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**E-COSHH Essentials Guidance Sheets;
User Consultation Exercise Phase IV**
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EXECUTIVE SUMMARY

The Health and Safety Executive (HSE) developed the 'COSHH Essentials: easy steps to control chemicals' guidance to help employers, specifically small to medium sized enterprises (SMEs), prevent or control exposure to chemicals under the COSHH regulations (HSE, 2002). An electronic version of COSHH Essentials has now been developed and is freely available on the Internet (www.coshh-essentials.org.uk). As an addition to the existing electronic COSHH Essentials database, HSE has developed a number of sector specific COSHH guidance sheets, and is currently in the process of expanding this catalogue to encompass a broader range of sectors. The guidance sheets are designed to address substances associated with specific processes carried out within each of these sectors, in order to provide easy to follow information on control measures.

OBJECTIVES

The Health and Safety Laboratory (HSL) were commissioned by HSE to conduct a user consultation exercise for the draft guidance sheets developed for industries that use Metal Working Fluid (MWF). Metalworking fluids are neat oils or water-based fluids used during the machining and shaping of metals to provide lubrication and cooling. Such fluids are routinely employed by manufacturing/engineering machine shops. Five draft guidance sheets were provided by the HSE for the consultation exercise.

The aim of the consultation exercise was to explore end user views on the acceptability, comprehensibility and usability of the draft guidance sheets, from individuals with experience of working within the relevant industrial sectors. In total the views of 6 individuals were obtained across 3 separate organisations. Given the small sample size we must be cognisant of the limitations of this research. Care should be taken regarding generalising the findings of these interviews to a wider population. The sample size was never intended to be representative of the range of views held by those that utilise metalworking fluids. However, it is possible to distinguish some significant issues from the comments obtained.

MAIN FINDINGS

Acceptability

- In general, the guidance sheets were well received and the information was acceptable in relation to work practices and contexts.
- There was felt to be some inconsistencies with the information within certain groups of guidance sheets, this included for example, confusion over recommendations for Respiratory Protective Equipment (RPE), which were considered to be misleading. There was a general consensus that the guidance should clearly state that a simple facemask is sufficient to prevent hazard exposure in the majority of instances.

- There was a conflict regarding the general information required across the sheets to highlight the consequence of the hazard. Some of the participants felt that awareness of the hazard and its harmful consequences should be raised, whilst others had an opposing view. Hazard awareness however should be framed in relation to lay understandings. This is consistent with findings from the risk communication and health protection literature that emphasise the importance of giving information on extent of harm, and personal susceptibility, in order to encourage self-protective behaviour.
- Participants felt that the guidance sheets were not wholly relevant to their workplace, e.g. they were more appropriate to modern machinery. It was suggested that any guidance needs to acknowledge the variation in workplace contexts in order to persuade the reader of the relevance of the guidance.

Comprehensibility

- The guidance sheets were generally perceived to be clear, accurate and relevant.
- There was some confusion over whether the information presented in the guidance sheets was for the purpose of disseminating good practice, or defining the legal requirements for compliance. Participants were in favour of information that would detail the requirements for legal compliance in a readily accessible format.
- There was a general consensus that the use of crosses and ticks to indicate Do's and Don'ts and the manner in which these were presented throughout the sheets was confusing. It was suggested that it would be more appropriate to clearly differentiate positive and negative practices, listing them separately rather than interspersing them, as is the case in the sheets current format. Raising the emphasis placed upon unsuitable practices, for example by displaying them in red was also suggested. Furthermore it was postulated that users are more inclined to assimilate information and use it if they are provided with the justification to do so. In their current format it is noted that guidance merely instructs operators not to do something but rarely qualifies the reason why.
- There was some confusion over the meaning of different numerical/technical terms used to highlight information, and also the use of acronyms. It was suggested by participants that these require expansion and clarification.
- Participants were aware of the difficulty in striking a balance between the need to provide sufficient information, and the need to reduce the information presented in order to make the guidance sheets more user friendly. However, in general the sheets were considered to be too lengthy. It was felt that future guidance sheets might consider the option of condensing generic information that is repeated across the sheets, into a single introductory guidance sheet.

- Criticism was drawn to the use of illustrations. In general illustrations were well received and it was considered useful to use illustrations to demonstrate simple procedures. Flow diagrams were considered to be particularly usable. However, several, in particular illustrations of charts for record keeping, were felt to be unnecessary and repetitive throughout the sheets and it was believed that this communication medium should be employed more effectively.

Usability

- The sheets were generally viewed as providing a practical framework for addressing the control measures for specific hazards, especially for companies with low levels of health and safety knowledge.
- There was a general perception that the guidance sheets failed to differentiate between old and contemporary machinery. The guidance was regarded as predominantly directed towards companies that utilise modern sealed machinery. Due to the prohibitive cost of purchasing new machines there was a belief that most small firms would still employ the older type of machines. It was proposed that as a corollary various sections of the guidance were irrelevant/unusable for such firms. Participant suggested that the provision of separate guidance, tailored to the different ages and type of equipment being used by SME's, should be considered.
- In some instances criticism was levied at several of the control measures advocated which were considered to be resource demanding (e.g. employing ventilation engineers/conducting daily checks) both in terms of required financial and time commitment. It was suggested by the participants that parts of the guidance failed to acknowledge the economic constraints under which smaller companies operate, and were thus deemed unrealistic.
- Following on from the above point, the guidance could highlight more cost effective practices, such as operators looking for problems as part of their routine working practices and raising these problems as and when they happen.
- As discussed previously, there is a balance to be struck across all the guidance sheets relating to the need to provide sufficient information, and the need to make the amount of information manageable. This factor has potential implications for the usability of the guidance. A general criticism concerns the targeted users of the guidance (machine operators). There was a perception that operators would be overwhelmed by the amount of information. Participants suggested that one possible solution is for the comprehensive guidance to be provided to those responsible for managing health and safety. In addition, the key messages could be directly communicated to machine operators in the form of posters or checklists displayed within the workspace.

