

Factors influencing the implementation of RPE programmes in the workplace

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This report sets out the findings from a qualitative study examining respiratory protective equipment (RPE) programmes across industry. Managerial decision-making was the focal point for this research given that decisions about RPE programmes rest with management. This cross-sector, exploratory study set out to address research on: what current RPE selection and use looks like; how this compare with 'good practice' and what factors influence choice and implementation of RPE programmes.

Considerable variation was found in RPE competence and control of respiratory risks. Four groups of companies were identified:

- **Learners** - were in very early stages of development of their RPE programmes and still had some way to go before both competence and control are established.
- **Developers** - had developed competence, but were failing on the implementation side of their programme.
- **Fortuitous** - lacked competence, but due to reasons outside of management control, were in control of respiratory risks.
- **Proficient** - meaning that managers were considered to have at least an acceptable level of RPE competence and controls did appear to be working.

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Our special thanks go to the managers and workers who took part in this research for giving generously their time and thoughts. We hope that the report does justice to their experiences and views.

EXECUTIVE SUMMARY

BACKGROUND

This research was commissioned by HSE to assist in improving the control of respiratory risks across industry. The need for this research arose from both previous HSE research and from anecdotal evidence gathered by inspectors indicating a high rate of UK employees potentially at risk of respiratory disease, a general lack of awareness and concern for respiratory risks, and organisational-level respiratory protective equipment (RPE) programme failings.

AIMS AND OBJECTIVES

This cross-sector, exploratory study set out to address three research questions. These were: (1) What do current RPE selection and use practices look like across industry? (2) How does this compare with ‘good practice’ needed for compliance with the law and for adequate protection from risks associated with inhalation exposure? and; (3) What factors influence the current practices for choice and implementation of RPE programmes? Managerial decision-making was the focal point for this research given that decisions about RPE programmes rest with management. Furthermore, very little is known about how managers select RPE controls, what information this is based on, whether any gaps or misunderstandings are inherent in their decision-making process, and what the enablers and barriers are to good RPE practice.

MAIN FINDINGS

What do current RPE selection and use practices look like across industry?

Considerable variation was found in RPE programmes across the companies that participated in this research. Four groups of companies were identified, namely:

1. **The Learners** – These companies had recently begun a journey towards better RPE performance. Current RPE practices would not be fully effective in this group. Managers were in the process of establishing a formal RPE programme whilst continuing to develop their own knowledge in the area.
2. **The Developers** – These companies had RPE systems in place and were generally aware of what they needed to do to protect workers against respiratory disease. They still had some way to go, however, with actual implementation of their programme.
3. **The Fortuitous** – In these companies workers were protected against respiratory hazards despite a significant RPE knowledge and skills gap at the managerial level, accompanied by the absence of a structured RPE programme.
4. **The Proficient** – These companies had a fit-for-purpose RPE programme; managers had an acceptable level of RPE competence and controls did appear to be working. Variation in the degree of success of programme implementation was apparent, however, amongst ‘proficient’ companies.

How does this compare with ‘good practice’ needed for compliance with the law and for adequate protection from risks associated with inhalation exposure?

Just under half of the sample was classified as ‘proficient’. These managers generally had good RPE knowledge and risk perception, selected RPE compatible with work tasks, had RPE

policies and procedures and a good standard of occupational health provision. Further they had regular communications on RPE with workers, trained workers on hazards and RPE use, followed HSE/industry guidance and kept abreast of updates through monitoring the HSE Website whilst proactively seeking new information from a network of external contacts. Conversely, managers belonging to other groups, especially the 'learners', relied too heavily on workers' 'common sense' to use RPE correctly. 'Learners' were happy to have reached what they considered to be an 'acceptable' standard of respiratory control (i.e. to have ticked all the boxes). Nevertheless, most companies (even some 'proficient') needed to improve:

- **Management and worker knowledge, awareness and understanding of respiratory risks and RPE generally.** In particular, managers need to be aware of the need for: adequate fit testing (with less reliance on 'common sense'), workers being clean-shaven, and refresher training for both managers (especially supervisors) and workers. Workers need a better understanding of the hazards that they work with and how, in the long-term, these could impact on their health and well being.
- **Knowledge of ongoing monitoring, storage and maintenance requirements.** This includes having an understanding of what maintenance procedures to put in place for different types of RPE and ensuring regular supervision of RPE operatives backed up by regular training (on good fit, cleaning, storage and maintenance) and appropriate reward/disciplinary procedures. **Substandard maintenance was a recurring theme,** and includes RPE documentation (in particular training and maintenance records).

What factors influence the current practices for choice and implementation of RPE programmes?

RPE programme choice:

- Legislation and external audits by HSE, insurers and industry groups were key motivators for initial programme development. Insurers influenced managers' to record RPE issue and provide health surveillance, even if not required by law.
- Managers sought advice from sister companies and a range of external contacts, mostly consultants, manufacturers and/or suppliers, industry contacts, and even competitors. Small companies looked to suppliers to tell them what to do.
- Worker feedback (particularly on comfort), control availability and history of use of specific controls within the organisation all influenced managers' choice of specific RPE controls. Further, managers' own knowledge, experience and research, supported by the advice they received from manufacturers/suppliers, played a role.

Implementation of RPE programmes:

- Objective assessments (e.g. exposure monitoring, fit testing) influenced managers' judgement of control effectiveness. Subjective assessments reinforced this, such as worker observations/feedback, improved self-efficacy and culture, and comparison to others (for small companies) or to their previous situation (in medium/large companies).
- RPE misuse was common amongst workers with the exception of companies governed by tight procedures (e.g. asbestos removal).

- Resources for ongoing maintenance of RPE and LEV¹ affected level of maintenance. Managers wanted simple solutions, ideally no storage or maintenance requirements.
- Managers rarely corrected poor storage and maintenance practices amongst workers despite these being commonplace. This seemed to reflect a lack of knowledge on their part about what exactly was required for their situation.

A note on how these research findings should be interpreted and applied:

Findings from this research provide an indication of the current state of RPE programmes across industry (strengths and areas in need of development). Although the companies that took part were not representative of industry at large, this study provides useful insight into failures in RPE competence and control that might be common across sectors. Nevertheless, there may be subtleties in managerial RPE decision-making and factors influencing subsequent behaviour/action, which are unique to particular industries. As such, care should be taken when applying these findings to other industries/sectors (i.e. beyond the following: Construction, Brick Making, Quarries, Foundries, Manufacturing of Composite Components, Metal Fabrication and Stone Masonry). Findings are indicative of what might be happening within a particular industry rather than conclusive accounts. HSE is advised to use these findings in conjunction with those from other research commissioned in the area to determine the way forward for tackling work-related respiratory disease. Recommendations have been made to the HSE customer (in a separate annex to accompany this report) for further research to support ongoing developments.

¹ *Local exhaust ventilation.*

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1 INTRODUCTION

This report sets out the findings from a qualitative study examining respiratory protective equipment (RPE) programmes across industry. This study involved research with 24 organisations between November 2008 and August 2009. This first section sets out the background and aims of the project before giving an overview of the research methodology. The section ends by laying out the structure of the rest of the report.

1.1 BACKGROUND

This research was commissioned by HSE to assist in improving the control of respiratory risks across industry. The RPE project identified a need for research to understand the behavioural aspects associated with managers' selection and implementation of RPE programmes. Also, previous HSE research and anecdotal evidence gathered by HSE inspectors indicated the following:

1. A high rate of UK employees potentially at risk of developing respiratory disease. The 2005 HSE FIT 3 workplace survey (Thompson & Wake, 2007) estimated that 5.5 million UK employees in 220,000 workplaces were potentially at risk of developing respiratory disease and up to half of these workplaces may be using RPE to protect their workers.
2. A general lack of awareness and concern for respiratory risks amongst employees. For example, in one study 17 welders believed the risks involved to be less significant than that of burns/heat (Murphy et al, 2008). A general lack of awareness was also reported in another study involving poultry farm workers (Hopkinson & Cummings, 2007).
3. Organisational-level RPE failings (e.g. incorrect respirators, lack of training for employees on correct use). A study carried out to develop baseline intelligence on exposure and the control of respirable crystalline silica (RCS) in key industry sectors found a general need to improve risk assessments for tasks that cause RCS exposure in line with the 'COSHH' (Controls of Substances Hazardous to Health) Regulations. More specifically, where RPE was relied upon as a form of exposure control, it required better organisational processes and procedures in place, namely, selection, training, cleaning and maintenance of equipment (See Easterbrook, 2008). Similar findings were reported in the poultry farm study (i.e. a lack of provision, training and enforcement of RPE use) and elsewhere (e.g. Howie et al, 1996).

A recent literature review carried out by the Institute of Occupational Medicine (see Graveling et al, 2009) found that most studies on RPE/PPE (personal protective equipment) have focused on compliance behaviour (relating to point one above). Attitudinal and behavioural studies on RPE were scarce in the literature; those carried out examined worker attitudes and behaviours behind the use and non-use of PPE generally (relating to point two above). Even fewer studies have addressed RPE successes and failures at the organisational/managerial level (relating to point three above). Although worker attitudes and behaviours were investigated in this research, the primary focus concerned understanding the influences on managerial decision-making underpinning RPE programmes. After all, very little is known about how managers select RPE controls, what information this is based on, whether any gaps or misunderstandings are inherent in their decision-making process, and what the enablers and barriers are to good RPE practice. Additional reasons for focusing the research at the managerial level are contained in Box 1.

- “*There is a lack of studies measuring managers’ subjective evaluations*” (Holmes et al, 1997), yet it is management who ultimately decide what RPE programme to put in place.
- It is widely accepted that directors who set a good example in their attitudes and actions towards health and safety promote similar attitudes and behaviour in their workforce (Shearn and Miller, 2005).
- A number of research studies (see Kelloway et al, 2006) have shown that when leaders actively promote safety, organisations have better safety records and more positive safety outcomes. “*Leadership is crucial to safety results (as it) creates and maintains the culture that determines what will and will not work*” (Petersen, 2004).
- DeJoy et al’s (2000) research indicated the need for making safety equipment readily available and reducing job-related barriers to compliance, both of which inevitably fall to management.

Box 1: Rationale for focusing the research at the organisational/managerial level.

1.2 AIMS AND OBJECTIVES

This exploratory study **aims** to address three research questions. These are:

1. What do current RPE selection and use practices look like across industry?
2. How does this compare with ‘good practice’ needed for compliance with the law and for adequate protection from risks associated with inhalation exposure?
3. What factors influence the current practices for choice and implementation of RPE programmes?

In order to address these research questions, five specific **objectives** were identified to guide the design and conduct of the research. These objectives were to:

1. Describe approaches to the selection of RPE that prevail in industry;
2. Identify the factors (attitudinal, behavioural or other) influencing the processes of selection, use, storage and maintenance of RPE;
3. Describe the types and levels of training and information provided by employers to operatives, and reasons for chosen approaches;
4. Describe how employers with effective (or ‘good enough’) RPE programmes achieve this level of performance;
5. Identify enablers and barriers to good RPE practice.

The outputs from this research will assist both industry and HSE to design communication interventions for employers and, to a smaller extent, employees, and will inform inspector training and dutyholder engagement strategy.

1.3 REPORT OVERVIEW

The next section of this report ([section 2](#)) provides an overview of the research methodology. The rest of the report discusses the substantive findings of the research. In [section 3](#) the ‘typological categories’² of managers that were identified through the research findings are presented. These typological categories were based on researchers subjective judgements of RPE programmes following each site visit and on managers own descriptions of their RPE programmes and the decision-making underpinning these. Results from the management interviews are set out in [section 4](#) of this report and worker observations and interviews in [section 5](#). [Section 6](#) brings together findings from the various data gathering approaches (interviews, observations and documentation review) to summarise key points of success and failure of RPE programmes. Finally, the conclusions are provided in [section 7](#).

The analysis of the data gathered from the management or worker interviews during the four pilot site visits carried out between November 2008 – March 2009 is largely excluded from this report. This is because the research tools changed significantly through the course of the pilot study. Pilot findings were used to inform the development of the research tools for the main research. As such, analysis of the management and worker interviews are based on the 20 main site visits carried out between April – August 2009. The worker observation findings included in section 5 do, however, include the four pilot companies, as the observation checklist was not changed following the pilot study.

² A **typology** is the result of the classification of things according to their characteristics. The products of the classification, i.e. the classes are also called types. See <http://en.wikipedia.org/wiki/Typology>

2 METHODOLOGY

2.1 OVERVIEW OF THE RESEARCH PROCESS

This section provides an overview of the research process in the form of a flow diagram (Figure 1 below). A more in-depth account of each stage can be found in the appendices to this report (contained in an accompanying annex (B) to this report³).

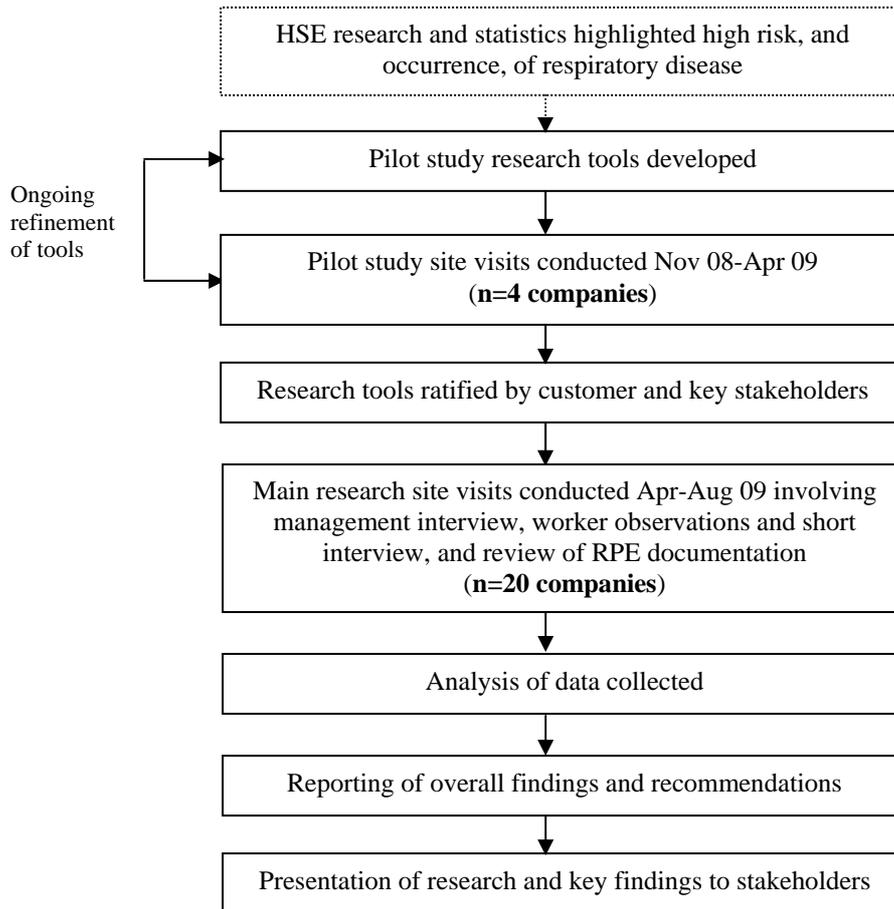


Figure 1: Flow diagram of study methodology.

