Access equipment for construction work at height in residential properties

Prepared by the Health and Safety Laboratory for the Health and Safety Executive 2013
The construction sector has a high rate of fatalities resulting from falls from height, especially among workers employed in small firms. The sector consists mainly of micro-small and medium-sized enterprises (SMEs) with a large number of self-employed and is peripatetic in its make-up, with employment often short-term and occurring within the informal economy.

The aim of this project was to identify reasonably practical measures to reduce the number of deaths of workers in micro enterprises (MEs), and those who work as sole traders, in carrying out repairs at height on residential properties.

Desk-based research was used to review the types of access equipment that are commercially available as well as to review the fall from heights statistics, and for a brief review of the literature on working at heights. A qualitative method involving semi-structured interviews and a thematic analysis was used to obtain perceptions and information on work practices from a sample of workers from micro enterprises and those who are self-employed and work as sole traders.

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Acknowledgements

The authors thank Lorna Hopwell for her assistance during the project.

The authors thank the participants who were interviewed for the research.
KEY MESSAGES

- The participants, i.e. those who worked within Micro Enterprises (MEs) or as Sole Traders (STs), used mainly ladders and scaffold as access equipment when they worked at height. They were comfortable with the equipment that they used. They tended to own the ladders, rather than borrow or rent them, and would replace these on average, every few years, or if they were damaged. Some of them owned a variety of small scaffold-type equipment that they reported as being easy to erect. If they decided that a particular job required full scaffolding, then this would be hired from equipment hire companies.

- The access to training was more structured within the MEs than with the STs, and this may be due to the availability of more resources (i.e. time, person, cost) within the MEs. However, some of the participants, across both MEs and STs, stated that they were considering pursuing training in the future.

- The MEs varied in the extent to which they encouraged their employees to adopt safe practices. The STs were similar in their approach in adopting safe practices, but some of them were more likely to adopt safe practices than others. Experience and common sense tended to guide the participants in how they approached a job. They had worked for many years in their particular field and felt secure in their knowledge and capabilities.

- The participants, both MEs and STs, used equipment hire companies for information and guidance in determining the most suitable piece of equipment to use for those jobs when they were uncertain about which piece of equipment would best match what was required for the job. They felt that the information they received was reliable and trustworthy. It may be useful to think of engaging with equipment hire companies as stakeholders in promoting best practice among this ‘hard to reach’ group of workers, as the relationship between them and the hire companies seems strong and focused.

- The participants, both MEs and STs, noted that while they would perform visual checks on their own equipment (mainly ladders), most of them admitted that they did not check the equipment, such as scaffold, erected by ‘competent’ workers inclusive of those within hire companies. They believed that as the person erecting the access equipment was trained for that job that it would be done to a satisfactory and safe standard. It would be useful to promote a higher consistency in checking all equipment to enhance safety amongst this group of workers.

- A review of access equipment for working at height showed the availability of different equipment that may be suitable for those MEs and STs who work within construction. However, while some of the equipment would be suitable, some are specific to certain tasks, such as accessing roofs, which would make them less relevant to respective workers within this broader group of workers.

- Overall, the participants, both MEs and STs, engaged in some aspect of safe working practice, but as with all work practices, these should be either adjusted, or improved periodically, and it is useful to promote this perspective among these workers. For example, some of the ME participants noted that they would let employees know if they were not following safe practices. While this is acceptable, the MEs could think of other options to put in place that would allow the employees to assess the type of practices in which they are engaging themselves, such as using a checklist before a certain task.
EXECUTIVE SUMMARY

The Health and Safety Executive (HSE) commissioned the Health & Safety Laboratory (HSL) to conduct this study to explore the use of access equipment and safe working practices among the self-employed, including those working as sole traders, and employees from micro enterprises who work on domestic premises. These types of workers are deemed to be ‘hard to reach’.

Fifteen workers within the construction sector were interviewed to obtain their perceptions on access equipment when working at height. These workers were a mixture of staff working for micro enterprises (MEs; fewer than 10 employees), and the self-employed who could be considered as sole traders (STs).