1 INTRODUCTION

The Health and Safety Executive (HSE) developed the 'COSHH Essentials: easy steps to control chemicals' guidance to help employers, specifically small to medium sized enterprises (SMEs), prevent or control exposure to chemicals under the COSHH regulations (HSE, 2002). An electronic version of COSHH Essentials has now been developed and is freely available on the Internet (www.coshh-essentials.org.uk). Users are required to input basic information about the tasks performed and substances utilised. The system then identifies appropriate control measures. As an addition to the existing electronic COSHH Essentials database, HSE has developed a number of sector specific COSHH guidance sheets, and is currently in the process of expanding this catalogue to encompass a broader range of sectors. The guidance sheets are designed to address substances associated with specific processes carried out within each of these sectors, in order to provide easy to follow information on control measures.

The Health and Safety Laboratory (HSL) were commissioned to conduct a user consultation exercise for the draft guidance sheets developed for industries that employ Metalworking fluids (MWF). Metalworking fluids are neat oils or water-based fluids used during the machining and shaping of metals to provide lubrication and cooling. MWFs also help to improve the quality of the workpiece and prolong the life of machinery by continuously removing the fines, chips, and swarfs from the tool being used and the surface of the workpiece (swarfs are the small pieces of metal removed from a workpiece by a cutting tool). Such fluids are routinely employed by manufacturing/engineering machine shops.

1.1 MAIN HEALTH RISKS FROM WORKING WITH METALWORKING FLUIDS

Exposure to metalworking fluids may cause:

- irritation of the skin or dermatitis;
- occupational asthma, bronchitis, irritation of the upper respiratory tract, breathing difficulties and, rarely, a more serious lung disease called extrinsic allergic alveolitis (EAA).

The main health concern associated with metalworking fluids is dermatitis. Every year, around 200 cases of contact dermatitis related to exposure to cutting oils and coolants are reported to EPIDERM (a scheme in which dermatologists report cases of occupational skin disorders) (HSE Website, 2005). These figures are considered by HSE to be a very substantial underestimate of the true incidence of skin disease.

There is also an association between exposure to airborne metalworking fluids and respiratory effects, including bronchitis and asthma. Work-related asthma is a significant and growing problem with an estimated 1,500 to 3,000 new cases each year. On average, up to 2003, at least 20 of these cases were associated with exposure to MWFs but it is thought many more cases go unrecognised (HSE website, 2005).

1.2 HOW HARM IS CAUSED

Metalworking fluids are mostly applied by continuous jet, spray or hand dispenser and can affect the health of those individuals who use them in a variety of ways:

- Via inhalation of the mist or vapour generated during machining/shaping operations;
- Direct contact with unprotected skin, particularly hands, forearms and heads;
- Via cuts and abrasions or other broken skin;
- Orally, if users eat, drink or smoke in work areas, or from poor personal hygiene, eg not washing hands before eating.

The Control of Substances Hazardous to Health Regulations (COSHH, 2002) requires exposure to metalworking fluids by inhalation, ingestion or skin contact to be prevented where reasonably practicable, or failing that, adequately controlled.

The aim of the consultation exercise was to obtain end-user views on the acceptability, comprehensibility and usability of the COSHH Essentials draft guidance sheets, from individuals with relevant experience of working with metalworking fluids.

In total, 5 draft guidance sheets relating specifically to MWF were provided by HSE for the consultation exercise. Table 1 below provides a summary of the sheets relevant to users of metalworking fluids.

Table 1 Guidance sheets relevant to users of Metalworking Fluid

Table 1. Guidance sheets relevant to users of Metalworking Fluid	
Relevant Sheets	Control measure
MW 1	Controlling the risk to lungs from fluids
MW 2	Controlling the risk to skin from fluids
MW 3	Sump cleaning (Water- mix fluids)
MW 4	Sump cleaning (Neat oils)
MW 5 (&G407)	Managing bacterial contamination

2 METHODOLOGY

2.1 RECRUITMENT OF COMPANIES

Recruitment of organisations that employ Metalworking Fluid on a regular basis was carried out in November 2005. Three companies were recruited to review all five guidance sheets. HSL researchers identified suitable companies via the Yellow Pages and by virtue of opportunistic cold calling contacted each company by telephone to explain the purpose of the research. Companies were offered £100 remuneration in recognition of their cooperation and to compensate for any inconvenience encountered as a consequence of their participation. Once companies had agreed to participate they were sent copies of the relevant guidance sheets along with a letter containing instructions on what issues to consider when reviewing the sheets. The letter also confirmed the date agreed for a visit by HSL researchers to obtain their views. A sample copy of the letter is provided in Appendix 1.

2.2 DATA COLLECTION

Once the recruited companies had sufficient time to review the five guidance sheets, they were visited by two HSL researchers, one to ask questions and the other to take written notes. The discussion was additionally tape recorded on audiotape, to support the notes being taken, with the prior consent of the interviewees. Prior to commencing the interview, the respondents were informed of the study, its objectives and the confidential nature of the interview.