2.2 RESEARCH DESIGN

The research was qualitative in design using a mixture of data collection methods during each site visit. In-depth interviews with managers were selected as the primary mode of data collection as the aims of the study required a detailed exploration of the drivers behind current RPE practice. Interviews lasted between 60-90 minutes and explored: the decision making behind the selected RPE and other controls (e.g. LEV); confidence in controls; limitations and concerns with the approach adopted; employee practices relating to the misuse of RPE; health monitoring/surveillance; instruction and training provided to workers as well as the storage and maintenance systems in place and reasons for adoption. The interviews were conducted using open, non-leading questions and answers were fully probed. All interviews were recorded once managers had provided written consent and recordings were later transcribed.

³ Available through the HSE customer.

Observations of workers undertaking tasks requiring the use of RPE were also included (if practicable and safe) and short follow up interviews (five to 20 minutes in duration) were carried out with workers to explore the reasons for the behaviour observed. Observing RPE operatives in practice allowed the views of managers expressed during the interviews to be compared with actual practices on the ground floor. Observations generally lasted an hour, during which researchers completed an observational checklist⁴. A review of available RPE documentation was also undertaken to provide an additional check on stated policies and procedures in the management interview with those actually in place. Comparison of the findings from the management and worker interviews, observations and documentation review was considered sufficient for triangulation of the data⁵.

2.3 SAMPLING AND RECRUITMENT

A team of experienced specialist occupational hygiene inspectors reviewed HSE's operational database and selected organisations and sites where work activities required the regular use of RPE. The sample included a mixture of high and low performing sites with regards to general RPE competence. Typical respiratory hazards that workers were exposed to included silica dust, general dust, fumes/vapours, solvents, chemicals, isocyanates and asbestos. However, due to the nature of HSE's enforcement process and the limited size of the sectors involved, the database did not contain sufficient examples of all high-risk activities. A further group of premises representing foundries, brickworks, quarries and welding/fabrication were selected by approaching HSE Sector groups. A soap works was also selected following this process.

The HSE customer sought permission from area inspectors to approach companies selected from the database. After obtaining approval, the HSE customer contacted individual companies by phone, briefly describing the research process before asking if the company would be willing to take part. The participant's contact details were then checked and a date and time for the site visit arranged. Once the companies had agreed to take part in the research, HSL researchers sent a confirmation letter to the company representative detailing further information about the research and the contact numbers of the research team should they have any questions prior to the visit. Forty managers and 63 workers participated in this research from a diverse range of industries (... Construction, Brick Making, Quarries, Foundries, Manufacturing of Composite Components, Metal Fabrication, Stone Masonry, Printing and Soap Manufacturing).

2.3.1 Generalisation

Caution is advised when interpreting the results from this research; these should not be generalised across industry. Although the research meets a number of criteria relating to the reliability and validity of qualitative research (i.e. consistent and high quality fieldwork, systematic and comprehensive analysis, and interpretation that presents categories, themes and explanations rather than simply individual accounts – see Ritchie and Lewis, 2003), it falls down on the sampling strategy adopted. Robust, purposive sampling is necessary for the research to be generalisable. There is a strong possibility that the sample employed in this research was biased towards companies that were motivated (through HSE enforcement activity or close liaison with HSE through Industry Advisory Committees) to adhere to good practice in all aspects of their RPE programme. These companies may have also received information and guidance through their HSE inspector about what they should and should not be doing to control respiratory risks within their

⁴ i.e. a series of 'Yes', 'No' questions and space for additional notes covering: actual RPE use (e.g. 'Are operatives using RPE?'), apparent influences on behaviour (e.g. 'Do operatives appear to be rushing?'), the work environment (e.g. lighting, available space), RPE storage (e.g. cleanliness, condition) and maintenance (e.g. filter, seals), supervision of RPE operatives (e.g. 'Are managers/supervisors present on the shop floor?') and information provided to workers on RPE (e.g. 'Were RPE information posters displayed?').

⁵ 'The use of more than one method or source of data in the study of a social phenomenon so that findings may be cross-checked' (Bryman, 2008).

organisation. For this reason, findings from this research can only be considered as indicative of the factors and influences underpinning RPE programmes within participating industries/sectors.

2.4 DATA ANALYSIS

2.4.1 Management interviews

The analysis of the management interviews was separated into three stages. For the first stage a spreadsheet was devised to capture separate information from the 20 participating companies for each interview question in turn. Researchers populated the spreadsheet with commentary and quotations taken directly from the transcripts. For the second stage, researchers analysed the data identified at stage one for each of the 20 companies and refined it down, firstly into overarching themes and then down to elements (or sub-themes). For the final stage, researchers worked through the chartered data in detail to seek and explain emergent patterns and findings (e.g. company groups, company size and sector differences).

2.4.2 Worker interviews

A less stringent approach to data analysis was followed in the analysis of worker interviews than for management interviews in line with the research aims and objectives, which specify the need to focus on the organisational/managerial level (i.e. selection and RPE use practices, legal compliance and influences on managerial decision-making surrounding choice and implementation of RPE programmes). Analysis of the worker interviews involved the extraction of key themes that emerged from notes taken for each question asked during the interviews.

2.4.3 Post-site evaluation

Shortly after each site visit, two researchers (Psychologist and PPE expert) rated each company on 48 defined aspects of RPE programmes with a score ranging from 1 (exemplary good performance) to 5 (inadequate and poor performance). Scores were determined by extracting evidence for each of the 48 aspects from notes taken during interviews and observations, and making a judgment (i.e. 'good' – a score of '1' or '2', 'ok' – a score of '3' or 'poor' – a score of '4' or '5') against set criteria for each component (e.g. supervision, training, etc.). Not all listed aspects applied to all types of RPE (e.g. aspects relating to filters were not relevant for breathing apparatus). As such, not all companies were rated on all 48 aspects. Whilst not definitive or precise, these subjective ratings provided a broad indication of the observed competence and effectiveness of RPE programmes in each company visited.

3 COMPANY GROUPINGS

Four categories of companies were identified from the research findings. These categories were ‘learners’, ‘developers’, ‘fortuitous’ and ‘proficient’ (see [section 3.1](#) for full definitions). Companies were placed in a category on the basis of the subjective ratings that researchers assigned to each company after each site visit on up to 48 defined components of the RPE programme (as detailed in [section 2.4.3](#) of this report). Each site was subjectively categorised as either ‘good’ (a score of ‘1’ or ‘2’), ‘acceptable/ok’ (a score of ‘3’) or ‘poor’ (a score of ‘4’ or ‘5’) on each component and on two overall dimensions. The overall dimensions were:

- (1) **General RPE competence** (i.e. an overall assessment of RPE competence of the organisation in comparison with the ideal situation described in HSE guidance document HSG53⁶ - in particular the legal requirements outlined in Section 11 on page 4), and;
- (2) **RPE control** (i.e. overall assessment of how well worker exposures were likely to be controlled by RPE under the regime prevailing at the time of observation).

Companies were categorised into two groups for each dimension i.e. ‘at least acceptable’ (with a score of ‘1’, ‘2’ or ‘3’) or ‘low’ (with a score of ‘4’ or ‘5’). This produced four categories of companies, namely, (1) at least acceptable competence, low control; (2) low competence, at least acceptable control; (3) at least acceptable competence and control; and (4) low competence and control. This classification method was adopted to ensure that groupings were not based purely on what managers said during interviews, but actually reflected the reality of practice on the ground floor.

As shown in Figure 2 the better companies were categorised as ‘proficient’ (managers were considered to have a good level of RPE competence and risks were under control). On the flip side, ‘learners’ had recently begun their journey to better RPE performance and, at the time of the study, had some way to go to develop RPE competence and control of RPE risks.

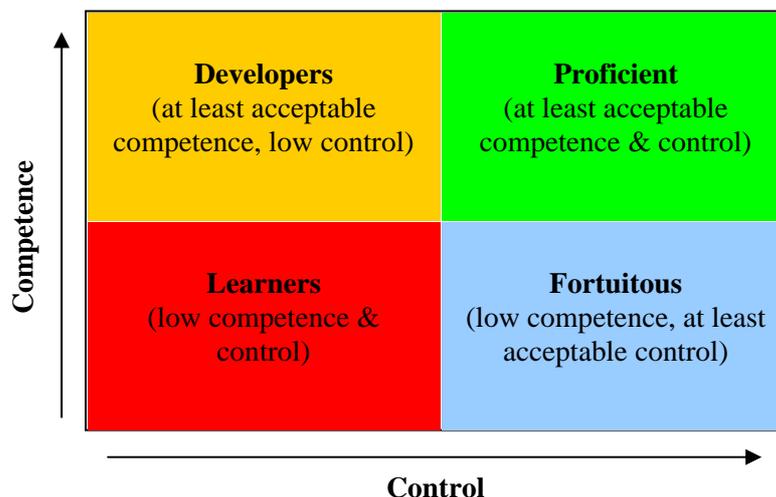


Figure 2: Company groupings based on subjective ratings of RPE competence and control.

The data collected during the management interviews was then explored to see whether any common features and characteristics were apparent amongst companies belonging to each of the four groups. These groupings were also used as an additional means for interrogating the data from both the management and worker interviews to seek and explain emergent patterns and findings. Furthermore, this categorisation was necessary for developing an understanding of how employers

⁶ See <http://www.hse.gov.uk/pubns/priced/hsg53.pdf> for further information.

with effective RPE programmes achieve this level of performance to answer one of the research objectives (objective 5, see [section 1.2](#) of this report).

3.1 FEATURES AND CHARACTERISTICS OF EACH GROUP

The defining features and key characteristics of each category/group are summarised in the boxes below. This is based on both notes taken by researchers during post-site evaluations and examining key RPE attitudes and behaviours described by managers during the interviews.

Proficient: These companies have a fit-for-purpose RPE programme. Management have at least an acceptable level of RPE competence and controls do appear to be working. Although marked by some degree of success in implementation of their programmes, a number of companies still have some way to go. **In only one case (tightly governed by asbestos regulations) was RPE performance considered to be ‘good practice’.** In most others improvements could be made on: storage, maintenance, training (e.g. providing refresher training), supervision/enforcement and RPE documentation. Specific characteristics include:

- Evidence of in-house health and safety knowledge and expertise.
- Senior management commitment/motivation to improve and recognition that their own actions influence their workers.
- Some provision of training (induction and fit testing as a minimum).
- Supervision/enforcement of RPE use in place.
- Close industry networks and a ‘social dialogue agreement’ with other companies.
- Proactive in searching for improvements using various external sources.
- General health and safety/housekeeping is a priority.
- Recognise the importance of having clear RPE procedures in place.
- Involve workers to accommodate preferences balanced against the RPE protection factor.
- Heavy focus on COSHH and risk assessments.
- Close monitoring of health/respiratory issues.
- Frequent verbal communications with workforce on RPE.
- Preference for engineering solutions and to use RPE as the last resort.
- Some evidence of a family business culture (moral driver to look out for colleagues’ health and safety).

Fortuitous: In these companies workers are protected against the hazards that they are exposed to despite a significant RPE knowledge and skills gap amongst management accompanied by the absence of a structured RPE programme. Only two companies were included in this category. Similarities between them include:

- Significant gaps in RPE knowledge/awareness; management in need of RPE training.
- Assume that workers know how to protect themselves and rely on their RPE knowledge acquired in previous/other jobs.
- Rely on external information sources/RPE suppliers.
- Little communication/training on RPE.

Other features that emerged as being unique to each case were:

- **Case 1 (Foundry):** Limited management resource, but a sufficient level of commitment to health and safety; some degree of worker involvement through obtaining operative feedback on RPE; workers disciplined if they do not comply.
- **Case 2 (Construction company):** A complete disregard for what was actually occurring on the shop floor; consider that the company has done its job by providing adequate RPE; reluctant to implement occupational health arrangements for fear of subsequent claims from mature workers; no responsibility taken for sub-contractors.

Developers: These companies have RPE systems and procedures in place and are generally aware of what they need to do to protect their workforce against respiratory disease. Most fall down, however, on actual implementation of their programme. Specific characteristics include:

- Some evidence of in-house health and safety expertise.
- Keen to improve further, but want to be told what to do.
- Respond to others' (external) suggestions.
- Take an 'educate workers' approach to enforcement rather than disciplinary approach.
- Want a simple life (e.g. no/little maintenance, simple stock control).
- Try to educate their workforce even though efforts are not wholly effective.
- Look to external people whom they trust and who they perceived to know the industry.
- Recognise that they still have some way to go on a journey to good RPE performance.
- Cost is an issue during times of low productivity.
- Heavily influenced by workers' wants and needs.
- Assume that workers know what to do, without adequate supervision/checks.
- Aware of having no formal maintenance programme in place.

Learners:

These companies have recently started a journey towards better performance with regards to RPE. They are in the process of establishing a formal RPE programme and are continuing to develop their knowledge in the area. Specific characteristics include:

- Generally no in-house health and safety expertise.
- Overconfident that workers know the risks/how to protect themselves, and rely on this.
- Tendency to adopt an authoritarian style of management with little worker involvement or behaviour change attempts.
- Struggling in the recession.
- Senior managers happy to delegate health and safety to another manager.
- Opted for quick and cheap controls and assume that these are working until told otherwise.
- Unaware of the legal requirement to fit test and other necessary stages of the RPE process (e.g. proper storage, maintenance).
- A tendency for health and safety to be viewed as bureaucracy or a box ticking exercise.
- Heavy reliance on RPE manufacturers/suppliers for information.
- Respiratory disease is generally not considered a key risk unlike others (e.g. noise/HAVS).

3.2 COMPANY GROUPS BY SECTOR AND SIZE

Further comparisons were made between these groups by company size and sector (see Table 1). A few differences were found, namely:

- The small quarry had a better RPE programme in place than the two medium-sized quarries and also had a more developed health and safety culture.
- Three of the four companies in metal fabrication (MF) were 'proficient'. These were the medium to large sized companies. The small company was categorised as a 'developer'.

- Both foundries were in control of respiratory hazards, but one of these (the ‘fortuitous’) was fortunate to have workers with reasonable knowledge of how to use RPE obtained from previous jobs.
- Both companies that manufacture composite components (MCC) had some way to go to establish competence in RPE performance and adequately control respiratory risks.
- Both construction companies were in control of respiratory hazards, but one (the ‘fortuitous’) was fortunate that their contractors were generally well equipped and trained in RPE.

Brick Making (BM)		2 (S)		1 (S)
Quarries (Q)	1 (M)	1 (M)		1 (S)
Metal Fabrication (MF)		1 (S)		3 (2L,1M)
Stone Masonry (SM)	1 (S)			1 (S)
Foundry (F)			1 (S)	1 (M)
Construction (C)			1 (M)	1 (M)
Manufacturing of Composite Components (MCC)	2 (S)			
Other		1 (M)		1 (S)
Overall Total	4	5	2	9

Table 1: Company groups by sector and size. (NB: S=Small/Micro, M=Medium-sized, L=Large companies).

