by 2008 and consists of a series of safety and health awareness events (SHADs)

- Follow-up inspection visits
- A programme of prioritised third-party influencing
- Other methods of increasing awareness

## 1.2 AIMS AND OBJECTIVES

The aim of this project was to conduct an observational study of the daily practices of motor vehicle paint sprayers, to assist HSE in developing interventions to communicate its key messages on working with isocyanate paint.

The project objectives were:

1. To involve 6 MVR premises with participating in a daylong observational study.
2. To conduct joint visits by HSL's human factors and occupational hygiene staff to the 6 MVR premises in order to observe and explore work practices.

Section 2 of this report details the methodology employed in carrying out the work. Section 3 presents the findings from the observational visits. The findings are discussed in section 4. Conclusions are provided in section 5.

## 2 METHOD

### 2.1 RECRUITMENT OF PARTICIPANTS

Six MVR body shops were recruited; four were in the East Midlands and two in the South West. Of the six, four had attended an HSE Safety and Health Awareness Day (SHAD) focussed on MVR paint spraying and the risks associated with isocyanate exposure. Three of the participants were recruited through cold calling MVR body shops listed in [www.yell.co.uk](http://www.yell.co.uk). In total 100 businesses were called and 3 volunteered. Of the other three, two were recruited at a SHAD. One was participating in another study being conducted by one of the researchers (Davies, 2006). Potential differences between recruits that had previously attended a SHAD and those that had not were noted by researchers prior to observations and within the limited scale of this study were not considered of consequence. It should be noted that an element of self-selection exists in the sample, as any volunteer participants are likely to belong to responsible companies, with reasonably high standards of health and safety.

Two of the MVR body shops were small independent businesses run by the owners. Two of the organisations would be classed as small; two as medium enterprises; and two of the companies were large<sup>1</sup>. The number of sprayers in each company ranged from 2 to 9. The number of spray booths in each company ranged from 1 to 4.

Company	Size	Spray Facilities	Number of Sprayers	Attended SHAD
1	Large	4 Booths Separate mixing room Separate gun cleaning room	4	Yes
2	Small	1 Booths Separate mixing room Separate gun cleaning area	2	Yes
3	Medium	2 Booths Separate mixing room Separate gun cleaning room	8	Yes
4	Small	2 Booths 1 spray room with axial fan in wall Separate mixing room Separate gun cleaning room	3	No
5	Medium	3 Booths Separate mixing room Separate gun cleaning area	9	No
6	Large	2 Booths Separate mixing room Separate gun cleaning room	3	Yes

Table 1: Organisational information

<sup>1</sup> Small under 50 employees, medium between 50 and 200 employees, large over 200 employees (DTI 2006)

## **2.2 OBSERVATIONS**

To counter individual observational bias two researchers from different disciplines conducted the observations simultaneously. One was an Occupational Hygienist the other an Occupational Psychologist. Observations were noted individually and then triangulated afterwards. There was little inconsistency between the two sets of recorded observations. This project utilised a systematic observation method as a particular behaviour (MVR paint spraying) was examined within a specific situation (at work). This method is considered strong in validity because the researcher is able to collect a depth of information about a particular behaviour (Coolican, 1999). It was deemed an effective method of gaining insight into salient health and safety issues within an MVR paint sprayers job role as it involves observing behaviour as it happens rather than relying on ad-hoc recall of individuals.

As this project was a cross sectional observational study causal associations between behaviours cannot be made. It is a concern with observations that participants will change behaviour in the presence of an observer. Due to this it was decided that unstructured interviewing should be used also to support visual observations and to gain more information about work practices and work related health issues, specifically the risk of isocyanate exposure. 15 sprayers were interviewed on an ad-hoc basis throughout the visits. These interviews were informal discussions based on a prepared question list (See Appendix). In order to discover if behaviour observed was typical, informal conversations were used to elicit information without being overly intrusive into the sprayers normal daily routine. This allowed for relaxed and open communication between the researchers and sprayers. Responses from these discussions were recorded on paper as soon as possible after the discussions. The questions were as open as possible to allow the sprayers the freedom to form their own conclusions and state their opinions with little steer from the researchers.

## **2.3 DATA ANALYSIS**

Data was analysed through a process of thematic deductive and inductive analysis. The activities of those observed were noted throughout the visit and the two observers notes collated afterwards. All comments from interviews were also noted and any apparent themes were extracted. Although the interviews were unstructured and informal, similar questions were asked of all sprayers relating to their knowledge of health risks associated with isocyanates, control measures, sources of information and other influences on their behaviour (for example supervisors or resources). Due to the informal ad hoc interview style the questions could not be identical but were worded so to ask for the same information each time. Data was structured according to the main themes that arose from each observation case study. These themes were background, facilities, routine, tasks, environment, behaviour observed, perceptions of health risks, perceptions of control measures and communication.

## **3 RESULTS**

### **3.1 COMPANY ONE**

#### **3.1.1 Organisational Background**

Company One was one of the leading suppliers of finished vehicle logistics services to the UK automotive industry. It had a fleet of over 500 car transporters and a network of 25 centres nationwide. It was responsible for over 1.2 million vehicle movements each year on behalf of vehicle manufacturers, fleet operators and dealerships. They specialised in the preparation, enhancement and distribution of finished vehicles. They also offered a Pre-Delivery Inspection (PDI) service for manufacturer-specification before the vehicles are delivered to dealerships or end users. They also had a repair and restoration facility that ensures new cars are delivered with no faults. A representative had attended an HSE SHAD.

The facilities available at Company One were:

- 4 paint booths
- Separate paint mixing area
- Separate spray gun cleaning area

There were four dedicated paint sprayers.