A structured interview schedule (see Appendix 2) was used to elicit participants' views on the acceptability, comprehensibility and usability of the guidance sheets. Views regarding any suggested changes or improvements were also obtained. Information was also obtained on the respondents prior knowledge and employment of COSHH Essentials and where they routinely obtained their health and safety information from. The researchers also obtained feedback from shop floor workers in addition to the views of management. At the end of the interview (which lasted approximately 90 minutes) the researchers thanked the participants and offered them the opportunity to ask any questions they may have. Finally confidentiality was reaffirmed and prior consent obtained for the use of any specific quote or reference.

The transcript data collected during interviews from each company was subsequently reviewed by researchers to identify the overall view of participating organisations in relation to the acceptability, comprehensibility and usability of the draft guidance sheets. Any specific suggestions for change/improvement or specific problems encountered were also identified. Once the feedback had been written up it was sent to the appropriate participants in order for them to verify the account of their views.

In total feedback was obtained from 6 individuals across 3 separate organisations. Given the small sample size we must be cognisant of the limitations of this research. Care should be taken regarding generalising the findings of these interviews to a wider population. The sample size was never intended to be representative of the range of

views held by those that employ metalworking fluids. However, it is possible to distinguish some significant issues from the comments obtained.

The following two sections present the overall findings of this research in relation to the acceptability, comprehensibility and usability of the draft guidance sheets in addition to any suggested changes/improvements or problems identified. Initially, the views obtained from each company are considered in detail, followed by a more general conclusion and overview of the findings.

3 FINDINGS

3.1 METALWORKING FLUID USER 1

Interview with the Managing Director who held responsibility for Health & Safety (H&S). Guidance sheets MW 1, MW2, MW 3 and MW5 (& G407) were considered relevant to the company. One of the sheets, MW4 was not considered relevant because the company does not use neat oils. An employee, who had no additional comments beyond those given by the interviewee, had also reviewed the sheets.

Background

- This was a machine turning company that has been in existence for 30 years.
- There were 16 employees.

General H&S Information for Hazardous Substances

1. The interviewee was familiar with COSHH and together with another team member with H&S knowledge, conducted COSHH assessments within the company.
2. The interviewee had previously used the HSE web site in order to keep up to date with current guidelines for managing the risks from hazardous substances. He also obtains H&S information from the website of the manufacturer's organisation, EEF.

3.1.1 Acceptability

The interviewee stated that the guidance sheets were generally clear and authoritative. Furthermore, many parts of the guidance sheets were relevant to the hazards experienced by this company (except for MW4 which was irrelevant) and that there was sufficient information to control the associated risks. However, there were some issues raised by the interviewee that related to the acceptability of the guidance in its current form:

Suggested changes/additions

1. Much of the guidance refers to the use of modern, sealed machinery, which is not used by this company. This company used older, unsealed machines due to the prohibitive cost of purchasing new machines. The interviewee stated his belief that most small firms would still be using the older type of machines and that therefore some of the guidance was not relevant. Specific examples of the difficulties caused by this focus on new machines are given in the Usability section.

2. There were other aspects of the guidance that the interviewee did not perceive as relevant to his company. For instance, the reference to ventilation was not considered relevant because of the large, unsealed working area; the reference to respiratory equipment was not considered relevant because most of the airborne vapour was steam as opposed to chemicals.
3. The interviewee stated that some of the guidance was impractical for small companies. For instance, the cost of hiring a specialist to examine an air sample was considered prohibitive.
4. It was suggested by the interviewee that a list of simple and cost effective ways of meeting safe regulations would be beneficial to small organisations.
5. Although not directly relevant to the company in question, the interviewee stated that MW4 (Sump cleaning - neat oils) "*doesn't shout loud enough*". He identified the hazards covered by this sheet as more serious than those relating to the other sheets because neat oils are more dangerous chemicals than mixed fluid. However, the interviewee pointed out that the instructions on each of the sheets appeared to carry equal weight. He therefore suggested that the greater relative danger should be emphasised.

3.1.2 Comprehensibility

The interviewee stated that the guidance contained the right amount of information and clearly worded. The diagrams were well received and considered practical. However, there were a number of issues raised in terms of improving the format and content of the sheets:

Suggested changes/additions

1. The interviewee stated a preference for a more clearly defined difference between the "*do's*" and "*don'ts*" and suggested that these needed to be visually separated on the sheets. This was a recurring theme throughout the sheets and was highlighted as the one of the most significant issues.
2. It was also suggested that the sheets could be divided into sections that related to specific issues such as dealing with tramp oil.
3. The interviewee proposed that a diagram of a simple filter system would be a particularly useful supplement to the written guidance.
4. It was suggested by the interviewee that MW3 (Sump cleaning – water mix fluids) should refer to the use of a drip tray (particularly for unsealed machines) and should point out the hazards (i.e. slipping on fluid) of not using this equipment.

5. The interviewee pointed out the need for more relevant language to be used in the guidance. For instance, the MW3 guidance sheet instructs workers to ‘keep absorbent material at hand in case of spillage’ but the type of material is not specified. The interviewee suggested that there should be a reference to a “*pig sock*” that is a well-known trade term that refers to the most effective equipment for containing a spillage. Furthermore, the same sheet refers to the use of RPE when cleaning machines, however, it doesn’t state which specific elements of protective equipment are required. The interviewee suggested that a simple facemask would be sufficient, but the reference to RPE gives the impression that “*full kit*” is necessary, which may deter some employees from undertaking the cleaning process.
6. The interviewee proposed that MW5 (Managing bacterial contamination) could make reference to replacing metalworking fluid if the machine has broken down and is standing idle, because the fluid will have become contaminated. It was further suggested that advice could be included on how to identify contaminated fluid (smell, discolouration).
7. This particular interviewee stated that the reference to biocide (MW5) was useful in highlighting the need to find out more about this issue. However, he proposed that many people would not make this effort and suggested that it would be useful to include further information on this sheet.