4 MANAGEMENT INTERVIEW RESULTS

This section presents the key themes that emerged across the interviews carried out with managers responsible for health and safety (including RPE) at the 20 sites visited. The findings address the following objectives for this research set out in [section 1.2](#) of this report:

- **Objective 1** – By outlining approaches to the selection and provision of RPE.
- **Objective 2** – By identifying factors influencing RPE selection, use, storage and maintenance.
- **Objective 3** – By outlining the type and level of information provided by employers to RPE operatives and reasons for these.
- **Objective 4** (to some extent) – by providing insights into how employers with good RPE programmes achieve this level of performance ('proficient' vs. 'learners', 'developers' and 'fortuitous' groups).

The key themes that emerged from the management interviews map onto critical stages of RPE programmes i.e.(1) 'knowledge, awareness and understanding' of respiratory risks followed by (2) 'programme selection', (3) 'RPE use', (4) 'training and advice', and finally, (5) 'ongoing monitoring and maintenance'. The findings have therefore been structured in this way. Any sector and company size (i.e. small/micro companies compared with medium/large) differences are highlighted under the relevant themes. Any differences between groups relating to each theme ('learners', 'developers', 'fortuitous' vs. 'proficient') are also shown in the yellow boxes. Quotations to annotate the comments made by managers have been included and key findings for each theme are shown in the grey boxes.

4.1 KNOWLEDGE, AWARENESS AND UNDERSTANDING OF RISKS

This section details the themes that emerged through the analysis of managers' responses to questions surrounding risk awareness, general knowledge and understanding of RPE. Although not explicitly stated in the research objectives, this was included in data collection and analysis as it represents a significant prerequisite to RPE programmes. Managers need to have an accurate understanding of their workplace hazards and potential consequences of not sufficiently protecting workers against these hazards to be motivated to act in the first place (see e.g. Rogers, 1983; Leventhal et al, 1984). No differences in management knowledge, awareness and understanding of risks were found across company size and few sector differences were discovered.

Summary of key findings:

- Managers' risk perception was generally better than their RPE knowledge; they often thought they knew more about RPE than they actually did (especially the MCC sector).
- Silica dust was the main primary risk cited. In some cases non-respiratory risks were considered primary (e.g. noise, manual handling).
- Respiratory risks were not a top priority in the foundries.
- Some managers did not equate nuisance dust with toxicity when it may have been (e.g. when silica dust was present).
- RPE knowledge stemmed from various sources: personal use, information share with other companies, external contacts (consultants and suppliers), publications and training, industry, and HSE events, guidance and Website.
- Key knowledge gaps were: the need for fit testing and being clean-shaven, proper storage and maintenance and awareness of RPE manufacturing developments.

4.1.1 Understanding of the risks

The overall opinion of managers across sites was that they had a good understanding of the respiratory risks inherent in their workplace. On occasions this stemmed from their own experience having worked their way up from the shop floor themselves. They felt that they had developed an appropriate approach tailored to the level of risk, driven by the need to reduce exposure levels in line with legislative requirements. On the whole, managers believed in the safe and proper use of RPE, including foundry managers even though respiratory disease was not considered a top priority for them.

“I’ve been in the industry for...36 years, so I know all... the dangers involved with the isocyanates...I’ve been using it for nearly 40 years so I know all the risks involved with sensitisation, respiratory problems and everything else.”

When asked about their workers’ understanding of respiratory risks, the majority felt that they were aware of the risks either because they had been in the industry for years or had previously/were currently engaged in a programme to educate them. Some managers mentioned an apparent complacency amongst older workers and others commented on ongoing difficulties to get workers into the ‘habit’ of wearing RPE despite their supposed increased knowledge and awareness.

“I know best...and it won’t hurt me...that kind of attitude. And it tends to be the people who’ve been in the job for 20, 30, 40 years that have those kind of attitudes...those things have changed while they’ve been in employment, but they still behave in the way that industry did when they first started work and it’s hard to get people to change behaviour.”

When asked what they considered to be the primary risks on their site, silica dust (respirable crystalline silica) was predominantly mentioned. Others included chemicals/vapours from work products (e.g. cleaners), welding/paint fumes, isocyanates, respirable enzymatic dust, grinding/MDF dust and asbestos (in a few cases, a couple with very rare exposure). In some cases non-respiratory risks were considered primary, such as noise and manual handling. Only managers in a few companies considered ‘nuisance dust’ to be a primary risk. It is a concern that some managers did not equate nuisance dust with toxicity (e.g. where silica dust was present). Little thought had been given to the removal of general dust to obtain tighter control over harmful dust (a requirement of COSHH). As one manager stated, *“(Dust is) just an ongoing thing that happens.”*

4.1.2 Knowledge base, gaps and needs

Managers thought that they had good knowledge of the controls they needed to put in place to protect workers from respiratory disease and were generally aware of the HSE guidance. Managers felt that they and fellow managers had a good working knowledge of RPE stemming from one or more of the following:

- Personal use of RPE in the past.
- Learning from fellow companies in their group or competitors through the open sharing of information and seeing what RPE programmes others have in place.
- Learning from external health and safety consultants, RPE manufacturers and suppliers (3M was frequently mentioned) on how to follow RPE best practice set out by HSE.
- External publications (e.g. BCC⁷ newsletters, SHP⁸ magazine) and training (IOSH⁹, NEBOSH¹⁰ courses).

⁷ British Ceramic Confederation.

⁸ Strategic Healthcare Programmes.

⁹ Institution of Occupational Safety and Health.

¹⁰ The National Examination Board in Occupational Safety and Health.

- Industry bodies, including Union guidance and support.
- HSE events (e.g. organised conferences, presentation and seminars, including HSL training days), guidance (including the info line), publications and the Website.
- Proactively seeking RPE information/advice (especially the quarries) and information on the latest technological developments.

“You’re always searching round for good practice. We’re members of various trade bodies and we’ll attend various meetings so you do pick up tips, but it’s perhaps a bit random.”

Whilst some managers commented on the high standard of RPE advice contained within the **HSE Website**, a number of barriers to effective use were noted. These were: the need to enter specific search terms, which are not always known; difficulty navigating or finding information; guidance being too lengthy – *“Directors don’t always have the time to sift through the information to find out what he needs to know”*; and little industry specific guidance.

“It’s quite easy to get some quite obvious things, but then if you want a bit more detail it gets a little bit more complicated. You can put into the search engine in the top, I found it frustratingly difficult to get information.”

Although some managers seemed to be quite well informed, it was clear that they lacked specific details on RPE. In essence, they thought that they knew more than they actually did.

“You think you know as much, you think it’s a dust mask, how complicated can it be? But the face fit testing, even that throws up a few clever bits of advice, or a few pointers which might seem commonsense.”

Managers in a few companies recognised that they needed further RPE training and commented that they were *“always learning.”* In other companies managers were only made aware of the shortcomings of their RPE programme through the research, especially those in the Manufacturing of Composite Components (MCC) sector. Nevertheless, these companies were classified as ‘learners’ and thus had recently started their journey to good RPE performance. Overall, key **knowledge gaps** were:

- The need for fit testing with paper and half masks.
- The importance of workers being clean-shaven for a better RPE fit.
- How to properly store and maintain RPE.
- Updates on ongoing developments in RPE from the manufacturing side.

In a few cases it was apparent that managers had misunderstood the manufacturers guidance on maintenance for a particular type of half mask. This had not been rectified in personal meetings between management and manufacturing/supplier representatives. A so-called ‘28-day disposable mask’ was favoured by some to reduce costs, avoid maintenance and enable simple monitoring of RPE issue/stock. A blanket policy was to replace the mask at 28 days – managers were under the impression that the filter would last this long. There is evidently the need for manufacturers/suppliers to avoid this kind of labelling in the written instructions that accompany RPE to prevent such misunderstandings.

“This one takes away the onus of COSHH because it’s a twenty eight day mask, you don’t have to maintain it because it is a disposable mask that lasts for twenty eight days so as long as it’s kept in its containers.”

Group differences:

- 1. Learners** - Overconfident in their own and their workers knowledge level. Unaware of certain health effects and critical aspects of RPE programmes (e.g. fit testing). Aware of HSE respiratory guidance, but not in any detail and want HSE to educate them.
- 2. Developers** – Focused on educating workers whilst recognising that they as managers are always learning. Heavy reliance on external information, actively seeking HSE support/advice and through the HSE Website.
- 3. Fortuitous** – Different knowledge levels apparent at different hierarchical levels. RPE knowledge gaps, but aware that they do not know everything on the matter. Reasonable risk perception and good attitudes towards safe use of RPE, but lacking management commitment.
- 4. Proficient** – Good RPE knowledge base at all levels, but need updating on developments. Good risk perception amongst managers and workers with either partial or good knowledge of HSE guidance. Following HSE’s hierarchy of controls, using RPE as a last resort. Committed managers who are proactive in seeking new RPE information and insights. Apparent shortfall in knowledge on maintenance evident.

4.2 PROGRAMME SELECTION

This section details the themes that emerged through the analysis of managers’ responses to questions surrounding the decision-making behind their selected RPE programme. More specifically, the factors that influenced their motivation to initially develop a programme and those that influenced their actual choice of controls are detailed. Factors influencing managers’ decisions on the effectiveness of these controls and any required updates are further documented. **A flow chart is included towards the end of the section (see [Figure 3](#)) to demonstrate this decision-making process.** Few differences were discovered across sectors and company size.

Summary of key findings:

- Legislation and external audits by HSE, insurers and industry groups were key motivators instigating initial programme development.
- Managers relied heavily on external information sources/advisors to select suitable controls. RPE manufacturers and/or suppliers, consultants, HSE guidance and/or the Website, industry contacts, publications and events, and sharing information with sister companies and/or competitors were all key.
- Some managers commented that the type of RPE recommended by their inspector was not practicable. Stonemasonry managers also commented that the Stone Federation did not provide timely information and updates.
- Medium/large companies were more likely than small companies to have a wider network of industry contacts and to monitor the HSE Website.
- Worker feedback, control availability, history of use, managers’ own knowledge, experience and research strongly influenced the specific controls selected, supported by manufacturers/suppliers advice. Small companies in particular looked to suppliers to tell them what to do, bearing in mind what was affordable.
- Objective assessments (e.g. LEV monitoring) determined control effectiveness. Subjective assessments reinforced this i.e. worker observations/feedback, improved management self-efficacy and health and safety culture, and comparison with other companies (small companies) or previous performance (medium-large).

4.2.1 Motivators of programme development

Two key drivers¹¹ were found to underlie the implementation of RPE programmes. These were: (1) *Legislation* or compliance with the law, and; (2) *External audits* by HSE Inspectors, Insurers (to reduce premiums) and/or industry groups (e.g. ARCA¹²).

“It’s best having the insurers back us up because they have a risk management team, so if we needed any new stuff putting in place they would help us with it...and then again the benefit is they should be able to reduce our premiums for us.”

Other motivating factors, albeit to a lesser extent than those above, were:

- *HSE enforcement* – the receipt of an enforcement notice¹³.
- *Following company philosophy/policy* – following the company’s health and safety plan/policy on RPE or had the philosophy of using RPE only as a last resort.
- *Moral duty* to workers or *“the desire to do the right thing.”*
- *Workforce health* was a driver for some managers from having experienced health-related claims in the past or knowledge of a previous worker becoming ill.
- *Organisational change* was an instigator (e.g. a new senior manager, company take over).

“(A new Regional Operations manager) kicked off a programme to look into the dust issue with a fresh pair of eyes ... We just set down a road of just basically taking a look at it and see what comes out of the other end and quite a few things did come out of the other end.”

- *Commercial drivers* (e.g. reputation, financial protection, smooth running of the business).

“Now the commercial reason could be that if we don't do it we'll get sued.”

4.2.2 Factors influencing choice of controls

4.2.2.1 Information sources and/or advisors

“There’s a plethora of guidance out there ... half the problem is trying to decide what's relevant.”

In order to decide ‘what is relevant’ managers relied heavily on external information sources and advisors. In some cases managers simply reacted to what they had been told to do. Compared with other sectors, Manufacturing of Composite Components (MCC) companies were more inclined to adopt this reactive approach to HSE inspector and/or health and safety consultants’ advice.

“So we've developed relationships with technical bodies, with outside suppliers to give us the information that we can make the decisions on.”

Five key information sources/advisors were:

1. *RPE manufacturers and/or suppliers* (including major PPE suppliers and machinery suppliers for specific work activities, such as welding). In some cases representatives worked with managers to help them to develop site-specific RPE procedures or to help

¹¹ i.e. those mentioned by the majority of managers interviewed.

¹² Asbestos Removal Contractors Association.

¹³ Most companies in the sample had been inspected by HSE and had received an improvement or prohibition notice rather than undergoing formal enforcement procedures (i.e. actual prosecution).

them solve RPE-related problems. Credible companies were considered to be a useful source of technical information, which managers were mindful of lacking themselves.

“We certainly have gravitated over the years to firms who have reps who seem to know what they're doing.”

2. *Health and safety consultants* (both internal manager/function and/or external consultants). These were often an information-gathering source explaining to managers what they needed to do to comply with the law, finding out what other companies were doing in the area and keeping managers abreast of any changes in the legislation and updates in RPE design. Consultants also carried out exposure monitoring and site audits, sometimes providing technical recommendations in their reports. Through tapping into the knowledge and expertise of consultants, managers felt confident that they were adhering to best practice.

“We just buy what they tell us to buy.”

“From our point of view being part of a big group and having the likes of (the Health and Safety Group Manager) and the experience there is a great asset, I don't know where we'd be without that.”

3. *HSE guidance and/or Website*. HSE guidance was generally accessed through the Website. The Website was thought to contain relevant, up-to-date and accurate information, useful for helping managers to understand what they needed to put in place.
4. *Industry contacts, publications and events* (e.g. organised meetings, seminars). These were considered to be a useful source of RPE-related information and a mechanism for sharing best practice. This was not always limited to ‘within sectors’; managers in the stonemasons took advice from publications or contacts in other sectors. They felt that the Stone Federation did not provide timely information and updates. Medium and large sized companies were more likely to have a wider network of industry contacts.

“We attend a BCC meeting and that's with people from within the industry, so again you get a lot of information from everybody else from within the industry.”

“The BCC is good we get a lot of stuff coming from them for all sorts”.

5. *Information share with other companies in the group and/or sector*. Sharing of ideas was common between companies in the same group as well as knowledge sharing with competitors. This ‘social dialogue agreement’ with fellow companies was thought to encourage everyone in the industry to help one other.

“We have...group quarterly meetings where the Works Manager from each of our sites gets together and we have a visit to one of the sites and have a walk round with PPE...the Works Managers say, I've seen this at (place), is there any chance of us trying it?”

“I've got quite a few numbers from peers in other companies, so I mean I've always said it's funny because on the production side of things nobody will share anything and you wouldn't be able to phone up the production manager (to) have a chat about production, but I can phone up the Health and Safety guy and we'll have a chat.”

Other information sources/advisors included:

- *HSE Inspectors* – although some managers commented that the type of RPE recommended by their inspector was not practical for workers to use for certain activities and were sometimes too expensive.

“I mean it was costing an awful lot of money and they are just sitting in there now...impractical.”

- *Insurers* through their annual audits and recommendations.
- *Trade associations* (e.g. Cast Metals Federation, Engineering Employers Federation) who have their own health and safety departments or employ consultants to offer advice.
- Occupational health providers, Unions, government bodies (e.g. the World Health Organisation, Universities) and general health and safety Websites (including IOSH¹⁴), some of which managers in small companies have paid for the privilege of using to access the documentation and guidance that they need (e.g. Business Safety Systems, the Barber Website).