#### **3.1.2 Daily Routine**

The sprayers worked from 7am until 4pm, however they can work overtime and many often work from 6am till 6pm. They had a 15 minute tea break at 10.30 am and a half an hour lunch break at 12 pm. Many of the sprayers sit in their cars during this time in order to have a cigarette. Some members of staff used the small canteen although the majority do not.

#### **3.1.3 Tasks**

The paint sprayers' tasks included cleaning the prepared spray area with chemical cleaner; mixing the paint; moving the car into the paint booth; spraying the necessary sections and moving the cars to the adjoining ovens.

The sprayers sprayed a base coat and two colour coats before spraying with the lacquer that contains the isocyanate. The average time spent spraying lacquer was 15 minutes per job. Each sprayer worked an average of 6 jobs a day.

#### **3.1.4 Work Environment**

The work environment was clean and tidy; this is illustrated by figure 1. There was very little dust as every stage of the prepping process was ventilated well. All air fed masks were stored in a clean safe area in the mixing room. Equipment appeared to be in good working order. There was a separate rest room available for all staff to use with a vending machine and kettle. The rest room and office areas were away from the paint spraying area however the prepping area surrounded the booths, which were in the middle of the room, therefore non sprayers could be exposed to isocyanate should the booths be leaking. These were maintained regularly and negative pressure was monitored.

There were HSE posters on the front of each of the spray booths, although there were no noticeable signs indicating the clearance times of the booths. Until the observers conducted smoke tests in the booths this was unknown.



Figure 1: Spray Booth Company One

### 3.1.5 Behaviour Observed

- Each layer was sprayed and then dried by an inbuilt heat system. This was programmed from a panel external to the spray booth. It was observed that one of the paint sprayers removed their air fed mask visors to inspect their work at close proximity, although the majority of the sprayers did not. When questioned as to why sprayers did not remove their masks the reason of isocyanates was quoted. It appeared that supervisors were unaware that sprayers lifting their visors.
- Each time the sprayer exited the spray booth he disconnected from the air supply when he had finished the job. It was noted that this disconnection was not at the exit but wherever the sprayer was in the booth when he had completed the job and walk to the door unconnected to the air source. It did not appear to be consistently at the exit when they disconnected. There was potential that the sprayers could have breathed contaminated air whilst walking to the exit, however one sprayer stated that he held his breath whilst exiting the booth.

### **3.1.6 Perceptions of Health Risks**

- Two sprayers were asked about their knowledge of the health risks associated with MVR paint spraying. Both of them quoted that occupational asthma and skin problems could occur. incorrectly assumed that sprayers could be harmed by isocyanates through the tear ducts and therefore would never uncover his eyes whilst spraying or in the booth.
- The sprayers were asked to describe how they learnt about these health risks. Sprayer 1 had recently trained; he stated that the risks associated with isocyanates were explained in detail in his training at college. He felt his knowledge was greatly enhanced as his trainer had once been employed as a sprayer. Sprayer 2 stated that he had never formally been told about the risks and he had been given the new RPE (air fed masks) with little or no explanation as to why he should now wear it. He knew of the risks of asthma from talking to his colleagues.

### **3.1.7 Sources of Information**

- It was the policy and practice of the management within this company to have a weekly staff meeting, where staff have the opportunity to voice their opinions concerning any matters they feel are pertinent. It was at this time that management convey to staff (including the sprayers) any information they want to disseminate. There are also team leaders who communicate messages to the sprayers.
- Sprayers acknowledged that management communicated some information from the SHAD to them. Posters were put up on the spray booth doors and urine samples collected and sent into HSL for analysis, results were returned directly to the sprayers. The health risks were not clearly defined, however control measures were highlighted and enforced.
- There was no training or induction at the start of employment within the company. Sprayers expressed that they thought that management assumed that experienced sprayers were safety conscious and knew health risks and management of their own health and safety.
- Sprayers expressed a desire to have more information concerning the health risks and management of such. They wanted information concerning the actual risks involved in their work, clearly explained to them. A short DVD was considered an appropriate method of communication. Leaflets were alleged to be useless in communicating messages, as they did not read them. Overall they stated that they liked the HSE posters. They posited that they would appreciate information at an induction session; they believed that a short DVD would not be too disruptive to their employers usual approach to induction for new starters starting work immediately as this would not consume too much time or effort on the part of the organisation. However, the sprayers stated that they would prefer to be shown the DVD during work time.

### **3.1.8 Perception of Control Measures**

- The sprayers expressed a high level of confidence that health and safety within their workplace was greatly considered by management. They stated that the procedures at the facility were very good and they did not feel at risk from their work. They knew that to test for isocyanates they should have a urine test and had partaken in this. This information was communicated following the SHAD. They did however express concern that they had not understood their results. One sprayer stated that he was shown that he was contaminated twice and then took a third test on Monday morning after a weekend away from spraying. He was concerned that this absence from spraying had caused the negative result. However he did not query this with management.
- The sprayers stated satisfaction with their work practices, RPE and their maintenance procedures. They personally maintain their own air fed visors and masks to ensure that vision is not impaired in any way. However the observers noted that one of the masks had gaps between the visor and the helmet. This was overlooked by the sprayer as being a risk of

contamination for his air supply. This contrasted with how safety conscious and informed this sprayer appeared.

- The sprayers believed that as they have to maintain very high quality standards they were not put under time pressure. Therefore their health and safety procedures and work practices were not negatively influenced by the factor of time.