The aim

The aim of this project was to identify reasonably practical measures to reduce the number of deaths of workers in micro enterprises (MEs), the smallest category of small and medium-sized enterprises (SMEs), and those who work as sole traders (STs), in carrying out repairs at height on domestic properties.

The objectives

The aim was met through the following objectives:

1. To review fatal and major injury accidents and identify those activities, which give rise to most incidents from work at height on domestic properties.

2. For those typical activities, to undertake a risk assessment and consider what commercially available access equipment and systems are available and are reasonably practicable i.e. effective, versatile, not too expensive and can be carried in a transit van.

3. To interview workers in micro enterprises and those who operate as sole traders to identify the reasons why better solutions are not adopted and make recommendations about how that situation can be remedied.

4. To identify any areas where better solutions are needed and consider how innovation might be encouraged.

The method

Desk-based research was used to review the types of access equipment that are commercially available as well as to review the fall from heights statistics, and for a brief review of the literature on working at heights. A qualitative method involving semi-structured interviews and a thematic analysis was used to obtain perceptions and information on work practices from a sample of workers from micro enterprises and those who are self-employed and work as sole traders. The thematic analysis allowed the themes (those common areas among participants) from the data to be identified and reported.
The results

Review of fatal and major injury incidents

The incidents that occurred between 2004 and 2011 were reviewed. In total, 16 fatal incidents occurred on domestic premises, all involving men. Eight of them were self-employed and companies, of different sizes, employed the other eight. The type of work they did was varied and the falls were from different heights: nine were high falls, three were low falls and four were unspecified.\(^a\) Falls that are considered high, could be described as over 2 metres (m) or above head height, while low falls could be described as up to and including 2m or below head height.\(^b\)

In respect of major injuries, 145 occurred on domestic premises, all involving men and falls from height. Thirty-five were self-employed, with 110 listed as either an employee (101) or employed by other (9). The type of work they did was varied and the falls were from different heights: 98 were high falls, 35 were low falls and 12 were unspecified. The majority of injuries were due to fractures (112).

The reasons given for the falls, both fatal and major were similar, and were due to walking on unsecured material (roofs, decking); slipping from: ladders, floor joists, roofs, scaffold; and experiencing a health condition, e.g. a stroke or a fit, and falling back from the ladder; putting weight onto material that could not sustain this weight and subsequently falling; inadequate scaffolding components; dismantling or carrying material, the weight of which could not be sustained by the ladder or scaffold; and ladders slipping due to not being secured or to weather conditions.

In respect of the fatal accidents, the common links with the three individuals on whom a more in-depth assessment was done, due to more detailed information being provided in the database, showed that they engaged in activities that might be seen to complete the job quicker.

Review of access equipment

The review of the equipment showed a predominance of traditional equipment, inclusive of ladders, stepladders, podium steps and scaffold towers. The researcher identified products that might be suitable for sole traders and those employed in micro enterprises, inclusive of the ease of transporting them. Due to the cost of some of these pieces of access equipment, it may suit the STs and MEs to rent the types of access equipment reviewed, rather than purchasing them outright.

Thematic Analysis

The thematic analysis saw twelve themes emerging:

- Work at height equipment (information on the equipment they use),
- Training (the training that they did),
- Support (the support that was available to them),

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\(^a\) A place is ‘at height’ if a person could be injured falling from it, even if it is at or below ground level. Accessed at The Work at Height Regulations 2005 (as amended). A brief guide. Health and Safety Executive INDG401(rev1) 04/07, p.1. http://www.hse.gov.uk/pubns/indg401.pdf

• Control (the amount of control they had or allowed when working),
• Trust (trust in others and practices),
• Experience (perceptions of experience and how they used this experience),
• Safety (the types and levels of safety in which they engaged),
• Knowledge management (how they passed on and kept information/knowledge),
• Communications (how to communicate to others and how others communicated with them),
• Judgement/decision making (how they arrived at decisions),
• Risk (the risk involved in the work), and
• Tools (the tools available for their jobs).