4.2.2.2 Managers own research

Managers own research into the specific type of RPE/LEV required for the activities on site was a key factor influencing their decision-making. This included consideration into what was practical for workers to use and the likely impact on the quality of work outputs (referred to as Job Practicalities/Outputs in [Figure 3](#)). This generally involved examining the following balanced against exposure monitoring results and risk assessments and/or method statements:

- Manufacturers instructions (e.g. suitability to work processes, percentage of dust extracted).
- Worker tasks (movements they take, space worked in, etc.).
- The impact of controls on the quality of the outputs.
- The feasibility of engineering solutions.
- The work required to enclose RPE operations.

Once completed managers discussed their findings with RPE manufacturers/suppliers to select *“the best mask for the job.”* Suppliers often helped small companies to interpret consultant’s recommendations in exposure monitoring reports by simply telling them what they need to do. In some companies managers also confirmed their selected approach with their HSE inspector. Nevertheless, management knowledge rarely took precedence over advice from external experts.

4.2.2.3 Management knowledge and experience

Another key factor underpinning the selection of RPE controls, particularly LEV, was the knowledge and experience that managers brought with them from previous jobs.

4.2.2.4 Worker involvement

Worker feedback on RPE and, to some extent, LEV trialled was found to have a strong influence on the specific type of controls selected by management - *“They’re the guys actually using the equipment.”* Managers generally selected controls based on worker satisfaction and exposure monitoring results. Workers were typically not involved in the initial selection of RPE; managers selected these with manufacturers/suppliers. Managers perceived workers as having little technical RPE knowledge and knowing which types were appropriate for the activities they undertake.

“So you have got to make your purchasing decisions along with the guy's feedback ... they're all much of a muchness for price so if the guy has got a preference and it fits him then we might as well go for it.”

¹⁴ Institution of Occupational Safety and Health.

“I mean, when we trial them the guys have forms to fill out on comfort, seal and all that side of things”.

4.2.2.5 Availability and history

Availability of controls and history of use within the organisation was also found to be a key factor influencing choice of controls. In some cases controls had been in place for many years and had evolved over time, often selected prior to current management being in post. RPE was often left untouched *“because it seems to work well with the guys that have them.”* This approach was more common amongst medium and large sized companies than small companies.

“They were certainly already in use when I started on the site 13 years ago.”

The decision to try different types of RPE was also reliant on whether the company could easily access a supply of these, including the required filters. In one company a manager talked about deciding to use different types of RPE, as there was a stack readily available on site.

4.2.2.6 Simple solutions

Some manager’s choice of RPE programme was influenced by their desire for a simple solution. For example, adopting the same approach as sister sites, producing a simple inventory for stock control, reducing time spent on multiple face fit testing with different masks and dealing with more than one health risk (e.g. adopting engineering controls to deal with respiratory and HAV risks).

4.2.2.7 Cost

Cost was found to play a role in some companies, particularly small companies (e.g. the three small brick making companies) that were more likely to be struggling in the recession.

“There's no two ways about it, the cost does come into things.”

“I think we’ve got a lot of plans in place it’s just getting them implemented ... but at the moment everything is at a standstill because of money.”

Some companies could not afford the most suitable type of RPE for their workers when single, expensive units (e.g. air powered respirators costing around £600 per unit) needed to be purchased for each RPE operative. Others commented on the considerable cost involved in engineering operators out of hazardous processes.

“In an ideal world we’d have a fantastic robotic system in place that did all singing all dancing, but financially the cost of that is just so exorbitant.”

In most medium and large sized companies, however, cost was not perceived to be a limitation.

4.2.2.8 Peripheral influencers

The following were found to have a low-level influence on managers’ decision-making:

- *Competitors* – Adopting controls that work in other similar organisations, possibly because knowledge of what others were doing was not readily available to them.¹⁵
- *Internet searches* – General searches by managers to find suitable RPE/LEV.
- *Machine suppliers* – Useful when job requirements change and RPE needs to be selected on an ongoing basis for new jobs, especially in Construction companies.

¹⁵ Companies where this appeared to have an influence tended to be small.

- *Physical site layout* – The buildings infrastructure was commented on in some cases, either enabling or hindering the segregation of RPE activities.

“I think here you’re limitations are the building...some of the buildings are old...like you were talking about putting more hoovers in place but that means more points.”

4.2.3 Factors influencing perceptions of control effectiveness

A mixture of objective and subjective assessments determined whether managers considered the controls implemented to be effective in reducing worker exposure to respiratory hazards. Objective assessments included exposure monitoring results (e.g. pre and post LEV air sampling), fit test results (to determine the suitability/effectiveness of the selected masks), feedback from occupational health providers (when used) on the health of the workforce, absence of health-related claims, and (in one case) licence renewal to work with asbestos. Subjective assessments reinforced findings from these objective assessments and had a strong influence on whether management considered their selected programme to be effective or not. These were:

- *Worker observations and feedback* – To check that workers were using RPE when required, and using it correctly in some cases, and discussing with workers reasons behind non-compliance or misuse. Ongoing feedback from workers through informal or formal channels of communication (e.g. suggestion schemes, worker representatives at health and safety meetings) mostly concerned level of comfort and any practical difficulties experienced when carrying out work tasks requiring RPE. Formal feedback mechanisms were more prominent in medium and large companies than small companies.

“I mean they’re the guys that are doing the job, they’ll surely tell you if the stuff that you’ve got is right or wrong.”

“We do a system called walk and talk which is where members of management go and literally have five or ten minutes talk with the operators, are things okay..., have you seen the risk assessment for this activity, are you aware of this and that, that gives you a chance then to actually ... see what people are doing and are they behaving safely.”

- *Improved health and safety culture* – Instilling a culture in which workers look out for one another or where everyone is working towards continuous improvement in controls.
- *Increased self-efficacy amongst managers* – Increased confidence in controls based on visual improvements (e.g. a reduction in dust), feeling more in-tune with HSE guidance and in a stronger position of control than previously experienced, and having liaised with ‘experts’ (mostly RPE manufacturers/suppliers and HSE inspectors) were all reported as positive influences on managers self-efficacy. One manager commented, however, that they were disappointed when their HSE inspector discovered problems after they had taken advice from those they considered ‘experts’ on the matter (i.e. suppliers).

“We certainly moved up a level in that time” (compared with eight years ago).

“I seek advice and to the best of my ability. I’ve ordered that equipment to protect the guys doing that particular job.”

- *Social comparison* – The perception of being better than competitors and/or better than the standard implicit in industry. Small companies tended to compare themselves against their competitors, where as medium and large companies tended to monitor their own progress over time.

4.2.4 Factors influencing whether the programme was reviewed/updated

Some managers were waiting to be updated on RPE developments to determine whether there was a better approach they could adopt or new equipment they could utilise. This often came from RPE manufacturers and suppliers, health and safety consultants, industry contacts or from developments in other companies within their group.

“I think that could be improved ... because we haven’t touched the subject for two years (and) no doubt there will have been improvements in the design, weight, etc., ... this month (RPE supplier) are going to come back ... and do another straw poll for us and tell us what has improved. I think we had the best on the market two years ago... Has RPE moved on in two years?”

Managers of medium and large companies were more likely to regularly use the HSE Website than small companies to keep up-to-date on developments or changes.

“Where possible I look at the HSE website on an as and when required basis, I also get the HSE updates on a regular basis that come through which I circulate round and send off to risk control and ... to all departmental managers.”

Key drivers initiating a review of RPE programmes were changes in legislation and recommendations from external audits (consistent with key motivators initiating programme selection in the first place). In addition, business/commercial factors, namely, to reduce costs and complexity of the programme (especially with regards to maintenance), were found to influence whether reviews were undertaken.

“Legislation drives decision-making ... as limits come down, controls are put in place.”

One manager commented, however, on their disappointment with their insurers for not keeping them abreast of changes in the legislation. This demonstrates the dependence that some managers have on their external advisors.

“When the HSE came in last time I was really disappointed, because we hadn’t done as well as we should’ve done and I ... think that sometimes you do feel let down because ... we have an insurance company that we pay to come and inspect who didn’t say to us, you should be doing (this).”

4.2.5 Summary flow chart of managers’ decision-making process and influencing factors.

Figure 3 illustrates the stages that managers go through when selecting their RPE programmes. The factors that influence this process are indicated at each level with the most influential highlighted in **bold**¹⁶. Evidently, there is considerable overlap between the stages. For example, a range of factors at varying levels influenced whether managers updated their RPE programmes. This review process was not, however, undertaken in all companies. Feedback loops between seeking advice, selecting and testing controls were also apparent as managers generally consulted external experts at given points to help determine appropriate ways forward.

In effect, this flow chart (Figure 3) represents managers ‘mental model’ of the decision-making process that they go through when implementing RPE programmes. It represents a simplified version of reality or managers representation of their external reality. As Forrester stated:

“The image of the world around us, which we carry in our head, is just a model. Nobody in his head imagines all the world, government or country. He has only selected concepts, and relationships between them, and uses those to represent the real system.”

¹⁶ These factors were mentioned by the majority of managers interviewed.

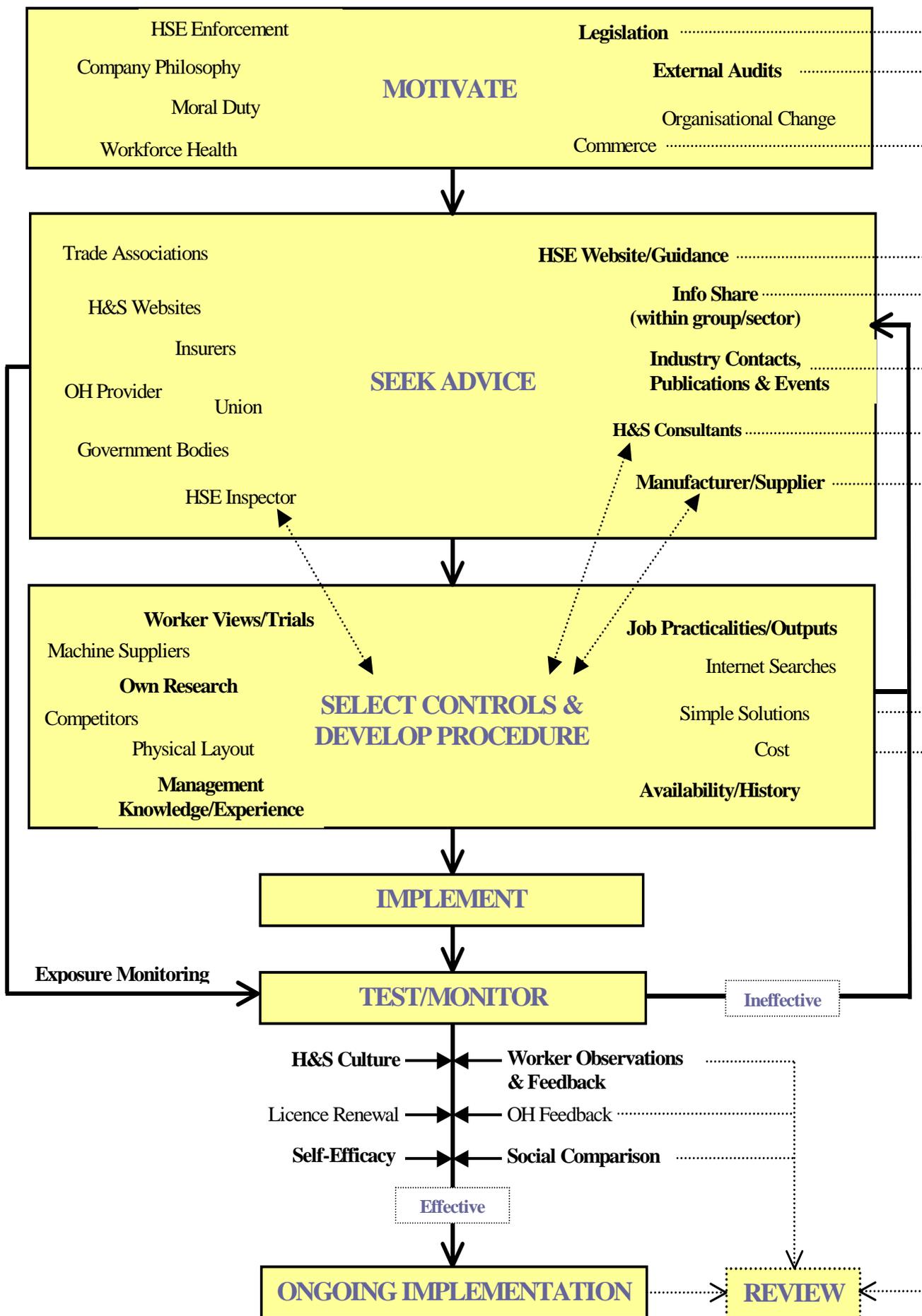


Figure 3: Flow chart showing managers' decision-making process in RPE programme selection.

Group differences:

- 1. Learners** – Less likely to use a variety of information sources to inform their decision-making and are thus not completely aware of all the options available to them. This creates problems when they do not use credible/known RPE suppliers. They are happy to have achieved an acceptable standard (in their mind), considering themselves to be better than they were previously or better than their competitors.
- 2. Developers** – Looking for simple maintenance solutions and in general want a steer with their RPE programmes, often looking to RPE manufacturers/suppliers for technical insights. In a few cases a manager in a position of authority was instrumental in driving forward changes. Keen to learn from other companies, but tend to wait to be updated. This group is more likely to get involved in research projects like this.
- 3. Fortuitous** – To some extent their decision-making has been taken away from them as there appears to be little consideration to technical data amongst managers; happy to hand this over to a reputable external source, mostly RPE suppliers.
- 4. Proficient** – Best practice guides their approach (through Industry/HSE). More likely to use a wider contact base and be more pro-active in their search for information to inform their decision-making than other groups. Tend to monitor RPE/engineering updates (e.g. through the HSE Website) internally and generally have a good level of health and safety resources to draw on.

4.3 RPE USE

This section details the themes that emerged through the analysis of managers' responses to questions surrounding RPE misuse amongst their workers. There was considerable consistency in the themes that emerged across the 20 sites with regards to the behaviours observed. Whilst no differences were found between sectors with regards to the approach taken to encourage behaviour change amongst their workers, a few differences were discovered between small and medium to large companies.

Summary of key findings:

- RPE misuse was common amongst workers, with the exception of companies governed by tight procedures (e.g. asbestos removal guidelines).
- Managers considered misuse to be the result of an interplay of factors, most commonly cited were discomfort, doing a 'quick job' (low exposure), stubborn attitudes amongst mature workers, not being able to see the hazard and not having RPE to hand.
- Companies preferred a friendly, informal, education approach to behaviour change, especially small companies. Medium and large-sized companies had also developed formal strategies for encouraging compliance behaviour including RPE policies/procedures, roles and responsibilities, structural modifications, communication channels and disciplinary/reward systems.
- Some managers recognised the importance of cultural developments to promote use.

4.3.1 Misuse observed by management

“You think it’s commonsense, how can you put (it) on wrong, but you find that you walk round and people do, they’re upside-down or... not on properly.”