## **3.2 COMPANY TWO**

### **3.2.1 Organisational Background**

Company Two was a family owned company that was established in 1948. It was both a mechanical repair shop and a body repair shop. However accident and bodywork repairs accounted for approximately half of the business. Space was limited for the amount of work undertaken. Their main source of business was insurance companies. One of the owners had attended a HSE SHAD.

The facilities available at Company Two were:

- 1 USITALIA spray booth (downdraft proprietary spray booth). The booth was located in the middle of the garage and, as the premises is rented, the booth has been raised up rather than the pit dug into the ground.
- 1 mixing room situated next to the booth, which was ventilated.
- 1 gun wash area situated in the main workroom, which has a facility for cleaning water based and solvent based guns. It is extracted externally.

### **3.2.2 Daily Routine**

The sprayers work from 8.30 until 5.30 with two fifteen minutes breaks one in the morning and one in the afternoon. Lunch break consisted of half an hour. These breaks are taken in the rest room. This is a small space shared with the other employees.

### **3.2.3 Tasks**

There was one experienced sprayer and one trainee sprayer, who attended college regularly, there was one other trainee but he no longer sprayed as it was not financially viable to retain two trainee sprayers. Due to the lack of space in the building, all paint preparation bodywork, including sanding, took place in the booth. They tried to condense as many jobs as possible in the booth at one time, for example bumpers, panels and a car in the booth. This meant that both sprayers worked in the spray booth at the same time on different paint jobs. The occupational Hygienist posited that this was unusual practice. Although they sprayed simultaneously they had two air fed lines but both were on the same line. The Occupational Hygienist observer was concerned that the air pressure to the air fed mask would be reduced and insufficient although this was not tested.

Sanding had no local exhaust ventilation however there was the floor extraction within the booth. When sanding down a job inside the booth, the qualified sprayer wore a disposable dust mask but used an airline to remove dust from the job, this is considered bad practice however, as this was inside the booth, the dust was seen to quickly move towards the grated floor.

### **3.2.4 Work Environment**

The work environment was tidy. There was limited space in the body shop but the space was used efficiently. Although there was a rolling door to allow entrance for the cars there was a good heating system that kept the warehouse at a reasonable temperature.

The floors were swept with a broom; it was observed that there was an industrial vacuum, although this was not easily accessible.

The air fed masks were stored on shelves in the paint mixing area. These shelves were not clean nor contained.

There was a small restroom sprayers shared with other employees at break times.

### **3.2.5 Behaviour Observed**

- The two sprayers sprayed the base coat wearing a half mask with organic filters. When questioned, the qualified sprayer said that the base coat did not contain isocyanate. The observers verified this and therefore there was no requirement to wear air fed masks.
- They both wore air fed masks when spraying the lacquer; however they both lifted up their masks as soon as they had finished spraying the lacquer, in order to talk to one another. They stated that clearance was very good because they were situated in a spray booth. This was unsubstantiated at this point. The observers conducted a clearance time smoke test in which the clearance time was very fast (approximately 1 minute) however residual smoke lingered in the top corners of the booth. The presence of residual smoke surprised the sprayers as the clearance time had not previously been assessed.
- The two sprayers simultaneously sprayed two jobs at opposing ends of the booth. Both wore air fed visors, although when the experienced sprayer had finished he took off his visor and went over to talk to the trainee, even though the trainee had not finished spraying.
- Dust was swept up in the workshop. The Occupational Hygienist suggested that this is considered bad practice in any industry. There was no acknowledgement that this may be harmful to all workers health.

### **3.2.6 Perceptions of Health Risks**

- The experienced sprayer taught the younger trainee and communicated information about isocyanate paints; he believed them to be dangerous and can a source of poisoning that could be fatal. He also indicated that isocyanate affects the kidneys and central nervous system.
- The trainee was still attending college. He was aware of occupational asthma and said that the college go into a lot of detail about isocyanate exposure. His lecturer used to be a sprayer.
- Since the SHAD, the sprayers now use nitril gloves instead of latex disposable gloves for spraying and they are happy with them.

### **3.2.7 Sources of Information**

- Although the owner had attended a SHAD the information did not appear to have been cascaded to the sprayers. There was an awareness of the necessary control measures and a heightened awareness of health and safety issues, however there was still confusion as to the nature of the health risks.

- The qualified sprayer had been paint spraying for most of his life, he trained straight out of school as a diesel mechanic but when his father offered to train him as a paint sprayer he changed his career. The only training he received was from his father. He has worked for the company for 22 years. He stated that he learnt about isocyanates from the paint manufacturer representatives. Originally when the two pack isocyanate paints were introduced the representatives told him he would only need a charcoal mask. They then transferred to air fed masks when the mask company informed them they needed to due to changing regulations.

### **3.2.8 Perceptions of Control Measures**

There was a strong belief that the control measures in place were effective. The sprayers stated that the procedures within the facility were good and they did not feel at risk from their work. They believed that they could ask management should they need equipment replacing. They also stated that their RPE was sufficient in protecting them from isocyanates and the floor extraction was very good at clearing the booth. This was substantiated by the observers smoke test in the booth, which showed clearance time to be under one minute.

## **3.3 COMPANY THREE**

### **3.3.1 Organisational Background**

Company Three was established in 1972. They have 250 employees based in 4 locations in 4 cities. The majority of work they undertake is issued by major insurance companies or by motor manufacturers including Jaguar and Mercedes. The Health and Safety manager had attended an HSE SHAD.

The facilities available at Company Three were:

- 2 Downdraft Spray booths with full ceiling filters and pit extraction
- Separate paint mixing area
- Separate spray gun cleaning area

There were 8 paint sprayers, however only one sprayer painted at a time, whilst the others worked on prepping or polishing the cars. The booths were used in rotation: one job would be put on a bake cycle whilst the sprayer was spraying in the other booth. They work in rotation either every one or two days. There was one trainee that did not spray, but the other trainees did. One employee was a dedicated paint mixer so the sprayers did not have to mix the paint.