Queries/clarification

1. The interviewee considered that the section of MW5 referring to ‘results from dip slides’ was particularly difficult to understand. It was suggested that a chart should be supplied to make this information clearer.

3.1.3 Usability

The guidance was considered usable in conjunction with the aforementioned suggestions for improvement. The interviewee said that the guidance sheets would be of practical use in this company as a move to new premises is imminent and there will be an introduction of a new filtration system at this point. He also informed us that he had learned about the need to undertake dip testing from reading this guidance, which will be put into practice in the new premises. However, there are a number of issues relating to the usability of the sheets with particular reference to the use of older machines as follows:

Suggested changes/additions

1. The interviewee indicated that the implementation of the guidance relating to tramp oil is difficult because old machines work by adding more oil to flush out the system, making it more difficult to control tramp oil.

2. The interviewee pointed out that the older machines have fixed sumps making it impossible to remove the sump to clean it as appeared to be suggested by the guidance.
3. The interviewee stated that it would be useful to have some reference to younger workers and the need for them to understand the H&S implications of using older machinery. In his experience, the training given to younger workers focused on the use of more modern, sealed equipment, which is less likely to be used by smaller companies. Since the guidance sheets also emphasise the use of this type of machinery, this highlights a potential knowledge and skills gap for less experienced workers that would not be bridged by use of the sheets.

3.2 METALWORKING FLUID USER 2

Interview with the General Manager and Works Foreman who jointly held responsibility for Health and Safety (H & S). Guidance sheets MW1, MW2, MW3, MW4 and MW5 (& G407) were considered relevant to the company.

Background

- This was a flange manufacturing company that participated in the turning and drilling of carbon steel and had been in existence for 15years.
- There were 19 employees.

General H&S Information for Hazardous Substances

1. The interviewees were familiar with COSHH and together with a Health and Safety professional recruited from an external organisation, conducted COSHH assessments within the company.
2. The interviewees were aware of COSHH Essentials but had not previously utilised it.

3.2.1 Acceptability

The interviewees stated that the guidance sheets were generally clear and authoritative. Many parts of the guidance sheets were relevant to the hazards encountered by this company. The guidance sheets were considered to provide sufficient information to control the associated risks. The sheet on Bacterial Contamination (MW5 & G407) was generally considered as very beneficial. Both interviewees commented upon the use of Dip slides to check bacterial contamination levels. They had not previously been aware of the availability of this measure and commented that this seemed to be a quick, simple

and cost effective way to monitor and reduce a potential hazard. However, there were some issues raised by the interviewees that related to the acceptability of the guidance in its current form. Various suggestions for improvement were made:

Suggested changes/additions

- 1 It was suggested that the majority of the guidance referred to the use of modern, sealed CNC machinery that was not employed by this company. It was proposed by the interviewees that most small companies would typically employ older machines. Consequently, the information contained in the guidance sheets would sometimes be irrelevant to their workplace. The issue of older machinery is addressed in greater detail in the Usability section.
- 2 The guidance on ventilation within sheet MW1 (Controlling the risks to lungs) was considered to be irrelevant for this company. The interviewees stated that whilst ventilation outlets were in situ they were unnecessary due to the nature of the working area, a large unsealed space. Additionally it was proposed that the majority of airborne vapour was merely steam and therefore did not pose a significant hazard to employees. Furthermore it was suggested that the reference to respiratory protective equipment (RPE), in addition to being irrelevant, was in actual fact alarming. It was proposed that the sheet should emphasise that a simple facemask is all that is required in some instances. It was believed that the mention of RPE suggests the need for technical breathing apparatus that would alarm readers, both in terms of cost and by suggesting the presence of a more serious hazard than actually exists.
- 3 It was felt that much of the guidance was impractical for small companies. It was argued that it would be impossible for small companies to follow all the suggested guidance. In particular the instruction to 'look daily for signs of damage to the ducting and fan' contained in sheet MW1 was highlighted by the interviewees as impractical. Daily checking would result in huge increases in time, manpower and costs that are not really feasible or practical for SME's.
- 4 A general criticism of all the guidance sheets related to the references contained within to occupational diseases such as asthma and dermatitis. One interviewee in particular stated that the sheets were potentially alarmist and could result in employees refusing to operate machines that utilise metalworking fluid for fear of ill health. It was felt by both interviewees that the sheets should approach the potential health risks from an alternative angle. It was suggested that rather than stating that metal working fluid can lead to asthma and dermatitis there should be greater emphasis placed upon how the correct use of these fluids will prevent any health related problems.
- 5 Overall, it was suggested that the information contained in sheets such as these could never be specific to every company due to the immense diversity of companies. In the interviewees opinion ready written packages cannot work effectively. It was suggested that the sheets should be constructed in some way that allows them be tailored to suit each individual companies needs. It was acknowledged however that this appeared to be an insurmountable challenge.

- 6 A criticism levied at the entire guidance referred to the crosses employed to indicate Don'ts. It was argued that the crosses simply tell you not to do something. However, there are no explanations offered as to the reasons why and it was proposed that this should be discussed. It was felt that people were more likely to follow the guidance if they understood, and were made aware of the reasons why they should do so.