The majority of managers commented on ongoing problems that they encounter with RPE use amongst their workforce. These included, but were not limited to:

- Moving RPE away from the face to talk to colleagues or to check work in progress.

“They tend to do it when you’re talking to them ... they’ll lift their mask up and put it on their head”.

- Holding RPE over the face when carrying out quick jobs (e.g. sweeping).

“(They) just like to sit it on their face rather than actually fitting it properly.”

- Only using one strap on a double-strapped mask.
- Not being clean-shaven when asked.
- Poor storage and maintenance habits (e.g. leaving RPE lying around and not using the bag/box provided, not cleaning/looking after as told).

“(We’ve) had trouble with having to keep calling them (workers) back in and saying...we’re giving you a bag, you’ve got to keep your bag, stop leaving them laying around...that was a bit of an initial problem... littering the site with them”.

Some also mentioned that it was an ongoing battle for them to ensure that workers wore their RPE when required. The risk of this was considered higher in the summer or when workers completed ‘quick jobs’, especially when team leaders/supervisors were not present.

4.3.2 Perceived reasons for misuse

The majority of reasons given by managers for RPE misuse rested with the worker, namely:

- Discomfort (restrictive, sweaty), especially over long periods of use. [Key¹⁷]
- Mature workers not used to wearing RPE questioning why (‘stubborn attitudes’). [Key]

“Research does show that you tend to get sensitised within the first two years for enzymes, its high molecular allergens...the highest rate of sensitisation is within two years of starting the job... I think a lot of our long termers are very much of the mindset that it won’t happen to me, I’ve been here so long.”

- Not being able to ‘see’ the hazard. [Key].
 - Perceived low exposure in quick jobs or for outdoor work on a windy day. [Key]
- “The worst ones are very quick jobs ... so fast it’s not worthwhile putting RPE on.”*
- Not being able to see an immediate effect on their health (long latency issue). [Key]
 - Considered inconvenient if not nearby or in hand (some alluded to ‘laziness’). [Key]
 - Forgetfulness during low frequency tasks or being distracted (e.g. out of work stresses).
 - Disrupting work processes (e.g. through restricting vision).
 - Workers seen to resist anything ‘new’.

“ I think with anything new, especially on health and safety, everybody puts up a fight to begin with.”

¹⁷ Considered ‘key’ as this was mentioned by the majority of managers interviewed.

- Have a propensity to take risks (like smokers).

“They know the risks but do it anyway.”

Some managers were, however, aware of *organisational-level* failings that contributed towards misuse or non-compliance. These largely reflected a lack of clear RPE processes and procedures (e.g. lack of clarity over when exactly RPE should be worn, accounting for all work processes, and not keeping RPE records of issue), poor communication with workers about RPE (e.g. barriers when workers first language is not English, rarely discussing RPE in meetings/briefings), absence of fit testing or lack of training on fit and care, and lack of supervision.

“Spraying is black and white, when you spray, you need the RPE on.”(But what about the shades of grey, such as standing near a colleague who is spraying?)

4.3.3 Behaviour change strategies

In general management preferred to adopt a *friendly/informal approach* to enforcing RPE use, particularly in small companies where they had established a close rapport with workers and wanted to retain directly employed staff. In these cases disciplinary action was considered a last resort after a substantial ‘teething’ period in which managers focused their attention on educating their workforce. This was accomplished by managers/supervisors talking to operatives on a regular basis, making them aware of the dangers and why it is important for them to wear RPE. The philosophy underlying this approach was to gain worker buy-in and encourage habitual use¹⁸.

“What we’ve said here is that we’ll leave it for a bit longer and keep gently pulling people up on it, what we did at the other sites was we then put up a notice that said you’ve got a month from today to vent any issues and then once that month has lapsed anybody not abiding by it will be subject to disciplinaries”.

Managers generally asked workers to be clean-shaven, as they felt uncomfortable creating a clean-shaven policy; some questioned whether they would actually be allowed to do this.

“We don’t demand (that) people are clean shaven, what we do is explain that they’re unlikely to get a satisfactory fit ... and then if they do need respiratory protection, then one that relies on a tight fit probably won’t be suitable. And generally people will cooperate.”

Some companies, mostly the medium and large, had developed *formal mechanisms* through which management encouraged compliance behaviour. This involved utilising formal communication mechanisms between management and workers (e.g. signage, committee meetings, training), developing standard RPE policies and procedures (e.g. designated RPE areas/activities, site audits, management health and safety targets, job rotation), implementing disciplinary and reward systems (although the former was more common than the latter), carrying out structural modifications (e.g. an office move to monitor workers), and establishing clear RPE roles and responsibilities (e.g. clear channels to report RPE problems). **In one company behaviour change was not deemed necessary as all workers were complying with the strict asbestos removal procedures that were in place.**

“... Whereas before it was a little bit like...you have to wear masks and it was kind of, well where do we have to?...but now its like this area is a dust mask area.”

¹⁸ Psychological theory states that peoples’ intentions have less influence over their behaviour when the behaviour has become a habit due to reduced mental control over that behaviour. It is more likely, therefore, that workers will don RPE during quick jobs when RPE use has become a habit, rather than when conscious effort is made to decide whether RPE is required for the task in hand. (See e.g. Triandis, 1977).

Some managers also highlighted the importance of *culture change* to overcome old school attitudes prevalent amongst workers and encourage compliance behaviour. Managers commented on developing a family business culture in which workers consider one another's health and influence each other to wear RPE. In some cases younger workers were being targeted to encourage this culture change.

“Today these lads have got it drilled into them and they realise the problems and what it can cause.”

Group differences:

- 1. Learners** – Assume that workers know how to correctly wear RPE, but encounter ongoing problems with getting some of them to wear it. Worker misuse is largely the result of management inadequacies (e.g. unaware of the need to fit test certain types of RPE). The basic approach is to tell them to wear a mask; *“They have been told what to do and they are expected to do it”*. Managers perceive that misuse rests with the workers.
- 2. Developers** – Adopt an ‘educate workers’ approach to encouraging RPE use with little enforcement. Persistent in educating workers. Thinking of bringing in disciplinary and reward systems and acknowledge that they could do more at the organisational level (e.g. provide more training).
- 3. Fortuitous** – Quick to intervene and discipline workers when they see RPE misuse on site. Speculate about the reasons for misuse, but do not take proactive action to find out the true reasons behind this and act accordingly.
- 4. Proficient** – Set RPE standards and procedures being followed and commitment to preventing misuse. Supervision in place to varying levels to monitor use. More likely to have developed their health and safety culture and communications over the years compared with other groups.

4.4 TRAINING AND ADVICE

This section details the themes that emerged through the analysis of managers’ responses to questions about RPE training and advice for workers. More specifically, the types of training and information that managers provide to their workforce and reasons for adopting different approaches are reported. Current gaps for both workers and managers are also discussed. Some differences were found between small and medium to large companies, but very few sector differences were discovered.

Summary of key findings:

- Companies used a variety of means to communicate the importance of wearing RPE or to provide updates. But, in the foundries little/no RPE-specific information was given perhaps because other health and safety issues took priority.
- Very few companies had a formal programme in place. Those that did tended to be medium-large companies and covered all health and safety issues.
- RPE inductions were commonplace, often through a supervisory briefing. MF companies covered the technical properties of RPE/LEV with workers.
- Refresher training was rare as managers felt that RPE was common sense. Small companies often did not have the resource to support this. Toolbox talks were the preferred means of refreshing knowledge when done.
- Manufacturers instructions accompanying RPE were not considered to be user-friendly.
- Key training and information gaps were communicating to workers the importance of a good fit, being clean-shaven and how to properly maintain RPE.
- Managers wanted more HSE training, guidance and support, frequent independent advice from HSE, insurers and consultants, closer links between HSE and intermediaries, an ‘intelligent advisor’ approach of inspectors and further research.

4.4.1 Types of training and information provided

4.4.1.1 Training

Very few companies had developed a *formal training package* for workers. Those that did tended to be medium to large that delivered health and safety training covering all site working procedures and health hazards (including PPE/RPE). These tended to be delivered by health and safety advisors/managers rather than supervisors on the shop floor.

“We made the assumption that our employees understand what silica can do to them but perhaps some of them didn’t, so the training package was put together which gave an overview of, this is what happens to you and... perhaps you could argue there was a little bit of scare tactics... but it certainly made sure that everyone knows why we were doing what we were doing.”

Very few companies put their workers through external health and safety training courses. Those that did had heavy Union involvement or National Vocational Qualifications were a requirement for the job and covered RPE.

“We don’t have any sort of training certificates, we don’t send them on any particular courses, it is something that we don’t feel is necessary. We believe that the instructions that I have from here is adequate for their use of it (RPE)”.

In the majority of companies workers were given some kind of *induction* to their RPE when new to the job or when first introduced to it. In some companies (particularly medium to large) a formal induction or ‘health and safety’ session was delivered, which incorporated RPE. In others (particularly small companies) RPE tended to be ‘covered’ through on-the-job instruction or task specific training by supervisors and was therefore more process or equipment focussed with RPE explained as appropriate. Inductions in Metal Fabrication (MF) companies focused on the equipment required for different tasks. Supervisors or team leaders in these companies were more likely to discuss the technical properties of RPE/LEV with workers than those in other sectors.

“They’re originally given training on everything related to their work area, so we split the factory into four areas, each area has got its own manual and they have to go through the noise survey, the dust survey...so they’re trained on what job roles require what PPE. For the mask they’re told which mask is suitable...it’s explained to them on how it’s to be worn.”

“We would do toolbox talks...the shorter perhaps more punchy informal training.”

Both formal and informal inductions generally covered basic information on RPE and LEV use, namely, requirements for different work tasks, reasons for use (focusing on the hazards), how to obtain RPE, how to correctly use LEV/don RPE, and the reporting of problems with equipment. Such training was generally felt to be effective, having a positive impact on operatives’ acceptance.

“When somebody starts working for the bagging plant they go through all of the risk assessments for the bagging plant, the procedures that they need to work to and part of that training is how to wear the respirators and what to do when.”

In companies that arranged *fit testing* for workers either through manufacturers, suppliers or in-house through a manager trained to carry this out, RPE inductions tended to cover all aspects of RPE programmes. This included how to ensure correct fit, common RPE failures, storage and maintenance procedures (cleaning, how to test and change filters, testing air supply, etc.).

“It’s covered as part of the face fit testing... even just giving them a bit of advice about making sure that the headband one is behind your crown and one’s behind your neck...things like that, it just makes people think that... it’s in the right place, they actually check that it’s fitted.”

Refresher training was generally not formally carried out; reasons included:

- RPE being ‘common sense’ and therefore not necessary to remind workers. [Key]. *“(It’s) like training someone to put on a pair of gloves.”*
- Confidence that workers know the risks and their kit as they use it everyday. [Key].
- A fear of overwhelming or confusing workers by providing too much information (especially small companies).
- Annoying workers with frequent reminders was thought to hinder compliance (especially small companies).
- Lack of resources - staff availability and time to carry it out (especially small companies).
- Workers did not use RPE frequently enough to justify training.

“It is harder to do it on a proactive, pre-emptive basis than it used to be, just purely because there just isn’t the numbers of people available on there to gather everyone together and ... you end up doing a toolbox talk with one or two people and it just can become difficult to just physically organise having several people in one area, just how things are.”

Refresher training is often resource intensive to organise and prepare. It was therefore more likely to be carried out in medium and large companies than small companies. For example, a manager from one company that provided refresher training to workers commented:

“Asbestos training has to be renewed every year ... it’s hard to put experienced guys through the training year upon year, upon year.”

The reason for including refresher training in this company was mainly driven by tightly controlled procedures being followed for asbestos removal, but also to protect the company against workers selecting and using incorrect RPE.

Some companies alluded to delivering informal reminders and updates through toolbox talks (weekly or monthly) or site walkabouts. One manager said that they informally questioned workers on RPE and provided a refresher if their knowledge was considered to be below par.

4.4.1.2 Information

Written material provided to workers on RPE included leaflets, booklets, and information posted on the Intranet and/or attached to notice boards. This information generally covered best practice when working with hazards, types of RPE available, when RPE needs to be used, and how to set up LEV/use RPE (a reiteration of the information conveyed through formal or informal inductions).

“We have the intranet, which has some information...I know there’s information on why we do the dust sampling... We’ve got site specific health and safety manuals and each employee has a CD copy of the company health and safety manuals”.

Some managers commented on the company’s Occupational Health Doctor/Nurse providing information to workers (e.g. HSE guidance on respiratory disease, a letter explaining silica risks, symptoms and health surveillance). Memorandums were also used to communicate any updates to RPE programmes in medium and large companies. Managers acknowledged the advantage of issuing such written guidance to workers in companies where they had a diverse workforce. Those in small companies also commented on the need to make sure that information is adequately tailored to workers level of understanding and needs, and appeared to be more in tune with this than medium and large companies.

There were a few cases, however, where the written material provided to workers was not reinforced with briefings or demonstrations by managers/supervisors. Workers were simply given a health and safety file or booklet covering RPE/PPE and expected to read this. In the worst case, workers were told to read the manufacturers instructions that accompanied the mask. Reasons for adopting a purely written approach mirror those given for not providing refresher training in [section 4.4.1.1](#).

“We show them any notices we get from BCC or anything we pull up go up on notice boards and things like that, but then they’ve got to interpret it”.

In the foundries that participated in the research, little or no RPE-specific information was provided to workers, perhaps because other health and safety issues took priority. In general, however, companies used a variety of mechanisms (verbal, written and visual) to communicate the importance of wearing RPE and to provide workers with updates. This was more evident in medium and large companies than small companies, possibly a reflection of greater resource in the former. Other types of *visual information* utilised included HSE/manufacturer posters, point of use prompts/signs, and DVD’s/videos (e.g. ‘Stone Dust and You’). A few managers were in the process of developing innovative means, such as videoing staff wearing RPE and posting this on the Intranet and displaying information on a TV screen near the canteen area. Both of these received positive feedback from workers. In the latter example, managers commented that workers discussed RPE and asked more questions than they did prior to these interventions.

“You’d see the TV on ... and probably RPE would be a subject, so we sort of do that and we’ve got monthly briefs so that we can pass on information like that.”

It was recognised by most managers that workers would not want to read the company’s *formal health and safety documentation* (e.g. risk assessments, COSHH assessments), but these were made available to workers through an open-door policy¹⁹ should they want access.

4.4.2 Training and information gaps (for workers)

Some companies recognised that they could do more with training workers about *the importance of good fit, including the need to be clean-shaven*. Formal fit testing was seen as the best method for achieving this. The area of RPE programmes that presented the biggest gap in terms of the quantity and quality of training/information provided to workers was *maintenance of the kit*. This was consistent across the 20 sites and even represented a gap in companies that provided fit testing. Although basic information was provided, good maintenance generally relied on good operator judgement.

“I’m not quite sure whether it covers the maintenance of the respirator but it tells them what to wear when”.

There was also little evidence of training being *formally documented and monitored*, despite formal training programmes being delivered in some cases.