### **3.3.2 Daily Routine**

The sprayers work on two shift patterns, one starting at 0.006 and finishing at 3.30pm, the other starting at 8 and finishing at 5.30pm. They have a 10 minute tea break at 10.30 am and a half an hour lunch break at 1 pm. Those working on the second shift also have a 10-minute tea break at 3 pm. Many of the sprayers sit outside during this time in order to have a cigarette. Some members of staff use the small rest room.

### **3.3.3 Tasks**

The paint sprayer's tasks included cleaning the prepared spray area with chemical cleaner, moving the car into the paint booth and spraying the necessary sections. The sprayers sprayed a base coat and two colour coats before spraying with the lacquer that contains the isocyanate. The average time spent spraying lacquer was 15 minutes per job. Each sprayer worked to a

quota of at least 12 jobs a day. If at the end of the early shift they did not complete the 12 jobs, another sprayer would continue spraying until the 12 jobs were complete or the shift ended.

### **3.3.4 Work Environment**

- The work environment was clean and tidy. The area was small for the amount of cars however it was well controlled and organised.
- When the booth was switched to bake cycle, the lights were seen to automatically turn off and did not come back on until the cycle finished. This lack of lights dissuaded anyone from entering the booth during this time, as they could not see anything.
- There were also two preparation booths. One was large, one small and they both covered one whole wall of the premises. The booths had ceiling filters and pit extraction but the pull down doors were open for the majority of the day. The sprayers indicated that the sanding and other prep work was conducted with the doors open, but when priming, the doors are closed as the primer contains isocyanate. This did appear to be the case during the day when the doors were closed on a number of occasions; although air fed visors were not observed being worn.
- In the rest room there were some out of date health and safety regulations on display, however there were more non-work related posters present.

### **3.3.5 Behaviour Observed**

- Each time the sprayer exited the spray booth he disconnected from the air supply when he had finished the job. It was noted that this disconnection was not on exit but wherever the sprayer was in the booth when he had completed the job and walk to the door unconnected to the air source.
- The qualified sprayer indicated that he had to lift his visor to inspect the quality of his work however this was not observed. He knew that this was bad practice but considered it something all sprayers did and therefore seemed to consider the consequences unimportant although he was aware there were health risks.
- It would appear that it is common practice to wear a 3M half mask with organic filters when priming and a 3M FFPS disposable mask for sanding and other prep work. All the disposable masks seen were brand new so it appeared that they may have been worn for our visit. A minority of sprayers were seen to be wearing the disposable masks correctly; many would wear them on their heads, hats or around their throats when not actually around their breathing zones. This allows the masks to get dirty and so their effectiveness is reduced.
- When sanding, they did not use the extraction. The sanding tool was always attached to the extraction ducting, but this was never attached to any extraction points, of which there were many. This behaviour was constant all day. This can be considered bad practice, they had facilities to remove dust but did not utilise them fully.
- One booth was smoke tested by the observers. It cleared in approximately one minute but leaked around the seals both at the front and around the back. At the front of both booths, there were burn marks around the pedestrian doors indicating release of heat around both door seals. There was also a smell of paint / solvent when standing next to the doors when spraying was taking place inside the doors. The manager was not interested in the smoke test until informed of the leaks. However management indicated a willingness to rectify the problem as soon as possible.

### **3.3.6 Perceptions of Health Risks**

- Two sprayers were asked about their knowledge of the health risks associated with MVR paint spraying. One assumed that isocyanates could cause cancer; the other knew that isocyanates was damaging to the lungs and could cause asthma. This knowledge was obtained at college 15 years previously.
- They both stated that the majority of training they received about health risks came from the paint manufacturing companies, through their ongoing training sessions.

### **3.3.7 Sources of Information**

- It was the policy and practice of the management within this company to have a site team meeting staff meeting, it is at this time that management convey to staff (including the sprayers) any information they want to disseminate.
- There were no posters on the front of each of the spray booths, also there were no noticeable signs indicating the clearance times of the booths, however the company had not conducted a smoke test previous to our visit. A smoke test was conducted and showed noticeable fault with one of the spray booths, Management were surprised at this, as they had been recently maintained.
- There was no training or induction at the start of employment within the company. Sprayers indicated that they thought that management assumed that experienced sprayers were safety conscious and knew about the health risks and management of their own health and safety.
- There was an e-mail pinned to a notice board in the paint mixing room with a number of working practices that had to be adhered to, such as sanding with extraction, no sweeping dust etc. When asked, the sprayers said that they never tend to read such notices.
- The sprayers indicated that they pick up information “through the grapevine” i.e. via other sprayers, rather than through a formal channel.
- Before the SHAD had been attended the sprayers said it was common practice to spray primer in the open booths without closing the doors, but now they do not.
- All the sprayers and preppers were witnessed to be wearing disposable gloves while working.

### **3.3.8 Perception of Control Measures**

- The sprayers expressed a high level of confidence that health and safety within their workplace was highly considered by management. They stated that the procedures at the facility were very good and they did not feel at risk from their work. There were a number of helmets that needed replacing and the sprayers were not permitted to spray until their replacement visors arrived. The sprayers believed the company to be looking after them.
- The sprayers stated satisfaction with their work practices, RPE and their maintenance procedures. They personally maintain their own helmets and masks to ensure that vision is not impaired in any way.
- The sprayers stated that they are under pressure to maintain very high standards and therefore jobs were not put under time pressure. Therefore their health and safety procedures and work practices were not negatively influenced by time pressure. Although they were pressured to finish twelve jobs a day, this did not appear to concern them or put them under pressure to cut corners.