Queries/clarification

- 1 Sheet MW2 (Controlling the risks to skin) cites that protective gloves are always required. However, the interviewees were confused about this guidance. There was uncertainty as to whether or not it referred to the mixing or the using of oils. Furthermore it was argued that operators should never use gloves when machining due to the potential hazard of entanglement in machinery.
- 2 Whilst sheet MW5 (& G407) (Managing bacterial contamination) was generally received favourably it was stated that the instruction to 'Cover the sump', was confusing. The respondents claimed that on their particular machinery the sumps are "*never open*", stating that the machine could not operate if the sump was open. Additionally, the instruction to 'keep sumps free of metal swarf' was also claimed to be misleading. Both interviewees stated that swarf would never enter a sump.

3.2.2 Comprehensibility

The information within the guidance sheets was generally identified as clear, accurate and relevant with no major gaps. There were however, some recommendations for improvement concerning the format and content of the sheets:

Suggested changes/additions

1. The overall layout of the sheets was criticised. It was believed that the use of ticks and crosses on all the guidance sheets to identify Do's and Don'ts was confusing. It was reported that because the symbols were randomly interspersed throughout the sheets and were relatively small it was difficult to quickly identify if the point being made was a Do or Don't. It was suggested that Do's and Don'ts should be grouped together and listed separately, ideally with the Don'ts being emphasised in some way, such as highlighted in red.
2. The illustrations and flow diagrams in several sheets were identified as useful. It was suggested that the sheets should include more of these, particularly the flow diagrams that were well received. One interviewee commented that he liked to use diagrams such as these. It enabled him to tick off each stage once he had completed it and he could sign the sheet upon overall completion and keep it as a record for both himself and other relevant individuals.
3. Overall the sheets were perceived as highly repetitive. It was suggested that the information contained within all five sheets should be condensed into just one

guidance sheet. As an example it was highlighted that the example of a chart on the final page of sheet MW2 (Controlling the risk to skin) to control fluids was equally applicable to sheet MW1 (Controlling the risk to lungs).

4. It was felt that overall there was too much information and as a corollary the important information did not “*jump out at you*”.

Queries/clarification

1. There was some confusion over whether the information presented in the guidance sheets was for the purpose of disseminating good practice, or defining the legal requirements for compliance.
2. There was considerable uncertainty over the terms ‘tramp oil’ and ‘highly refined neat oil’, which were referred to in several of the sheets. Both interviewees stated that they were unclear as to what these terms referred to and suggested it should be clarified.
3. Furthermore, there was confusion with reference to sheet MW5 (&G407) (Managing bacterial contamination) as to what ‘Regularly check that tramp oil is below 2%’ meant. In addition to being unclear as to the terminology ‘tramp oil’ neither interviewee was clear as to what ‘2%’ referred to.
4. The term ‘ppm’ contained in MW5 was also highlighted as potentially misleading. Only one of the interviewees was aware of this acronym and consequently it was suggested that this should be clarified.

3.2.3 Usability

The guidance was generally considered usable with the addition of the aforementioned suggestions for improvement. There were however a number of issues relating to the usability of the sheets with particular reference to the use of company specific information.

Suggested changes/additions

1. The interviewees stated that much of the guidance contained in sheets MW3 and MW 4 (Sump cleaning - water mix fluids and neat oils respectively) was unusable in their particular instance as it suggests removing the sump. It was considered to be impossible to remove and clean the sump on their older machinery. It was explained that such machinery typically contains fixed sumps and is commonplace within small companies.
2. It was suggested that given the above criticism, the guidance should describe the alternative procedure of flushing the machine with cleaner. It was claimed that this point, once again emphasised the failure of the sheets to differentiate between old and new machinery. This was believed to be a general fault within

all the guidance sheets and it was proposed that the sheets should direct companies towards further guidance specific to their machines.

3. It was suggested that in their present format the sheets are unusable for a small company. There is too much information that is “*over the top and unmanageable*” and they could not be used to any value. One interviewee proposed that the information within them should be condensed; possibly placed upon cards, and in such a manner that would permit incorporation into some form of maintenance schedule that would attend to only the points relevant for each company.
4. Finally, the interviewees expressed the view that having people visit their company and go through the guidance was preferable to simply reading the sheets. One interviewee suggested that a visit would ensure that companies are more likely to take notice and use the guidance. “*It would get through to more people if you actually talk to them*”.

3.3 METAL WORKING FLUID USER 3

Interview with Managing Director and Machinist (horizontal borer). Guidance sheets MW1, MW2, MW3, MW4, MW5 (& G407) were considered relevant to the company.

Background

- This was a 26-year-old company involved in sub-contracting machining (boring, cutting, turning etc).
- There were 14 employees.

General H&S Information for Hazardous Substances

1. The interviewees were familiar with COSHH. The MD was aware of COSHH guidance sheets.
2. In conjunction with the Federation of Small Businesses, they use independent consultants to perform H&S audits.