Summary of the main themes

When the participants, both MEs and STs, work at height, they tended to use mainly ladders and scaffold (either small easy to erect systems or full scaffolding systems) as access equipment. They considered these as suitable for the work they did and found them safe, convenient and allowed them also to operate in a cost effective fashion. However, if they felt any particular job required a different piece of equipment then the cost of this would be priced into the work. They admitted however that they did have to consider the cost that the customer would be willing to pay. Moreover, they were willing to not do a job if they felt it was very unsafe. Equipment, for this group of workers, both MEs and STs, is the main resource for their work and all of them owned their ladders and would hire equipment, as needed, from equipment hire companies. They noted that they changed their ladders regularly, and changed other scaffold type equipment as needed. They tended generally not to perform checks on hired equipment, as they trusted the competency of the person erecting or supplying the equipment. Therefore, they did not believe that the secondary checking of the equipment was necessary or practical. The participants trusted the hire companies in guaranteeing that the equipment was safe to use. Only a very small number of participants stated that they would check the equipment that was brought to site or erected on site.

Due to these perceptions of believing that they did not need to check equipment that they did not install, it would be useful to promote a higher consistency in checking equipment, either owned or hired, among this group. These checks should promote and increase safe practice.

The MEs, for the most part, had a structured approach for putting in place safe working practices, as well as having risk assessments/method statements in place, conducting tool box talks and providing the necessary support to their employees. The STs, for the most part, did follow safe practices, but were not as rigorous in their approach as the MEs.

The participants, both MEs and STs, seemed agreeable to receiving information on safer work practices. Five of them agreed to have information on work at height material posted to them, while others admitted to thinking of going on courses as they felt that they could learn better practices. They accepted that there are elements of working at height on which they could improve, such as more knowledge about any specific requirements when working at height. Two of the participants admitted to falling from ladders, one with a serious injury and the other
sustaining a minor injury. The participants are aware of the risks involved in working at height and there was a perception that they would benefit from information that came from a reliable source.

The training undertaken by participants, STs and those from the MEs could be improved. A small number of participants from the MEs had a very focused and structured approach to training and ensured that workers received refresher courses. However, some of the STs stated that they had not done any training since their apprenticeship or since leaving college. Some of them felt that it was not necessary due to the experience they had gained while doing the job, and because they relied on ‘common sense’. It may be useful to provide information on where training could be obtained at minimal or no cost for some of these workers. However, it is important to note that for some STs, this may not be economically viable, as they may have to choose one day’s paid employment over one day obtaining training.

For most of the participants, they felt that training was more beneficial to the inexperienced and for those young employees who were new to the trade. This misperception would need to be addressed, as training and competency are key factors in improving worker safety. One participant, in acknowledging his reluctance to take on an apprentice due to the high risks of the job, did state that he would invest in scaffold training for any young person to whom he may offer an apprenticeship.

As part of the interview process, the participants were shown six pictures of alternative access equipment, which were identified during the review of the access equipment. In responding to the questions, they thought about the suitability of each piece of equipment for their particular line of work. One participant stated that he felt he was learning, just by looking at the pictures. Overall, most of the participants had not seen nor used most of the equipment. Some of them had used similar types of equipment to those shown, and depending on their experience of using these, led to their determination on how safe or useful were the equipment that were displayed to them.