4.4.3 Training and information gaps (for managers)

Insights into the types of training and guidance that would assist management in improving their current RPE programmes were gained from asking them about further RPE specific support that they would like from HSE or elsewhere. Only one manager out of the 40 who participated in this research felt that they did not require any more information or support. The following themes emerged from the remaining 39 managers:

¹⁹ *These files were usually kept in management offices.*

1. Further *HSE training, guidance and support* through:

- Delivering seminars on RPE including demonstrations to educate managers. HSE is preferred to other external sources as it is regarded as impartial.

“There’s an awful lot of seminars on silica and dust but there’s not really anything on RPE...I’d like to see something... almost like a road show ... with ... exhibitions and things”.

“I’d like to see somebody that’s not biased give ... an opinion on it really.”

- Setting up an RPE forum (company representatives, RPE manufacturers, designers, suppliers).
- Conducting more site visits/inspections to clarify that companies are taking the right approach. A manager at one of the quarries thought that more inspections needed to be carried out in smaller quarries to encourage *“a level playing field.”*
- Providing simple guidance (i.e. shorter versions of full guidance), in particular, RPE tips and guidance on what specific masks are suitable for different work tasks, how they work and how effective they are, what best practice involves for each stage of RPE programmes, and preferably, industry-tailored guidance.

“Directors don’t always have the time to sift through the information to find out what he needs to know.”

- Sharing of case studies to communicate the types of RPE that other companies use, the programmes they have put in place and found to be effective. A benchmarking service would be a huge motivator for some companies.
- Providing guidance to managers on how best to train their workers and materials that managers can use in training, such as a handbook of industry hazards (e.g. isocyanates, chemicals, foams, etc.), a dust/paint/welding pack (like the noise pack), RPE DVD’s, and materials for toolbox talks. DVD’s were considered by some managers to be a powerful mechanism for motivating workers to wear RPE. One manager requested that the occupational asthma DVD be updated as well as the information contained within the HSE Website.

“We’ve got a noise folder from HSE that we ordered which is just a training pack, its toolbox stuff, and it would be nice to see something for dust... At the moment we have to put all of it together so we have to interpret our report, interpret the legislation and pull some sort of training together and it would be nice to have a pack.”

- Making the HSE Website user-friendlier. Whilst some managers commented on how good the advice contained within the HSE Website was as a source of RPE information, a number of barriers to effective use were mentioned. These were: the need to enter specific search terms that are not always known, difficulty navigating or finding information requiring time and patience, and not being able to find industry specific guidance.

“I found it frustratingly difficult to get information.”

2. *Further research and development* – One manager mentioned the need for developing an understanding of the typical ranges of RPE protection during exposure monitoring in the ‘real world’ rather than the laboratory. This would help managers to be clear about the exact level of reduction in exposure that RPE provides to workers. It is a concern that this manager was unaware that HSE’s RPE selection system was developed around protection levels in the field.

"Obviously, you assume they're well below an exposure limit if they're wearing the respirator, but it's an assumption."

Comments were also made about the need for greater research and development in RPE manufacturing.

3. *Closer links between HSE and intermediaries* (e.g. offering employers a contact/phone number to discuss health and safety concerns).
4. *Independent advice* – HSE, insurers and independent consultants were considered to be the only independent sources of advice and preferred to RPE suppliers. In particular, guidance was sought on the best engineering controls to implement bearing in mind the complexity of issues faced by different sectors, balancing exposure levels against the cost of solutions.
5. *The approach of HSE inspectors* –
 - Acting more as an advisor rather than enforcer - deciding with managers what is feasible, what specific RPE/LEV would be suitable, etc. This would require inspectors to have industry specific knowledge in order to recommend practical RPE solutions.
 - Linked to the above, managers emphasised their desire to contact their inspector (or HSE generally) without feeling that they are exposing themselves to potential enforcement.
 - Creating realistic expectations at the start, ensuring that managers know what is involved in the whole process (from selection through to maintenance) to avoid later frustrations.
 - Consistency in approach (e.g. not opting for the highest level of control when it is not always necessary).
 - Encouragement – a “*pat on the back*” from inspectors as companies make improvements.

Group differences:

- 1. Learners** – Poor standard of training overall (quality and quantity) with little information provided to workers on how to properly fit RPE and maintain it. RPE was considered simple to use and not necessary to explain to experienced workers. Greater onus was placed on workers knowing or finding out for themselves. Senior managers had little knowledge of what was in place for workers. Some inconsistency was apparent in training documentation.
- 2. Developers** – Recently introduced or were thinking about introducing more formal training. Generally provided information in a format that workers understood, using a mixture of communication means. Little appreciation for the importance of refresher training, inconsistencies in training documentation and poor provision of information on storage and maintenance.
- 3. Fortuitous** – No RPE-specific training provided to workers, just adhoc, quick reminders to wear RPE for certain tasks. It was fortunate for these companies that workers were knowledgeable about RPE.
- 4. Proficient** – Used a variety of communication means, some innovative measures. Included RPE in toolbox talks and were more likely than other groups to have well-established training systems in place, including refresher training. Acknowledged in some cases the need to provide more information to workers on maintenance and keep training records.

4.5 ONGOING MONITORING AND MAINTENANCE SYSTEMS

This section details the themes that emerged through the analysis of managers' responses to questions concerning the ongoing monitoring and maintenance regimes the companies have in place. This was an area in need of further development for the majority of participating companies. No differences were found across sectors or company size. Few differences were also found between groups ('learners', 'developers', 'fortuitous' vs. 'proficient'). Although 'proficient' companies were more likely to have monitoring and maintenance systems in place, there was room for improvement.

Summary of key findings:

- Insurers were a key driver behind implementation of systems to record RPE issue and worker health through health surveillance (not always required by law).
- Managers were often opting for simple solutions, ideally no storage or maintenance through using disposable masks where possible. Resource was a key barrier to ongoing maintenance of RPE and LEV.
- Companies were generally without standard procedures for storage and maintenance and rarely enforced poor practice in both areas despite this being commonplace.
- RPE maintenance was often left to worker discretion, which seemed to reflect a lack of clarity amongst managers of good practice.
- Some managers found manufacturers instructions difficult to interpret and put into practice; they sought prescriptive advice on what to do in their workplace.

4.5.1 Factors influencing systems for monitoring RPE provision and worker health

Most companies had implemented a system whereby workers signed for new RPE upon issue. The motivation to do this mostly stemmed from their insurers.

“(We’ve) got a fairly good control system in now where (as) before it was just literally everybody helped themselves to PPE or whatever. They literally now have to come up through their (supervisor) and sign for the bits of kit that they take”.

Similarly, insurers were a key-driving factor for managers implementing health surveillance for their workers, particularly amongst those who had a history of health claims (mostly non-respiratory related). The other driving factor was legislation (or being told by their HSE inspector), which specified this requirement in some companies (e.g. where exposure to silica dust was a risk).

“I think it's just merely the case of if we did have people developing any industrial type injuries our insurance will either become unaffordable or – we pay a very, very heavy price insurance wise... we understand that if we can protect the guys and they did get an injury and had to make a claim, commercially wise it would be catastrophic.”

In a few cases health surveillance was not strictly required, but managers had implemented this as a 'protection' measure following discussions with their insurers. In particular, management were keen to carry out pre-employment medical tests (including lung function tests) with new workers to guard the company against future health claims relating to workers' previous employment. One manager talked about the frequent review of new starters in their first few months of employment.

“New starters get reviewed over a shorter period during their first few months.”

They (insurers) like the fact that we do health surveillance ... their view is you're ticking a box, you're doing a pre-employment medical, and you're doing a regular medical.”

The provision of health surveillance was reinforced by positive feedback from workers and from managers themselves realising the benefits from liaising with occupational health professionals (e.g. finding out what other companies were doing, a useful additional mechanism for obtaining worker feedback on health and safety matters, including RPE). Nevertheless, these benefits seemed to depend on a certain degree of trust being developed between all parties involved.

4.5.2 Factors influencing systems for monitoring RPE storage and ongoing maintenance

In general RPE (new and replacement parts/filters) was stored in a place that was easily accessible to workers. Managers believed that easy access was a key factor influencing worker compliance. Following guidance from RPE suppliers, companies were providing the appropriate means of storage (e.g. a sealable plastic bag or container, personal lockers). Managers recognised the importance of proper storage (i.e... in a sealed container/bag away from contaminated areas) and maintenance to keep RPE fit-for-purpose and to extend the life of the kit. Some companies issued their own plastic boxes for workers, as they were aware that the plastic bags provided with the masks had a limited shelf life.

“It’s about the fact that to be its most efficient it’s got to be maintained.”

It was evident that management wanted to make RPE storage and maintenance as simple as possible for workers (and themselves). In some cases disposable masks were supplied to avoid the need for both storage and maintenance. In others a maximum time was allowed for replacement (e.g. every 18 months) or masks were labelled with the filter replacement date. These managers generally relied on manufacturers instructions to determine filter change and mask replacement dates.

“The beauty of these [half] masks is that they are low maintenance.”

For some companies ongoing monitoring of equipment was considered difficult due to a lack of spare labour to maintain RPE/systems and/or the cost of ongoing LEV servicing (by consultants). Managers in other companies, however, believed that their RPE and LEV systems were being properly maintained due to rigorous monitoring by external consultants (quite frequently in some cases e.g. monthly) and/or insurers (usually annually or bi-annually).

Nevertheless, managers generally spoke of what workers ‘should’ be doing based on what they had told them rather than what they were actually doing.

“They should put them in the locker... if they’re going for their dinner ... but between shifts they should put them away.”

In many cases workers had been given very little instruction about how to properly look after their RPE when disposables were not in use (e.g. when to clean them, change the filters and replace the mask). Ongoing maintenance of RPE was frequently left to operators’ discretion and managers noted considerable variability amongst their workers. Yet, very few companies had a formal policy on RPE storage and maintenance because it seemed that managers themselves were unclear on what to do. Some commented on the difficulty that they encountered finding information on maintenance in HSE and the lack of clarity in manufacturers guidance (e.g. uncertainty over the required frequency of checks in cases where RPE was used daily for a short amount of time).

“I mean the only information you can get from the HSE website is to have a monthly check on the air you put into that (airfed system) ... I don’t know whether there’s any kind of calculation that you could do to say... get an assessment, twice a year maybe... or something like that”.

There was also little evidence of regular supervision or enforcement of poor storage or maintenance. Supervision tended to focus on RPE misuse or non-use with storage and maintenance taking less priority, despite most managers being fully aware of the poor practice happening on the shop floor.

Some management *misunderstandings or misconceptions* were apparent, namely:

- About the dangers of storing airfed visors directly next to the machines.
- A belief that ongoing monitoring is not required, as the risks do not change and workers are constantly aware of these.
- Maintenance is considered unnecessary in a low exposure environment.
- About the need for workers to change their RPE prior to the point where they can taste the dust or smell the fumes.

There were a few exceptions where good supervision and maintenance systems were in place (e.g. regular RPE inspections by supervisors, daily logs maintained). Not surprisingly, these companies were categorised as 'proficient'.

“We do a lot of monitoring, personal monitoring so it's (silica dust) always in people's minds that it's a hazard.”

Not all 'proficient' companies, however, had a good level of ongoing monitoring and maintenance. Some were considered 'acceptable' as they either did not provide a sufficient level of information to workers on RPE care or had no formal maintenance documentation to demonstrate regular checks. In one company management had not implemented a system to ensure the ongoing testing of workers airfed kit.

“There is an audible alarm to indicate a problem and the need to change the filters ... they're (airfed) pretty maintenance free really.”

5 WORKER OBSERVATION AND INTERVIEW RESULTS

This section presents the key themes that emerged across the observations and interviews with workers (or RPE operatives) during the site visits. The findings address, in part, the following objectives for this research set out in [section 1.2](#) of this report:

- **Objective 2** – Assessing the adequacy/suitability of the RPE selected and determining the factors influencing RPE use and care (storage/maintenance).
- **Objective 3** – To corroborate findings from the management interview with worker perceptions of RPE information/training provided, risk perception and understanding of respiratory health risks. In addition, comparing observed practice on the shop floor with good practice.
- **Objective 5** – Enablers and barriers to effective RPE use and ongoing care.

Results from the worker observations and interviews have been compared with findings from the management interviews to determine the consistencies (between what managers and workers said or did) and highlight any inconsistencies in findings from the three data sets. Crosschecking data this way helps to build a clear picture of what is actually happening in practice. Furthermore, a more accurate estimate can be made of workers knowledge and understanding of respiratory risks by observing them in practice and asking them directly about observed behaviours. Any sector and/or group differences ('learners', 'developers', 'fortuitous' vs. 'proficient') are highlighted. Where possible, quotations to annotate the comments made by workers are included²⁰. For more detailed results of (1) worker interviews, see Appendix D and (2) worker observations, see Appendix E in the accompanying annex (B) to this report²¹.

Summary of key findings:

- On the whole, results supported findings from the management interviews. There were, however, some aspects that managers were unaware of or had misjudged, including:
 - The potential influence of the immediate physical benefits (e.g. no stiff chest) of wearing RPE on worker behaviour.
 - Some concerns amongst workers over whether the correct RPE had been chosen.
 - The suitability of RPE was often not ideal, mostly due to the absence of fit testing. In some cases ideal protection had been rejected due to high cost or worker preferences.
 - Some workers who had received little RPE guidance wanted further information.
 - The common belief amongst workers was that they are invisible whilst wearing RPE, even if not correctly worn.
 - Posters and written RPE documents were largely ineffective communication means.
- None of the sites visited were achieving optimum control through the use of RPE.
- Lack of clarity amongst *all workers* on correct storage and maintenance stood out.

5.1 FACTORS INFLUENCING RPE USE AND ONGOING CARE

Considerable overlap was found between worker behaviour and explanations of influences on their RPE use including ongoing care of their kit and managers' perceptions of this (as documented in [section 4.3](#) of this report). These consistent themes are summarised overleaf.

²⁰ **Please note:** Limited quotations are included as the interviews were not transcribed and notes generally did not include worker comments verbatim.

²¹ Available through the HSE customer.

Being **threatened by the 'law'** was a driver for influencing workers to wear RPE in some companies. This is not surprising as managers themselves were primarily motivated to implement RPE programmes to comply with the law.

“(We are) told to do it as it’s law.”

Some managers had an **unrealistic perception of workers understanding of the health risks**, particularly those belonging to the ‘learners’ and ‘developers’ groups. These managers placed too much emphasis on workers already being aware of the risks when they were often unaware. There is evidently the need for all managers to better communicate health risks to their workforce, ideally through risk awareness training in companies where this is not already being conducted.

The majority of workers considered RPE to be easy to use, but **those who had not undergone fit testing had a poor concept of fit**. Comments such as *“it’s near enough”* and *“it seems to fit okay”* highlight the poor understanding of the need for proper fit. Whilst management sometimes assumed that their workers knew how to properly don RPE, in practice they often lacked such knowledge or had made their own alterations rendering the mask useless.

Proficient companies had **established RPE policies and procedures** to ensure that workers donned RPE when required (e.g. listing specific activities requiring RPE or segregated mandatory areas). Workers belonging to the ‘developers’, ‘learners’ and ‘fortuitous’ groups were unsure whether a disciplinary system existed. These workers commented that their colleagues were not always following RPE policies (e.g. for storage), but not being corrected by management.

“It’s very obvious when a mask is required – if not cutting (there’s) no need.”