3.3.1 Acceptability

The interviewees stated that the guidance sheets were generally clear. The sheets were broadly relevant to the hazards faced by the company and the view was expressed that they contained more than enough information to control the associated risks. The interviewees stated that the sheets had a measure of credibility in that they were “*not fatuous*”; however some concerns were raised that related to the acceptability of the guidance in its current form. Suggestions for improvement included:

Suggested changes/additions

1. It was suggested that much of the guidance related to the use of modern, sealed machinery that was not used by this firm. It was argued that producing separate sheets for older machinery would increase the relevance of the information given, particularly for smaller firms that were more likely to employ this type of machinery. This issue is addressed in greater detail in the Usability section.
2. The interviewees considered the reference to ventilation to be largely irrelevant for their particular work context. It was believed that the guidance conveys an impression that MWF users are operating in confined spaces. The interviewees considered the large unsealed area in which they operate to provide sufficient natural ventilation.
3. The references to the occupational diseases asthma and dermatitis contained within the sheets were considered to be incomplete. The interviewees highlighted that the sheets instruct users to 'tell your workers what the early signs of asthma/dermatitis are'. This perplexed the interviewees however, who stated that this was impossible, as they did not know themselves. Whilst this information is accessible when the sheets are consulted electronically and there are web links provided at the end of the sheets it would be preferable to provide a short summary of key signs and symptoms beside this instruction.
4. The interviewees were of the opinion that parts of the guidance proceeded from an assumption that operators would know the volume of the sump. It was proposed that on older machinery this might not be the case. Consequently, it was suggested that there should be a prior instruction to ascertain the sump volume.
5. With regard to the guidance concerning neat oils (MW 4) the interviewees were of the opinion that neat oils constituted a greater risk than water-mix fluids. Consequently they suggested that this greater risk should be highlighted and conveyed more effectively in some way.
6. It was suggested that awareness of the hazard and its harmful consequences should be raised. Attention was drawn to the fact that only sheet MW5 (Managing bacterial contamination) begins with a short paragraph in bold highlighting the potential health risks posed by MWF. The interviewees were of the opinion that each sheet should begin with a similar paragraph in order to encourage self-protective behaviour.

Queries/clarification

1. Sheet MW2 (Controlling the risks to skin) cites that protective gloves are always required. However, the interviewees were confused about this guidance. It was felt that the guidance failed to specify under which circumstances gloves should be worn. Furthermore it was argued that operators should never use gloves when machining due to the potential hazard of entanglement in machinery.

2. A further query relating to MW2 concerns the possible need to use de-ionised water. Both interviewees were unclear as to where this could be obtained and suggested that the guidance should provide further information on this matter.
3. There was a query about the guidance provided in sheet MW1 (Controlling the risk to lungs) that refers to applying fluids at the 'lowest possible volume flow rate to avoid overheating'. The interviewees were of the opinion that the instruction should be to use the maximum flow rate.
4. A query concerning sheet MW5 (Managing bacterial contamination) relates to the instructions to 'measure the sump fluid temperature regularly and ensure it does not rise above room temperature'. The guidance however does not specify the reason for this and the interviewees were uncertain as to the nature of the hazard that would be controlled by this measure.
5. A further query within MW5 concerns the instruction to keep records of all dip slide tests for at least five years. Again, the guidance fails to provide information on the reason for this and the interviewees were uncertain as to why this was required.

3.3.2 Comprehensibility

The information and use of language contained in the sheets was considered to be generally clear with no obvious omissions. Overall no parts of the guidance were perceived as too technical for end-users. There was however some concern raised in this area.

Suggested changes/additions

1. The interviewees considered that the amount of information given in each sheet was somewhat overwhelming. They suggested that the comprehensive version of the sheets should be reserved for managers and that a shortened version of the sheets (more like a checklist) should be produced which targeted machine operators, in order to increase usage of the guidance. One possible suggestion was for the key messages within the sheets to be communicated to operators in the form of posters displayed within the workspace.
2. There was a general feeling that the guidance sheets were unnecessarily repetitive, simply saying the same things in different ways. It was proposed that as a corollary this repetition has the effect of diluting their important function; impressing upon end-users how hazardous MWF's can be and encouraging them to take the appropriate control measures. However, they acknowledged that if someone were to use the sheets selectively, that all the relevant information needed to be on each one. Nevertheless, it was suggested that some condensing of information would be useful.

3. It was pointed out that some of the sheets refer to ‘fluids’ in their title, but in the body of the guidance, the term ‘chemicals’ is used. This was considered to be potentially confusing as many workers would consider their products to be fluids rather than chemicals and might therefore dismiss the guidance as irrelevant.
4. Flow diagrams and illustrations within the sheets were generally well received. The illustration of record keeping on sheet MW5 (Managing bacterial contamination) however was considered to be more appropriate for larger firms. It was suggested that it would be difficult for small firms to monitor and keep such charts due to time constraints.

Queries/clarification

1. Point 4 within sheet MW2 (Controlling the risk to skin) – ‘Minimise leaks of tramp oil was queried’. The interviewees stated that “*unused oil just runs off and there is nothing you can do about it*”. The interviewees were uncertain as to how this guidance could be implemented.

3.3.3 Usability

The guidance was generally considered usable with the addition of the aforementioned suggestions. There were however a number of issues relating to the usability of the sheets in their present format with particular reference to their relevance for small companies.

Suggested changes/additions

1. The interviewees were of the opinion that the sheets failed to acknowledge the traditional design of older equipment that is commonly in situ in small firms. Unlike the previous participant, they claimed that the sumps couldn’t be covered on their particular machinery. They expressed the common view however that the guidance was directed more towards contemporary sealed machinery. As a corollary, elements of the guidance were considered to be unusable.
2. Whilst the interviewees acknowledged a need to provide sufficient information it was suggested that too much information was presented within the sheets. Given the further criticism that there was considerable repetition, it was proposed that the information provided should be condensed in some way to improve manageability and usability. Following on from the failure of the guidance to differentiate between older and modern sealed machinery, one suggestion was for guidance to be targeted specifically toward each type of machinery. Firms would then be able to select the guidance most pertinent for their particular work context.
3. It was suggested that there would be difficulties encountered by small firms in implementing the guidance in its current format. Small firms have limited resources available to them. Time in particular is constrained within small firms

and it was suggested that it might be impossible for such firms to devote the time needed to perform all the tasks suggested in the guidance. Older workers within these firms in particular were considered least likely to perform tasks such as daily checks as “*they would not see the need*”.