### **3.4 COMPANY FOUR**

#### **3.4.1 Organisational Background**

Company Four was an owner-managed company that had been in business for 35 years. The main source of repair work was through insurance companies however they occasionally would undertake private repairs. It had specialised in body repair work rather than mechanical repair work in order to survive in the modern market. No representative from this company had attended an HSE SHAD.

The facilities available at Company Four were:

- 2 Spray booths (1 SPRAYBAKE, 1 DALBY) both had pit extraction
- 1 Spray Room with an axial fan in wall
- Separate paint mixing area
- Separate spray gun cleaning area

There were three experienced sprayers; they worked on a weekly rotation, one sprayed for a week, whilst the others prepared the cars for spraying.

#### **3.4.2 Daily Routine**

The sprayers worked from 8am until 5pm. They had a 15 minute tea break at 10.30 am and a half an hour lunch break at 1 pm. The majority of members of staff used the small rest room on site although some went off site to purchase food.

#### **3.4.3 Tasks**

The paint sprayer's tasks included cleaning the prepared spray area with chemical cleaner; mixing the paint; moving the car into the paint booth; spraying the necessary sections of the car and moving the cars to the adjoining ovens.

#### **3.4.4 Work Environment**

The work environment was clean and tidy. There was little dust as every stage of the prepping stage was ventilated well local exhaust ventilation was used whilst sanding. There was a separate rest room available for all staff to use. The rest room had no work related posters in this room; it was full of glamour posters. There were no posters or notices concerning the health effects of isocyanates near or around the booths. The only posters stated the requirements of safety equipment usage within the booths.

#### **3.4.5 Behaviour Observed**

- The sprayers ordinarily sprayed one thick coat of base paint then put the heaters on to dry the paint followed by another thin coat then the heaters again. The lacquer was usually put on in 2 coats with the heaters on in between each coat. Most priming was done in the booth and if not, the air fed visor was worn in the spray space. The sprayers checked the negative air pressure on the booth gauge before starting. If the air pressure became positive, an alarm sounded.
- Each booth had a maintenance checklist for the operators on the outside. This included filter changes and cleaning procedures. This maintenance checklist is followed every day. It was observed that the checklist was up to date and signed.

- The spray room used to be where they sprayed paint but was used for sanding and preparation work at the time of the observation visit. The sander had an LEV attachment. The observers were told that all the sanding took place in this room with the fan on, but sanding was also observed in the main workroom. A Moldex FFP1 2365 mask was worn when sanding.
- The sprayers were not observed lifting visors, but they admitted to checking the quality of their work by doing so. They also stated that the management would be angry should they find sprayers not adhering to the proper safety procedures.
- It was not possible to observe behaviour in the spray room, although the sprayers stated they always wore an air fed mask if priming.
- Sprayer 1 stated that he would always leave the spray booth for about 5 or 10 minutes after spraying. If he needed to re enter before that time, he would wear a half mask.

#### **3.4.6 Perceptions of Health Risks**

- The sprayers knowledge concerning isocyanates was negligible. They all stated that they understood they had to wear the masks for their protection but were not clear as to what these reasons were.
- The sprayers had annual health surveillance and they were told about the health effects there.
- Sprayer 1 acquired his knowledge about isocyanates from the paint manufacturers and his colleagues. He was told to wear the air fed visor and that the 'chemical is bad for the lungs', but he had no more knowledge concerning isocyanates.
- Sprayer 2 was aware that the isocyanate in lacquer spray could cause Occupational Asthma, but he could not recall where he got the information. He attributed this knowledge to the fact that a previous sprayer at the company developed Occupational Asthma.

#### **3.4.7 Sources of Information**

- This was a family run business; the management structure hierarchy included the owner, a body shop manager and then the sprayers. Communication was often direct from the owner to the sprayers, although there was more communication via the manager.
- The management and sprayers were interested to see the smoke test conducted in one of the spray booths. This cleared in two minutes although for the first minute you could not see any change, suddenly the smoke dropped rapidly. The sprayers were intrigued but did not question why this was important to their health.
- The owner/manager stated that a DVD would be a great information provider, both in terms of being economical in terms of time and information quality. It was considered that any information in the DVD would be correct if coming from the HSE and would make a change from management nagging. This could be significant as there was no training or induction for new starters; it was assumed that they are trained and knowledgeable when they start. The owner did state that they would prefer sprayers to watch the DVD in their own time.
- The company employ an H&S consultant for one day every 2 months. He looks at all aspects of the business including paint spraying. The evidence observed concerning the Health and Safety consultant was a health and safety file and the booth maintenance record sheets that were located next to the booths; these were updated on every visit.
- Sprayer 1 had been at the company for 6 years. He qualified in a completely different career, not in MVR, but he needed to change career for various reasons. He had no formal training in paint spraying apart from attending the paint manufacturers training days.

- Sprayer 2 had been at the company for 10 years. He was originally a mechanic and trained in college, then tried spraying and decided to continue with that. He had no formal training, just acquired spraying skills with practice.

### **3.4.8 Perception of Control Measures**

- The sprayers expressed a high level of confidence that health and safety within their workplace was highly considered by management. They stated that the procedures at the facility were very good and they did not feel at risk from their work.
- They stated satisfaction with their work practices, RPE and their maintenance procedures. They personally maintain their own helmets and masks to ensure that vision is not impaired in any way. The company provided masks and it was expressed by the sprayers that they could get replacements of any equipment should they need them.
- As they have health surveillance once a year they feel that they are healthy, although they do not fully appreciate the health risks and therefore the need for this surveillance.