In companies where RPE standards and procedures were not in place, workers used their **personal judgement** to decide whether or not they needed to wear RPE for given tasks. This was generally considered to be “common sense” and was often based on sensory information in the work environment (e.g. seeing, tasting or smelling the dust/chemicals).

“(You) can smell the iso’s (isosyanates) in the air.”

A common finding was that workers considered the donning and correct use of RPE (particularly filtering facepieces and half masks) to be trivial, and that **training in how to fit the equipment was an unnecessary waste of time**. But, improper fitting to the extent that protection was likely to be compromised was commonly observed.

Regardless of whether any RPE standards and procedures were in place workers generally **did not wear RPE for quick tasks** either because of the limited exposure time or to avoid the extra time and effort of donning RPE.

“(You) can get away with doing little jobs.”

Comfort played a role in determining whether workers donned RPE when required. Those who commented that they were happy to wear RPE generally considered their mask to be comfortable. However, these workers were often using RPE for short periods at a time. Those wearing RPE for long periods each day commented on the following: difficulty breathing during manual tasks or during hot weather or when suffering from a cold; top straps of half masks cutting into the ear; finding full face masks heavy/cumbersome; and a preference for a small mask in confined spaces.

“(It’s) uncomfortable and cumbersome to wear” (half mask)

“(It’s) okay to wear for short periods.”

Considerable variation was found in the level of training received by workers ranging from non-existent to exemplary, the latter being in sites where there had been a high level of past involvement with HSE. Those in ‘proficient’ companies had received training that went beyond a simple induction on how to use RPE to being fit tested, receiving other training covering respiratory issues (e.g. silica training) and, in a few cases, refresher training. In other (non-proficient) companies there were some good examples of training and information for workers, but these aspects had not (yet) impacted on workforce practice.

Workers generally reported **little difficulty in obtaining RPE or replacement parts**.

Wide variability was noted for the storage of RPE, particularly during breaks. This ranged from workers keeping RPE with them (e.g. around their neck) to leaving it hung up beside or left on their work bench/area. It was only at the end of the day that workers claimed to put their RPE away in the protective bag/box in a designated area. In line with findings from the management interviews, workers in general had **received little information on storage and maintenance**. Common sense was being relied upon for the ongoing care of RPE. There were uncertainties amongst *all* workers about correct storage and maintenance procedures (in most cases policies for these had not been set – see [section 4.5.2](#) of this report).

“(I received) a lot (of training) when first introduced three or four years ago, (but) not much refresher (training), not a lot on filters.”

When asked how they would feel **if they got ill because of their job**, those saying that they would be angry as they had done their best to protect themselves were in the minority. Most workers either had **not thought about it or did not care**.

Workers in the ‘**proficient**’ group commented that **management provided consistent messages on the importance of RPE use** through, for example, daily briefings. They were also aware that should management observe any acts of non-compliance immediate action would be taken, usually following a disciplinary process.

“Everyone knows (that) management take it (RPE) seriously.”

Those belonging to either ‘**developers**’ or ‘**learners**’ generally perceived managers as **having a moderate level of commitment at best**. This seemed to be a reflection of delivering inconsistent reminders, lack of a formal monitoring system and little if any enforcement of correct RPE use.

Practical supervision of RPE programmes was almost universally poor. This was often due to lack of clear responsibilities and detailed knowledge of those supervising to the extent that they did not recognise bad practice, or did not act on it. This lack of workforce clarity over good RPE use and care appears to have been underestimated by managers.

Workers belonging to ‘proficient’ companies were more likely to have been involved in the RPE selection process (often through trialling different masks) or, at the very least, had undergone fit testing compared with those in the ‘learners’, ‘developers’ and ‘fortuitous’ groups.

Fully documented procedures describing the RPE programme were rare, only being properly established where there was either a clear statutory need (e.g. for asbestos licensing) or where there had been a significant history of HSE involvement. In general, **records of maintenance and testing** (as required by COSHH for all forms of RPE which are used for more than one month) **were lacking or completely absent**. Although the absence of such records does not invariably indicate that RPE is not being maintained in effective condition, it indicates that formal systems are not in place to demonstrate that maintenance is being kept under control.

Nevertheless, it was apparent in worker observations and interviews that managers were either unaware or had misjudged the impact of the following factors on worker behaviour:

<p>To protect ones health, particularly common amongst foundry workers, was a motivator to wear RPE. This seemed to stem from their knowledge of a family member or colleague who had suffered a respiratory illness through work. Of most importance, however, was noticing the immediate physical benefits of wearing RPE by feeling better during and at the end of the day (e.g. no cough, stuffy/black nose, stiff chest). The latter was particularly apparent amongst workers in Metal Fabrications (MF) sector regardless of their time spent using RPE each day and their time in industry.</p> <p style="text-align: center;"><i>“(I) immediately notice the effects...go home not stuffed up.”</i></p> <p style="text-align: center;"><i>“(I) want to stay healthy...(my) Dad died young from miners’ lung, aged 53.”</i></p>
<p>Although workers generally trusted management to select the best type of RPE due to not knowing any better themselves, a few were concerned about the type of mask that they had been provided as they saw dust in their mask at the end of the day. They had not, however, voiced this concern to their supervisor. In numerous instances the suitability (i.e... matched to the wearer, the working environment and the task) of RPE was not ideal. This was mostly due to the absence of fit testing and workers not being clean-shaven. In some cases ideal protection had been considered but rejected due to cost or worker preferences.</p>
<p>Managers in (non-proficient) companies that did not provide training to workers considered RPE to be common sense, but not all workers felt the same. Of those who had received very little or no training, some wanted further information (e.g. health effects of hazards, RPE use).</p>
<p>RPE invincibility was common amongst workers i.e... the belief that they are protected by simply wearing RPE, regardless of whether it fits or is operating correctly. Compliance with simply wearing RPE (however badly) created a feeling of ‘being protected’ and any chance of getting ill through work was therefore perceived to be ‘low’.</p>
<p>Static posters, even the most recent HSE poster giving donning guidance, did not appear to be effective in getting the message across to RPE wearers – they tended not to be read, and quickly became ignored. Simply issuing documentation to workers, or locating information folders in the workplace, had a similar lack of effect.</p>

5.2 ENABLERS AND BARRIERS TO EFFECTIVE RPE USE AND CARE

Table 2 summarises the key enablers and barriers to effective RPE use and care from the workers perspective. It would be worthwhile for managers to be made aware of these. Results from the management interviews illustrated that they tended to attribute RPE misuse to the worker-level, often overlooking organisational-level influences on worker behaviour that represent key enabling factors (see [section 4.3.2](#) of this report). Overcoming barriers to taking action (in this case for effectively using RPE) is implicit in key health psychology theories. Managers need to provide workers with the necessary knowledge, skills and resources to encourage compliance behaviour²².

²² See e.g. Rosenstock, 1974; Ajzen & Fishbein, 1980; Ajzen, 1988; Fishbein & Ajzen, 1975).

Clear RPE policies and procedures communicated to all workers covering all stages of the RPE programme (from use through to maintenance).

Disciplinary systems in place to respond to non-compliance, complimented with reward systems for good practice.

Worker awareness that their management is committed to the RPE programme.

Consistent messages delivered to workers about the importance of and need for RPE use.

Ongoing supervision of correct use of RPE.

Seeing that managers take RPE issues seriously and quickly resolve these.

Getting into the habit of wearing RPE.

Knowing someone who died/got ill through their work.

Worker involvement in RPE selection (early on) and fit testing for new comers.

Training in RPE use, storage, maintenance and pre-use checks. Also, about the health effects of different hazards.

Refresher training.

Acceptance of responsibility for own health and safety.

Noticing immediate physical benefits.

Own judgement on RPE use and care – likely to be ineffective unless trained in all aspects of the RPE programme.

No enforcement of those flouting the rules.

Managers ‘talking the talk’ but not ‘walking the walk’.

The perception that RPE is common sense and obvious.

Inaccurate perception of risks / health effects.

Uncomfortable/poor interaction with other PPE.

Long periods of use at a time.

Unhealthy coping styles / cognitive strategies.

Absence of fit testing and guidance on correct storage and maintenance.

Table 2: Key enablers and barriers to effective RPE use.

6 POINTS OF SUCCESS AND POINTS OF FAILURE

This section brings together the findings presented in sections 4 (management interviews) and 5 (worker observations/interviews) of this report to summarise the key points of successes and failures of RPE programmes. This is achieved through comparing the performance of the best performing companies (referred to as the ‘proficient’ group throughout this report) to those most in need of improvement (referred to as the ‘learners’ group). These comparisons are based on (1) the key differences in RPE programmes that emerged through the groupings analysis (see [section 3](#) of this report) and (2) comparisons between the two groups on each aspect of their RPE programme (selection, supervision, training, etc.) following post-site evaluation. The enablers and barriers to good practice are also listed. This addresses the following objectives for this research set out in [section 1.2](#) of this report:

- **Objective 4** – by providing insights into the characteristics of the best companies compared with those most in need of improvement (the ‘proficient’ vs. the ‘learners’).
- **Objective 5** – by identifying the enablers and barriers to good RPE practice.

Summary of key findings:

- Shortfalls were evident in knowledge, awareness and understanding, and ongoing monitoring/maintenance for both ‘proficient’ and ‘learners’ groups.
- Differences were found between ‘proficient’ and ‘learners’ at all stages of RPE programmes (from selection through to maintenance).
- *Training* has obvious potential as an intervention to improve RPE programme performance, although there may be other routes to progression (e.g. through RPE design).
- Differences were also noted in the level of company resources for health and safety.
- The biggest differences lie in training (quantity and quality), RPE type selected (levels of practicality and worker preference), RPE maintenance (of air supply), and the standard of occupational health provision (where implemented).

6.1 KEY DIFFERENCES – THE PROFICIENT VS. THE LEARNERS

Table 3 illustrates the key differences between the ‘proficient’ and ‘learners’ groups on various aspects of RPE programmes. Organisational resource is also included as differences were apparent for this. There were some aspects of the programme where shortfalls were evident in both groups, i.e... in knowledge, awareness and understanding and ongoing monitoring and maintenance. These represent key gaps in RPE programmes across industry that HSE could address through targeted communication strategies. Table 3 also demonstrates that different groups require different interventions. HSE’s challenge lies with influencing managers in the ‘learners’ group i.e... motivating them to go beyond a simple box ticking exercise to actively seeking advice on their RPE programme and to periodically review this in line with COSHH. Additionally, making these managers aware of what they need to put in place and why, overcoming their assumptions that RPE is ‘obvious’ or ‘simple’. This is made even more challenging by the current economic climate in which health and safety resources may be limited.

Table 3: Key differences in RPE programmes between the ‘proficient’ and ‘learners’ groups.

Programme	Learners	Proficient
Knowledge, awareness and understanding.	<ul style="list-style-type: none"> • Manager knowledge gaps on critical aspects of RPE programmes. • Manager and worker knowledge gaps on health effects and RPE generally. • Managers lacked detailed understanding of HSE’s respiratory guidance. 	<ul style="list-style-type: none"> • Good RPE knowledge base at all levels. • Good risk perception amongst managers and workers. • Partial or good knowledge of HSE’s respiratory guidance. • Following HSE’s hierarchy of controls. • Seek new RPE information.
Programme selection.	<ul style="list-style-type: none"> • Limited external information sources used to inform decision-making. • Content with achieving an ‘acceptable’ standard (in their view) i.e... being better than before or better than their competitors. 	<ul style="list-style-type: none"> • HSE/Industry best practice guides decision-making. • A wider external contact base used to inform selection. • Proactive in searching for information/advice. • Track changes through the HSE Website.
RPE use.	<ul style="list-style-type: none"> • Assume that workers know how to correctly don RPE. • RPE misuse/non-use is common and blamed on workers. • Little, if any, supervision. • Basic approach is to tell workers to wear RPE with little explanation as to why they should. • Management failings to encourage RPE use (e.g. no fit testing when required). 	<ul style="list-style-type: none"> • RPE standards and procedures are being followed. • Managers are committed to preventing misuse. • Supervision is in place at various levels to monitor and act on misuse. • Developed a health and safety culture to support behaviour change amongst workers. • Better RPE communications in place.
Training.	<ul style="list-style-type: none"> • Poor standard of training – RPE is considered ‘common sense’. • Little information provided to workers on RPE fit. • Onus is placed on workers to find out for themselves. • Senior managers sometimes unaware of what is in place. 	<ul style="list-style-type: none"> • More likely to have well-established training systems in place. • More likely to provide fit testing and refresher training. • A variety of communication means used. • RPE included in toolbox talks.
	<ul style="list-style-type: none"> • Limited information on storage/maintenance for workers. • Inconsistencies in training documentation. 	
Ongoing monitoring and maintenance.	<ul style="list-style-type: none"> • Not yet reached this stage, still focusing on earlier stages of RPE programme development. 	<ul style="list-style-type: none"> • More likely to have ongoing supervision in place (including disciplinary). • More likely to have maintenance systems in place.

	<ul style="list-style-type: none"> • Area most in need of improvement across companies. • Shortfalls in ongoing supervision and maintenance of RPE/LEV in most cases. 		
Organisational resource.	<table border="1"> <tr> <td> <ul style="list-style-type: none"> • Generally no in-house health and safety expertise. • Limited senior management commitment. • Struggling in the recession. </td> <td> <ul style="list-style-type: none"> • Evidence of in-house health and safety knowledge and expertise. • Senior management commitment. • Good level of resources. </td> </tr> </table>	<ul style="list-style-type: none"> • Generally no in-house health and safety expertise. • Limited senior management commitment. • Struggling in the recession. 	<ul style="list-style-type: none"> • Evidence of in-house health and safety knowledge and expertise. • Senior management commitment. • Good level of resources.
<ul style="list-style-type: none"> • Generally no in-house health and safety expertise. • Limited senior management commitment. • Struggling in the recession. 	<ul style="list-style-type: none"> • Evidence of in-house health and safety knowledge and expertise. • Senior management commitment. • Good level of resources. 		

Comparisons between the two groups on each aspect of their RPE programme (up to 48 defined aspects covering selection, supervision, training, etc.) following post-site evaluation revealed notable differences in performance levels for each the following:

- Training (quantity and quality).
- RPE type selected (levels of practicality and worker preference).
- RPE maintenance (of air supply).
- The standard of occupational health provision (where implemented).

6.2 ENABLERS AND BARRIERS TO GOOD RPE PRACTICE

Enablers and barriers to good RPE practice are listed overleaf. These have been extracted from the findings in sections 4 and 5 of this report and therefore represent an amalgamation of findings from the management interviews, worker interviews and observations (including reviews of RPE documentation).