4 CONCLUSIONS

This section presents a summary of the overall findings from the participants in relation to the acceptability, comprehensibility and usability of the draft guidance sheets. Care should be taken regarding generalising the findings from the interviews to a wider population, as the sample size was never intended to be representative of the range of views of those that employ metalworking fluid.

4.1 ACCEPTABILITY

- In general, the guidance sheets were well received and the information was acceptable in relation to work practices and contexts.
- There was felt to be some inconsistencies with the information within certain groups of guidance sheets, this included for example, confusion over recommendations for Respiratory Protective Equipment (RPE) that were considered to be misleading. There was a general consensus that the guidance should clearly state that a simple facemask is sufficient to prevent hazard exposure in the majority of instances.
- There was a conflict regarding the general information required across the sheets to highlight the consequence of the hazard. Some of the participants felt that awareness of the hazard and its harmful consequences should be raised, whilst others had an opposing view. Hazard awareness however should be framed in relation to lay understandings. This is consistent with findings from the risk communication and health protection literature that emphasise the importance of giving information on extent of harm, and personal susceptibility, in order to encourage self-protective behaviour.
- One factor that may influence the effectiveness of a health appeal is the frame of the message. Prospect theory proposes that people are differentially persuaded when a choice is framed in terms of associated costs (loss-framed) or associated benefits (gain-framed) – even when the two frames describe objectively equivalent situations (Kahneman & Tversky, 1979). Research on framing has suggested that the function of health behaviour is important in determining the optimal frame for messages promoting the behaviour. Many prevention behaviours have relatively certain outcomes (e.g. using RPE reliably reduces the risk of occupational asthma), and studies suggest they are better promoted by gain-framed messages, (e.g. Rothman, Martino, Bedell, Detweiler, & Salovey, 1999). Positively framed messages have been found to increase intentions to follow safe working practice (Ferguson, Bibby, Leaviss & Weyman, 2003). Rather than the guidance simply stating that MWF can cause asthma and dermatitis it may be more effective to emphasise how implementing the guidance will lead to gain by limiting risk of these occupational diseases.
- Participants felt that the guidance sheets were not wholly relevant to their workplace, e.g. they were more appropriate to modern machinery. It was suggested

that any guidance needs to acknowledge the variation in workplace contexts in order to persuade the reader of the relevance of the guidance.

4.2 COMPREHENSIBILITY

- The guidance sheets were generally perceived to be clear, accurate and relevant.
- There was some confusion over whether the information presented in the guidance sheets was for the purpose of disseminating good practice, or defining the legal requirements for compliance. Participants were in favour of information that would detail the requirements for legal compliance in a readily accessible format.
- There was a general consensus that the use of crosses and ticks to indicate Do's and Don'ts and the manner in which these were presented throughout the sheets was confusing. It was suggested that it would be more appropriate to clearly differentiate positive and negative practices, listing them separately rather than interspersing them, as is the case in the sheets' current format. Raising the emphasis placed upon unsuitable practices, for example by displaying them in red was also suggested. Furthermore it was postulated that users are more inclined to assimilate information and use it if they are provided with the justification to do so. In their current format it is noted that guidance merely instructs operators not to do something but rarely qualifies the reason why.
- There was some confusion over the meaning of different numerical/technical terms used to highlight information, and also the use of acronyms. It was suggested by participants that these require expansion and clarification.
- Participants were aware of the difficulty in striking a balance between the need to provide sufficient information, and the need to reduce the information presented in order to make the guidance sheets more user friendly. However, in general the sheets were considered to be too lengthy. It was felt that future guidance sheets might consider the option of condensing generic information that is repeated across the sheets, into a single introductory guidance sheet.
- Criticism was drawn to the use of illustrations. In general illustrations were well received and it was considered useful to use illustrations to demonstrate simple procedures. Flow diagrams were considered to be particularly usable. However, several illustrations, in particular illustrations of charts for record keeping, were felt to be unnecessary and repetitive throughout the sheets and it was believed that this communication medium should be employed more effectively.