## **3.5 COMPANY FIVE**

### **3.5.1 Organisational Background**

Company Five was an employee owned company. They have been at the premises for 4 years since they took over an existing automotive company. They specialise in both mechanical and body repair work. Most of the business is through insurance work however some work is privately contracted. No representative attended an HSE SHAD.

The facilities available at Company Five are:

- 3 paint booths
- Separate paint mixing area
- Separate spray gun cleaning area

There were nine dedicated paint sprayers; they worked in three groups of three, team A, B and C. Each team consisted of a team leader and two sprayers. Each team rotated who was spraying each week, this meant that each team had one spraying and two prepping as long as all team members were present at work.

There were approximately 5 spray jobs completed each day in each booth.

### **3.5.2 Daily Routine**

The team leaders worked from 06:00 to 14:30 hrs with a 15-minute break at 10:00 and a 30-minute break at 13:00. The other sprayers start at 08:30 and work until 17:00 having two 15-minute breaks (10:00 and 15:00) and a 30-minute break at 13:00.

### **3.5.3 Tasks**

The paint sprayers tasks included cleaning the prepared spray area with chemical cleaner, mixing the paint, moving the car into the paint booth, spraying the necessary sections of the car and moving the cars to the adjoining ovens. The sprayers sprayed a base coat and two colour coats before spraying with the lacquer that contains the isocyanate. Each sprayer worked an average of 5 jobs a day.

The company had a dedicated mixer who had been employed by the company for 16 years. He was previously a sprayer but was offered the mixing job for more remuneration. He had been mixing paint for 8 years. Although he may be regarded as having a low risk of exposure of isocyanate for this employee but his exposure to solvents may be a health issue.

The company have health surveillance carried out annually.

#### **3.5.4 Work Environment**

- The work environment was clean and tidy. There was a separate rest room available for all staff to use during breaks. This room had a coffee machine. It did not contain any work related posters it was mainly decorated with 'glamour posters' or humorous cuttings from newspapers.
- There were HSE posters on the walls; the sprayers said that they did take notice of them. These posters were given to the manager by an HSE inspector. Other posters and notices stated the requirements of safety equipment usage within the booths.

#### **3.5.5 Behaviour Observed**

- Sanding was done in the general workshop with enough extraction points for all the work needed. Not much dust was observed during sanding and the sprayers can wear a half mask if they want, although this is not compulsory. It was observed that some sanders wore a mask and some not. One worker wore one after lunch whereas he had not been wearing it before lunch. It appeared as though he had been told during lunch to wear it as they were being observed.
- Team leader 1 was observed spraying a solvent-based filler onto a car wearing a half mask with organic filters, also wearing a disposable dust mask underneath as the organic filter mask was not his own.
- Team leader 1 also indicated that visors were always lifted to check the finish, as one cannot see clearly through visor screens.

#### **3.5.6 Perceptions of Health Risks**

- Team Leader 1 had been a sprayer for 15 years. He trained in college as a panel beater then went into spraying. The company has employed him for 5 years. He knew about isocyanates and the lung problems though not specifically about asthma. He said that he sprays on the base coats in one go then leaves the booth for 5 minutes then puts on one coat of lacquer then leaves for 5 then after the second coat leaves for another 5 then goes in to check the finish before putting the booth into bake mode. This last check is done without the visor on. He believed that 5 minutes is enough to clear the booth, he did not know what the actual clearance time was.
- Team Leader 2 was told about isocyanates and health problems in college. He was aware that isocyanates cause lung problems.
- Team Leader 3 stated that his knowledge of the effects of isocyanates was gained through common knowledge and what he had picked up over the years on the job rather than formal training. He didn't go to college and has been spraying for 20 years. He stated that isocyanate is 'bad for you and that it can be absorbed through the eyes'.
- Team Leader 3 learnt that isocyanates was harmful in college but that was a long time ago and in the previous 17 years he has not had any refresher training. He remembered that isocyanate was bad for the lungs but nothing else. He was unaware of the risks of

occupational asthma. He stated that he wore his mask when spraying because the law says you have to rather than because it could be harmful not to.

### **3.5.7 Sources of Information**

- There was no training or induction at the start of employment within the company. Sprayers expressed that they thought that management assumed that experienced sprayers were safety conscious and knew health risks and management of their own health and safety.
- Sprayers indicated an interest in having more information concerning the health risks and management of such. They wanted information concerning the actual risks involved in their work, clearly explained to them. A short DVD was suggested by the sprayers as an appropriate method of communication, if they could watch it at work, especially good for a new starter.
- None of the sprayers knew about clearance times and thought that about 5 minutes should be enough time to clear the spray.

### **3.5.8 Perception of Control Measures**

- One of the sprayers has been spraying for 17 years. He stated that the previous company he was employed by cut lots of corners but are no longer in business. He believed that his present employer was much more concerned and proactive about health and safety issues and therefore felt confident that control measures were adequate.
- Some of the sprayers appeared surprised when we explained the implications and health effects of it and that a sprayer would have to leave the industry.
- One sprayer indicated that he regularly lifts his visor during spraying but holds his breath when he does so; he believed this was an adequate control measure against isocyanate.
- Team Leader 2 worked at company five for three and a half years. He stated that the company are 'pretty good' to work for especially in comparison with other companies he had previously been employed by. He stated that he was confident about the control measures in place and that he did not feel at risk from his work.
- The sprayers stated satisfaction with their work practices, RPE and their maintenance procedures. They personally maintain their own helmets and masks to ensure that vision is not impaired in any way.