ENABLERS
Management commitment: Driving through change, securing buy-in at the top, persistence, taking responsibility for health and safety (H&S).
Culture of continuous improvement: Striving towards working without RPE by boosting engineering controls, and regular communications on RPE.
Management knowledge pool: Formal H&S courses (e.g. IOSH), supervisory (how to deliver) training courses.
Assistance from other organisations: Open sharing of information from sister companies and competitors.
Organisational change: Key triggers being a new manager responsible for H&S, committed senior management team, and job rotation/restructuring.
Noted improvements in management self-efficacy and worker satisfaction/morale through improvements made.
Control availability: Easy access to required controls.
Legal requirement to follow tight procedures for high-risk hazards like asbestos and silica.
External audits: Acting on advice from HSE, insurers and industry groups. A wake up call that workers are not fully protected.
Management experience of RPE: Lessons learned from experience in a previous company.
HSE support and guidance (on a personal level, good relationship with HSE inspector).
Clear RPE policies, procedures and responsibilities in place (most likely when tight procedures are set out in legislation).
Trust established between managers and advisors (e.g. supplier representatives, H&S consultants, occupational health providers).
Sound external advice: Including clear and practical recommendations from consultants and information updates from RPE manufacturers/suppliers.
BARRIERS
Misunderstandings & misconceptions: E.g. the myth of the ‘28-day mask’ (from manufacturers instructions) and need to be clean-shaven.
Knowledge gaps: Including the health effects of hazards, when fit testing is needed, importance of being clean-shaven, how to properly maintain RPE, importance of proper storage during breaks, and unaware of RPE manufacturing developments.
Worker attitudes: Particularly complacency in mature workers; ‘RPE invisibility’; preference for specific RPE meaning ideal type not purchased/used.
RPE design: Impractical for some work tasks, generally uncomfortable (hot, sweaty), perceived lack of RPE research and development in manufacturers.
Time: Limited time to research into RPE/sift vast amounts of information and therefore rely on recommendations from suppliers.
Credit crunch/Cost: Limited finance to select ideal RPE and make improvements; need for low cost solutions (especially in small companies).
Perceived bureaucracy of HSE: Perception that HSE is hard to please; there is never an end to improvements needed.
Respiratory disease is not considered a key industry health risk, supported by the absence of civil cases.
Management assumptions/overconfidence: That workers know about the hazards and know how to wear RPE.
Desire for simple solutions: For example, selecting one type of mask for the whole workforce, simple storage and no/limited maintenance.
Absence of trigger to change: Stuck in the same old ways, no independent/external review of the RPE programme, relying on ‘being told’.
Worker resistance to change.
Absence of RPE being a Habit: Workers forget to don as they are not used to wearing RPE.
Perception that company is doing better than others in industry, so why do more?
Perceived low severity of hazards: For example, complacency about general dust where silica is a risk, respiratory risks not the top priority.
Interference of RPE with work processes: For example, disrupting TIG welding, affecting vision.
Managers not ‘walking the talk’.

7 CONCLUSIONS

7.1 SUMMARY OF KEY FINDINGS

Table 4 provides a summary of the key findings that have emerged from this research. It draws on the results shown in the ‘summary of key findings’ boxes contained within the results section (i.e... sections 4, 5 and 6) of this report.

Table 4: Summary of key findings.

Knowledge, awareness and understanding of respiratory risks and RPE.

- Although managers’ risk perception was generally good, respiratory risks were not always considered to be a high priority. Workers had very basic knowledge of health risks/effects.
- Some managers and most workers considered RPE to be ‘common sense’ and underestimated nuisance dust when silica was present.
- ‘Proficient’ companies were generally following HSE’s guidance on respiratory control and the hierarchy of controls, constantly seeking new insights, where as the ‘learners’ had only surface-level understanding of the guidance and hazards.
- Key RPE knowledge gaps across *all companies* were: the need for fit testing and being clean-shaven, proper storage and maintenance procedures and awareness of RPE manufacturing developments.

Programme selection.

(I.e... initial motivators and factors influencing selected controls/ procedures, including whom managers mostly seek advice from).

- Legislation and external audits by HSE, insurers and industry groups were key motivators instigating initial programme development.
- Managers relied heavily upon external information sources notably, RPE manufacturers/suppliers, industry contacts, consultants and information share with other companies.
- Worker feedback, control availability, history of use, and managers own knowledge, experience and research strongly influenced the specific controls selected, supported by advice from manufacturers/suppliers.
- The suitability of RPE was often not ideal, mostly due to the absence of fit testing. In some cases ideal protection had been rejected due to high cost or worker preferences.
- Small companies tended not to use HSE information and the Website; rather they looked to their suppliers for guidance.
- ‘Proficient’ companies were following HSE/Industry best practice, keeping updated through HSE’s Website and using a wide range of external contacts. Conversely, the ‘learners’ were happy with reaching an ‘acceptable’ standard and had fewer contacts.

RPE use.

- RPE misuse was common amongst workers except those governed by tight policies and procedures.
- Misuse was the result of an interplay of factors, mostly complacency in mature workers, no visual cue for hazard detection (e.g. seeing the dust), and no convenient access to RPE. Feeling protected for ‘most of the time’ often led workers to complete quick tasks without RPE. Both managers and workers also mentioned discomfort.
- Noticing immediate health benefits and knowing someone with a work-related respiratory illness was a driver for workers to wear

	<p>RPE. Managers need to be made aware of this as a potential tool for behaviour change. For managers, workforce health was not a key driver, although respiratory cases were rare.</p> <ul style="list-style-type: none"> • ‘Proficient’ companies had RPE procedures in place, had secured management commitment to preventing misuse and developed a positive health and safety culture, where as the ‘learners’ attributed misuse to individual workers and relied heavily on assumptions that workers knew how to correctly wear RPE.
Training.	<ul style="list-style-type: none"> • Very few companies provided formal RPE training; this was mostly done via on-the-job briefings and focused on donning. Refresher training was rare; for small companies resource was an issue. • ‘Proficient’ companies generally provided more training to workers using a variety of means, compared with the ‘learners’ who provided little guidance and left workers to find out for themselves. Whilst these workers generally thought they knew enough, there were some who wanted further information and guidance. • Translating RPE manufacturers instructions and HSE guidance into ‘workers language’ was considered necessary; small companies were often better at this than medium-large companies. • Key training and information gaps were communicating to workers the importance of a good fit, being clean-shaven and how to properly store and maintain RPE. Maintenance gaps were apparent in all companies regardless of whether fit testing had been provided.
<p>Ongoing monitoring/maintenance.</p> <p>(Including factors influencing ongoing implementation/review).</p>	<ul style="list-style-type: none"> • Companies were generally without standard procedures for storage and maintenance and rarely acted on observed poor practice. • Managers wanted simple solutions, ideally no storage or maintenance. This was due to lack of resource and/or not understanding what to do. • Lack of management knowledge on correct storage and maintenance was reflected in workers not completely knowing what to do. • Effectiveness of RPE controls were based on objective assessments (exposure monitoring) and subjective assessments, mainly worker observations and feedback, improvements in health and safety culture and managers self-esteem, and comparisons with other companies (if small) or prior controls levels (if medium-large). • Good supervision of RPE users was rare. Supervisors need to know what to look for beyond whether workers are actually wearing RPE (e.g. correct fit, well maintained, not tampered with, etc.).

7.2 RESEARCH CAVEATS

Findings should be considered in light of the following caveats highlighting potential biases that could have influenced the findings drawn from this research:

1. **Selection bias** – Two key biases are of note:
 - a. It is possible that **participating companies constituted a biased sample in the sense that they were ‘motivated’ to develop their RPE programmes**, either through their HSE inspector or through close liaison with HSE and industry on RPE matters (e.g. through Industry Advisory Groups). Nevertheless, some insights into the ‘less motivated’ companies were obtained from analysis of the ‘learners’ group,

some of which had previously fallen into the ‘less motivated’ category. Understanding influences on initial programme selection therefore sheds light onto potential ways to influence the ‘less motivated’.

- b. This **study did not include a representative cross-industry sample**. Although findings provide useful insight into failures in RPE competence and control that might be common across sectors, there may be subtleties in managerial RPE decision-making and factors influencing subsequent behaviour/action, which are unique to particular industries. **As such, care should be taken when applying these findings to other industries/sectors** (i.e... beyond the following: Construction, Brick Making, Quarries, Foundries, Manufacturing of Composite Components, Metal Fabrication and Stone Masonry). Results from this research are indicative of what might be happening within particular industries rather than conclusive accounts. For this reason HSE is advised to use these findings in conjunction with those from other research commissioned in the area to determine the way forward for tackling work-related respiratory disease. It is also advised that any subsequent research uses stringent sampling methods to avoid such pitfalls.
2. **Self-report bias** – Given that the primary data collection method was interviews, self-report bias is a possibility in this research. **Managers could have reported what they think HSE wants to hear rather than the actual truth during the interviews**. Nevertheless, to some extent including worker observations and interviews to check the validity of managers’ statements offset this bias (i.e... through triangulation of the data). It was the combination of these data from which the four company groups (i.e... ‘learners’, ‘developers’, ‘fortuitous’ and ‘proficient’) were developed, rather than relying on one potentially biased source. Inter-rater reliability checks when categorising the groups acted as another control. Additionally, using HSL researchers with experience of interviewing increases the likelihood of an honest account from managers and workers.
 3. **Interpretation bias** – Much of the **higher-level analysis**²³ of the management interviews was **carried out by a sole researcher**. Although this permits greater consistency across the analysis and enables recommendations to be mapped onto salient issues through this researcher having a more in-depth understanding of the key issues, interpretation bias is possible. This is considered to be low, however, as inter-rater reliability checks were conducted at all other stages of the analysis process and for the analysis of the worker observations and interviews. Furthermore, the researcher is aware of these potential biases through rigorous professional training.

7.3 OVERALL SUMMARY

To summarise, a higher-level overview of the results is provided by addressing each research question in turn that this research set out to answer.

1. What do current RPE selection and use practices look like across industry?

Considerable variation was found in RPE competence and control of respiratory risks across the companies that participated in this research. None of the sites visited were achieving optimum control through the use of RPE. Just under half had very significant failings that would be likely to result in inadequate levels of protection to RPE wearers. Some (the ‘learners’) were in very early stages of development of their RPE programmes and still had some way to go before both competence and control are established. Others had developed competence, but were failing on the

²³ *i.e. working through the chartered data in detail, drawing out the range of experiences and views (e.g. according to company groupings), identifying similarities and differences (e.g. between company size and sectors), developing and testing hypotheses, and interrogating the data to seek and explain emergent patterns and findings.*

implementation side of their programme (the ‘developers’) or lacked competence, but due to reasons outside of management control, were in control of respiratory risks (the ‘fortuitous’). Just under half of the sample was classified as ‘proficient’ meaning that managers were considered to have at least an acceptable level of RPE competence and controls did appear to be working. Resources were found to play a role in this; proficient companies generally had in-house health and safety knowledge or expertise, senior management commitment to their RPE programme, and sufficient time, money and staff to make improvements. This was not always the case in other groups, especially in small companies.

2. How does this compare with ‘good practice’ needed for compliance with the law and for adequate protection from risks associated with inhalation exposure?

None of the companies exhibited exemplary RPE practice in all aspects examined. But, the ‘proficient’ group were considered to have a ‘good enough’ RPE programme, which incorporated:

- Managers with good RPE knowledge and perception of respiratory risks, who used a wide range of external contacts to inform programme selection/review and close monitoring of HSE/Industry standards.
- Physical layout conducive to RPE use (e.g. zones, signs, storage facilities) and selected RPE compatible with work tasks.
- Correct use of RPE by ‘all’ with necessary pre-use checks carried out. Established company RPE policies and procedures.
- Regular communications on RPE between management and workers, and regular supervision/enforcement when poor practice is observed.
- Well-established training systems on hazard awareness, RPE use (including pre-use checks) and, to some degree, storage and maintenance.
- Some evidence of ongoing maintenance of kit (e.g. cleaning, filter changes, checks of compressed air supplies).

The majority of companies (including some considered ‘proficient’), however, needed to improve the following aspects of their programme:

- **Less reliance on ‘common sense’** at different levels of RPE programmes (fit, use, storage and maintenance). Adequate **fit testing** needed for all RPE users.
- Management and worker **knowledge of** the requirements of good **RPE storage and maintenance regimes**. Substandard maintenance was a common recurrent theme. **RPE documentation** (in particular training and maintenance records) needs improvement.
- **Refresher training** to maintain worker knowledge and awareness of the risks and required protective behaviours.
- **Regular supervision** of RPE operatives **and enforcement** of those found not to comply.

3. What factors influence the current practices for choice and implementation of RPE programmes?

Choice:

- Legislation and external audits by HSE, Insurers and industry groups were key motivators for initial programme development.

- A range of factors were found to influence RPE decision making largely falling under the banner of ‘external guidance’ received from sister companies, competitors, consultants, HSE guidance/Website, manufacturers, suppliers, and industry contacts.
- Insurers were a key driver behind implementation of systems to record RPE issue and worker health through health surveillance, not always required by law.
- A range of factors was found to influence choice of the specific respiratory controls selected. Worker feedback (particularly on comfort), control availability and history of use of specific controls within the organisation all influenced selection. Furthermore, managers’ own knowledge, experience and research, supported by the advice they received from manufacturers/suppliers, played a role.
- Small companies looked to suppliers to tell them what to do, bearing in mind what was practicable and affordable. Although ‘cost’ was not a key driver overall it played a role for small companies, especially in demanding economic times.

Implementation:

- Objective assessments (e.g. LEV monitoring) determined control effectiveness. Subjective assessments reinforced this i.e. worker observations/feedback, improved self-efficacy amongst managers and health and safety culture, and comparison with other companies (small companies) or their previous level of control (medium-large).
- RPE misuse was common amongst workers with the exception of companies governed by tight procedures (e.g. asbestos removal).
- Managers considered misuse to be the result of an interplay of factors, most commonly cited were discomfort, doing a ‘quick job’ (low exposure), stubborn attitudes amongst mature workers, not being able to see the hazard and not having RPE to hand. Key training and information gaps were communicating to workers the importance of a good fit, being clean-shaven and how to properly maintain RPE.
- A key barrier to effective implementation of RPE was the assumption held by some managers (especially ‘learners’ and ‘developers’) that correct RPE use was ‘common sense’ or already known by workers. More needs to be done with regards to training workers about the importance of good RPE fit and care.
- Managers wanted simple solutions, ideally no storage or maintenance requirements. Resource was a key barrier to ongoing maintenance of RPE and LEV.
- Managers rarely corrected poor storage and maintenance practice on the shop floor despite these being commonplace. This seemed to reflect a lack of knowledge on their part about what exactly was required in their situation.
- Managers wanted more HSE training, guidance and support, frequent independent advice from HSE, insurers and consultants, closer links between HSE and intermediaries, and inspectors to act as ‘intelligent advisors’.

[Figure 3 in section 4.2.5](#) of this report provides a useful summary of the influences on managers’ RPE decision-making.

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Factors influencing the implementation of RPE programmes in the workplace

This report sets out the findings from a qualitative study examining respiratory protective equipment (RPE) programmes across industry. Managerial decision-making was the focal point for this research given that decisions about RPE programmes rest with management. This cross-sector, exploratory study set out to address research on: what current RPE selection and use looks like; how this compares with 'good practice' and what factors influence choice and implementation of RPE programmes.

Considerable variation was found in RPE competence and control of respiratory risks. Four groups of companies were identified:

- **Learners** - were in very early stages of development of their RPE programmes and still had some way to go before both competence and control are established.
- **Developers** - had developed competence, but were failing on the implementation side of their programme.
- **Fortuitous** - lacked competence, but due to reasons outside of management control, were in control of respiratory risks.
- **Proficient** - meaning that managers were considered to have at least an acceptable level of RPE competence and controls did appear to be working.

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