4.3 USABILITY

- The sheets were generally viewed as providing a practical framework for addressing the control measures for specific hazards, especially for companies with low levels of health and safety knowledge.
- There was a general perception that the guidance sheets failed to differentiate between old and contemporary machinery. The guidance was regarded as predominately directed towards companies that utilise modern sealed machinery. Due to the prohibitive cost of purchasing new machines there was a belief that most small firms would still employ the older type of machines. It was proposed that as a corollary various sections of the guidance were irrelevant/unusable for such firms. Paradoxically, such small firms are precisely the intended targets for the guidance. Companies suggested that the provision of separate guidance, tailored to the different ages and type of equipment being used by SME's, should be considered.
- In some instances criticism was levied at several of the control measures advocated which were considered to be resource demanding (e.g. employing ventilation engineers/conducting daily checks) both in terms of required financial and time commitment. It was suggested that parts of the guidance failed to acknowledge the economic constraints under which smaller companies operate, and were thus deemed unrealistic. Participants were of the opinion that SME's may not be able to afford the cost implications of some of the control measures, particularly in terms of additional staff-hours or employees. The trade-off between cost and benefit in terms of improved safety performance needs to be more carefully considered for SME's. It may however be a misperception that certain control measures are costly to implement. HSE could provide accurate information on the likely costs to SME's.
- Following on from the above point, the guidance could highlight more cost effective practices, such as operators looking for problems as part of their routine working practices and raising these problems as and when they happen.
- As discussed previously, there is a balance to be struck across all the guidance sheets relating to the need to provide sufficient information, and the need to make the amount of information manageable. This factor has potential implications for the usability of the guidance. A general criticism concerns the targeted users of the guidance (machine operators). There is a perception that operators would be overwhelmed by the amount of information. Participants suggested that comprehensive guidance could be provided to those responsible for managing health and safety whilst additionally the key messages could be directly communicated to machine operators in the form of posters or checklists displayed within the workspace.
- Finally, it should be considered that any generic guidance requires individual companies to be cognisant of any necessary modifications in relation to their particular working environment/practices and resources available. The guidance

should incorporate some advice for companies on the need to obtain specific guidance tailored to their particular needs in order to facilitate its use.

5 APPENDICES

5.1 APPENDIX 1: LETTER TO COMPANIES

Re: User Consultation for COSHH Essentials Guidance Sheets

Dear XXXX

Following our telephone conversation on XXX, I would like to thank you for agreeing to assist us in reviewing the draft COSHH Essentials guidance sheets.

The Health and Safety Executive is currently producing sector specific guidance on COSHH Essentials, of which Metalworking fluid users is one sector. They have asked the Health and Safety Laboratory to speak to the end-users of these draft guidance sheets to obtain their views on the information contained within them.

Your participation would involve reviewing the guidance sheets and talking to us during a visit to your organisation to obtain your comments on the guidance sheets. A summary of the discussion we have with you will be sent to you once we have written it up so that you can check that what we have reported is accurate. We would also like to give you £100 payment to show our appreciation of your time and effort in helping us with this research.

I have enclosed three copies of each guidance sheet for review by yourself, employee(s) and any other interested parties in your organisation. Please could you read and comment on the guidance sheets (before the consultation date of XXX). As you read each sheet we would like you to think about:

How relevant the guidance is for you and your workplace

How easy the guidance is to understand

How easy the guidance is to use in your workplace

How helpful the guidance is for controlling exposure in your workplace

What would improve the guidance sheet?

In addition, it would be helpful if one or more of your employees could read and comment upon the Employee Section and have a brief chat with us when we visit your organisation.

If a specific sheet does not apply please disregard it.

Once again many thanks for your assistance. My colleague XXXX and I look forward to meeting you on XXXX. If you have any queries or problems in the meantime please do not hesitate to contact me at 01298 XXXX.

Yours sincerely,

5.2 APPENDIX 2: QUESTION SET

COSHH Guidance Sheets: User Consultation Question Set

Introductions: Thank for assistance, names, position, experience etc.

Check background details of company: size; activities; length of time in business.

General H&S Information for Hazardous Substances

1. Who is responsible for COSHH in the organization?
2. How are the COSHH assessments done?
3. Have you used COSHH essentials?
Prompt
 - What did you think of the content?
 - Was the information easy to understand?
 - Was the information usable in your workplace?
4. Where else do you get H&S information for hazardous substances?

QUESTIONS FOR EACH SHEET:

Acceptability

1. What do you think of the guidance?
Prompt
 - Is it reasonable?
 - Is it relevant (to hazards)?
 - Is it sufficient (to cover hazards and to control risk of exposure)?
 - Is it the right information for your workplace?
2. Are there any gaps in the information?
Prompt
 - What would you add?
 - How would you improve it?
3. Did you learn anything from this guidance sheet?

Comprehensibility

1. Is there anything on the sheet that is unclear, or difficult to understand?
Prompt
 - Could you follow the guidance?
 - What do you think about the amount of information?
 - Is there anything that needs changing?
 - Could the presentation of the information be improved in any way (e.g. text or pictures)?
2. What would you do to make the sheet easier to understand?

Usability

1. Would you be able to use the guidance in your workplace?
Prompt
 - What difficulties would there be in implementing the guidance?

2. If you implement the guidance do you think it will make any difference?
3. Does the guidance address:
 - (a) The specific hazards in your workplace?
 - (b) The realities and practicalities of your workplace?

Round up

1. Thank you for your help and time. Is there anything that we haven't covered that you would like to add?
2. Do you have any further questions about the work?

Workers

1. What do you think of the guidance?
2. Is the guidance relevant for?
 - (a) Your job?
 - (b) Your workplace?
3. Is there anything that is unclear or difficult to understand?
4. Would you have any difficulties in following the guidance?
5. What improvements could be made to the guidance?

6 REFERENCES

HSE (2002) The Control of Substances Hazardous to Health Regulations 2002. SI 2002/2677.

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decisions under risk. *Econometrica*, 47, 263–291.

Rothman, A. J., Martino, S. C., Bedell, B. T., Detweiler, J. B., & Salovey, P. (1999). The systematic influence of gain and loss-framed messages on interest in and use of different types of health behaviour. *Personality and Social Psychology Bulletin*, 25, 1355-1369.

Ferguson, E., Bibby, P.A. and Leaviss, J., & Weyman, A. (2003). Effective design of workplace communications. *HSE Research Report 093*.