## **3.6 COMPANY SIX**

### **3.6.1 Organisational Background**

Company Six was a franchise of a leading car manufacturer. The body shop was connected to a retail outlet. They mainly spray cars from their manufacturer however they also have links with another leading brand situated nearby. The manager and supervisor attended a HSE SHAD.

The facilities at Company Six were:

- 2 Spray booths (pit extraction)
- Separate paint mixing area
- Separate spray gun cleaning area

There were three dedicated sprayers employed at this organisation.

### **3.6.2 Daily Routine**

The sprayers had three breaks during the day, 2, 15-minute tea breaks one in the morning and one in the afternoon and a 30-minute lunch break. Lunch breaks were often staggered with the mechanical workers. There was a washing facility next to the canteen with hand care products. This facility appeared well used, although it was not observed in use.

The atmosphere was relaxed in the body shop and although there was pressure to complete work to a high standard in a limited time the sprayers did not seem adversely affected by this pressure.

### **3.6.3 Tasks**

The sprayers tasks included prepping the vehicles before they were moved into the spray area. Sprayers also cleaned the prepared spray area with chemical cleaner; mixing the paint; spraying the necessary sections of the car and moving the cars in and out of the ovens.

All sprayers tended to spray two base coats together before leaving the booth. The same occurred for most of the lacquer jobs, though special cases and large jobs meant that coats were sometimes sprayed on separately.

Gun cleaning and mixing took place in a dedicated room between the booths. Extraction was present in the wall and there was an inlet filter in the ceiling. There were two gun cleaning machines, one for water based, one for solvent based. Only the solvent based machine was extracted externally. The gun cleaning / mixing room had the door open constantly to the workshop.

### **3.6.4 Work Environment**

The work environment was clean and tidy.

The company supplied visors but they were not the brand that the sprayers like to wear, so they all have their own Devillbiss visors. This was due to their confidence in the effectiveness and comfort of the Devillbiss visor being higher. Air fed masks were stored in plastic boxes in the mixing room, although a trainee sprayer had had his box stolen and this had not been replaced, so he stored his visor on a dirty shelf in the mixing room. Equipment appeared to be in good working order.

There was a separate rest room available for all staff to use with a vending machine, microwave, kettle, pool table and television. There were no work related posters in this room; the only posters were of a glamour nature.

There were no HSE posters displayed and there were no noticeable signs indicating the clearance times of the booths, although until the observers conducted smoke test in the booth this was unknown.

### **3.6.5 Behaviour Observed**

- One booth was smoke tested and cleared in under a minute. There were blowers along the length of the booths at the join between the ceiling and the walls that moved any circulating smoke downwards (see figure 2). The exit filters in the pit had recently been changed.



Figure 2: Company Six Spray Booth

- Sprayer 1 was a young inexperienced trainee. He attended college in block weeks learning to spray. Although confident in appearance about his competency it was alluded to that he is still inexperienced and therefore does not spray without some supervision. After lacquering a piece of work, he tended to re-enter the booth to check the finish while the lacquer was drying, unaware of clearance time and its significance.
- Two of the sprayers wore disposable gloves to spray. Sprayer one stated that dermatitis is talked about in college, more than isocyanates are.

### 3.6.6 Perceptions of Health Risks

- Sprayer 2 who had attended a SHAD was a senior sprayer who had once owned a spraying company. He was aware of the risks associated with isocyanates however did not cascade this information to more inexperienced sprayers. He had verified with the paint supplier whether the base coats used contain isocyanate as this was mentioned in the SHAD. He was told no, so admits that small base coat jobs are done in the open workshop, although this was not observed.
- Sprayer 2 had been spraying for 17 years and knew about isocyanate and occupational asthma. He stated that he had known about these before attending the SHAD.
- Sprayer 1 knew that spraying could be bad for his health, but thought that blood poisoning was the main issue and believed it could cause impotence. He was not aware of the risks associated with isocyanates and occupational asthma.
- He was told in college and at work that he had to wear a mask but not told why.
- Sprayer 3 had been spraying for approximately 12 years. He had worked for a number of companies and this was his second employment term at this company as he stated that it was a good company to work for and they cared about their employee's health at work.
- Sprayer 3 stated that isocyanate causes cancer, but he still considered it appropriate to lift his visor when finishing a job to check the quality of the work. He tended to lift the visor

immediately after finishing, before leaving the booth. He appeared to be unconcerned about the health risks.

### **3.6.7 Sources of Information**

- There was no training or induction at the start of employment within the company. Sprayers expressed that they thought that management assumed that experienced sprayers were safety conscious and knew health risks and management of their own health and safety.
- Although the manager and senior sprayer had attended a SHAD, the sprayers were still unaware of the health risks and the reasons for wearing their RPE properly. This information was not cascaded down.
- They stated that they would appreciate information at an induction session or a team meeting. A means of communication that was short and to the point would be considered best as they are all busy and they know the company would not like long training sessions.

### **3.6.8 Perception of Control Measures**

- The sprayers expressed a high level of confidence that health and safety within their workplace was highly considered by management. They stated that the procedures at the facility were very good and they didn't feel at risk from their work.
- The sprayers stated satisfaction with their training, work practices, RPE and their maintenance procedures. They personally maintain their own helmets and masks to ensure that vision is not impaired in any way. However the observers noted it that one of the sprayers lifted his visor whenever he wanted to see more clearly. This was overlooked by the sprayer as being an exposure to isocyanate and viewed as 'something that everyone did'.

## 4 DISCUSSION

This section provides a brief discussion of the key findings presented in the results section. The overall findings indicate that health and safety knowledge within the MVR paint spraying industry is inconsistent and communication is unreliable. The observations revealed much about the daily work practices of these MVR paint sprayers and the findings were similar in all of the participating organisations.

All participant organisations were volunteers and the standard of health and safety practices were generally high as would be expected with such a sample, however the awareness of the health risks associated with isocyanate exposure was quite low; just over half of the sprayers illustrated that they did not know what the risks were. Considering that four of the organisations had had representatives attend the HSE SHAD event, this was an inconsistent result compared to the aims of the SHAD.

All sprayers were aware there are health risks associated with spraying lacquer and primer, but their understanding of the nature of these risks was imprecise. Occupational asthma was quoted by seven out of fifteen sprayers as the major health risk, the others were either vague, or stated that the main risks were 'isocyanate poisoning' or 'cancer'.

All participants indicated that they clean their own visors to limit the need to lift the visors whilst in the spray booth. Even so, all indicated that there was a lack of clear vision with their visor down. The majority of sprayers stated that they would lift their visors within the spray booth after spraying to see the quality of the spray job. Universally, clearance times within a booth were unknown; many assumed that because a booth had good extraction that clearance was instantaneous.

Overall, it was considered that there was a deficiency in cascading information. Although four of the six participating organisations had attended a SHAD the information provided at the event had not been communicated to the body shop workers. Representatives that had attended had not communicated the health risks of isocyanate clearly as there was a lack of knowledge of the health affects.

There was a consensus between sprayers that organisations assumed levels of competency when sprayers were first employed by an organisation. No organisation had an induction programme for new starters. It was considered normal for a new sprayer to start spraying immediately on commencement of employment. There is a strong potential for organisations to assume that experienced sprayers are aware of the health issues associated with their job, the risks / hazards and the necessary control measures.

There was little ongoing training within the participating organisations. The paint manufacturers conducted most of this training. As a consequence of this, sprayers' knowledge depended on their original training. When this training had occurred many years previously, sprayers were less likely to know that isocyanates caused occupational asthma. There is a tendency for on the job trainees to depend on the experienced sprayer for information, in some cases the experienced trainer did not know the associated risks.

The HSE posters were viewed positively by sprayers though only two of the organisations had them displayed. The posters were shown to the other sprayers in the other organisations by the researchers. Only one of the four organisations that had attended the SHAD, where these were distributed, displayed the posters. One of the organisations displaying the posters had not

attended the SHAD but had been given the posters by an HSE inspector. The inspector had visited them because they declined an invitation to a SHAD.

Considering the inclination for observed workers to try to display good working behaviour it was surprising to detect two sprayers lifting their visors and one sprayer taking off his mask whilst spraying continued. All sprayers admitted to doing this at some time in their working day. It was viewed as common practice.

It was common practice for air fed masks to be disconnected from the air supply away from the exit. The sprayers were unaware that they were doing this, they disconnected wherever they were in the booth when they finished spraying. Some sprayers stated that they held their breath until leaving the booth, however as sprayers were unaware of clearance times this could not be considered common practice. However, after questioning it would appear that this was a behaviour they did not realise may have a deleterious effect on their health.

There was a high level of confidence in the control measures in place within each of the organisations. All sprayers stated that they were happy with the controls in place and the organisation's attitude towards their health and safety. However all sprayers expressed an interest in getting more information about health risks and control measures. The perceived confidence in a company's management of health and safety may be heightened due to the sprayer's lack of knowledge about the risks and control measures.

## 5 CONCLUSIONS

The following conclusions are based on the findings from the six MVR body shops observed. This is a very limited sample of the total MVR body shop population, and so the extent that these findings and their conclusions represent the wider population should be regarded tentatively.

1. Reinforcement is needed on the importance of cascading information to workers by management or representatives attending SHAD's. This communication needs to include the salience of risk and why various behaviours are necessary to control risks, as well as what sprayers should do to comply with health and safety procedures.
2. Further encouragement is needed for organisations to conduct smoke tests for clearance times. Of the four organisations that had attended the SHAD none had actually conducted a smoke test.
3. The HSE posters were well received by sprayers, although there was insufficient evidence to indicate that they had impact on behaviour. Further evaluation and feedback to explore their effectiveness in communicating key messages is needed.
4. Sprayers expressed a desire for more information about health risks. The sprayers stated that due to their experienced status, when starting work at a new organisation, it was assumed they were competent and were aware of health risks and control measures. Providing information on health risks and control measures that MVR body shops could use as the basis for an induction programme could address the problems associated with assumed competence, and could be one method of communicating messages directly to the sprayers. Such information could also be used to refresh existing sprayer's knowledge.
5. The sprayers proposed the use of a short DVD as a method of communicating health risk information from the HSE. There was a disagreement between management/employee opinion as to how this would be used. The potential exists to explore the usefulness of such an approach to risk communication within this sector.

## 6 APPENDIX

### **MVR Observation Study Question Set**

#### Background Information

- Size
- Day to day activities of the company
- Do you feel at risk from any work activities here?
- Where do you get your information about health and safety? Sources? Best/worst?
- How do you communicate/ managers communicate H & S issues?

#### Guidance Information

- Have you seen the HSE posters?
- What do you think?
- What do you think would be good to see HSE doing to communicate messages about health and safety issues in MVR?

#### Work Practices

- How confident are you that you are working in safe environment?
- What are the main work practices that can cause isocyanates exposure?
- How long does it take to clear the spray booth/area?
- Do you know how you can check if you've been exposed to isocyanates?
- What health problems do you think you are exposed to?
- What influences your work practices and behaviours?
- How do you check the quality of your work when you're in the spray booth?
- Do you have time pressures put upon you? How do these influence your work practices?
- What kind of supervision do you have here?

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