Due to the inherent risks in this sector and among this group of workers, the research suggests that while overall the participants reported engaging in some safe work practices, these practices could be improved.
<table>
<thead>
<tr>
<th>CONTENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. INTRODUCTION</strong> .......................................................... 1</td>
</tr>
<tr>
<td>1.1 The Aim ................................................................. 1</td>
</tr>
<tr>
<td>1.2 The Objectives ......................................................... 1</td>
</tr>
<tr>
<td><strong>2. METHOD</strong> ................................................................. 2</td>
</tr>
<tr>
<td>2.1 The Design .............................................................. 2</td>
</tr>
<tr>
<td>2.2 The Interview Schedule ................................. 3</td>
</tr>
<tr>
<td>2.3 The Sample ............................................................ 3</td>
</tr>
<tr>
<td>2.4 The Interviews ......................................................... 3</td>
</tr>
<tr>
<td>2.5 Limitations of the Research ......................... 4</td>
</tr>
<tr>
<td><strong>3. RESULTS</strong> ................................................................. 5</td>
</tr>
<tr>
<td>3.1 Review of Fatal and Major Injury Incidents .... 5</td>
</tr>
<tr>
<td>3.2 Review of Access Equipment ....................... 7</td>
</tr>
<tr>
<td>3.3 The Participants ................................................... 7</td>
</tr>
<tr>
<td>3.4 Thematic Analysis ............................................... 8</td>
</tr>
<tr>
<td>3.5 Perceptions of the Set of Pictures ............... 26</td>
</tr>
<tr>
<td><strong>4. DISCUSSION</strong> ............................................................ 29</td>
</tr>
<tr>
<td>4.1 Use of Equipment ................................................. 29</td>
</tr>
<tr>
<td>4.2 Suitability of Available Equipment ............... 30</td>
</tr>
<tr>
<td>4.3 Encourage the Adoption of Solutions ............ 30</td>
</tr>
<tr>
<td><strong>5. CONCLUSIONS AND RECOMMENDATIONS</strong> ............ 33</td>
</tr>
<tr>
<td><strong>6. REFERENCES</strong> .......................................................... 35</td>
</tr>
<tr>
<td><strong>7. GLOSSARY</strong> .............................................................. 38</td>
</tr>
<tr>
<td><strong>8. APPENDICES</strong> .......................................................... 40</td>
</tr>
<tr>
<td>8.1 Appendix I: Semi-Structured Interview Guide ... 41</td>
</tr>
<tr>
<td>8.2 Appendix II: Review - Work at Height Equipment 52</td>
</tr>
<tr>
<td>8.3 Appendix III: Overview of Themes and Sub-Themes 58</td>
</tr>
</tbody>
</table>
1. **INTRODUCTION**

The Health and Safety Executive (HSE) commissioned the Health & Safety Laboratory (HSL) to conduct this study to explore the use of access equipment when working at height and safe working practices among those who are self-employed and seen as sole traders (STs)\(^1\) and employees within micro enterprises (fewer than 10 employers; MEs),\(^2\)\(^3\) all of whom work within the construction sector on domestic premises. There are concerns about the number of fall from height fatalities that occur in the sector and that some of them could have been prevented\(^4\)\(^5\). Some of the reasons identified for falls from height include poor management control\(^6\), lack of attention and task distraction when working at height, lifting and carrying heavy and/or awkward and unstable loads, the use of inadequate or damaged equipment and risk taking, such as rushing, taking short cuts and not using appropriate methods and equipment that require time and expense\(^7\).

The construction sector is one that has a high rate of fatalities from falls from height\(^8\)\(^9\) and especially among workers employed in small firms\(^10\). Moreover, this sector consists mainly of micro-SMEs (small and medium-sized enterprises) with a large number of self-employed\(^11\), and is peripatetic in its make-up, with employment often short-term and occurring within the informal economy\(^12\), further underscoring the importance of promoting safe practice for these workers.

This specific type of transient work is rarely touched by proactive HSE inspections or building control so inherent safety solutions are needed. There is no collective body to represent their interests, highlight concerns or identify solutions. As such, it would be useful to gain perceptions from the workers within this group on their work practices and the type of access equipment that they use when they work at height.

1.1 **THE AIM**

The aim of this project was to identify reasonably practical measures to reduce the number of deaths of workers in micro enterprises (MEs), the smallest category of small and medium-sized enterprises (SMEs), and those who work as sole traders (STs), in carrying out repairs at height on domestic properties.

1.2 **THE OBJECTIVES**

The objectives that follow assisted in the achievement of the aim:

1. To review fatal and major injury accidents and identify those activities, which give rise to most incidents from work at height on domestic properties.

2. For those typical activities, to undertake a risk assessment and consider what commercially available access equipment and systems are available and are reasonably practicable i.e. effective, versatile, not too expensive and can be carried in a transit van.

3. To interview workers in micro enterprises and those who operate as sole traders to identify the reasons why better solutions are not adopted and make recommendations about how that situation can be remedied.

4. To identify any areas where better solutions are needed and consider how innovation might be encouraged.
2. METHOD

2.1 THE DESIGN

The design for the study was two-fold in nature as described below, and included desk-based research for the review of the accidents and the literature and a qualitative method that consisted of semi-structured interviews, which were analysed using a thematic approach. Such an approach is recommended to elicit similarities in perceptions, in this situation, among a homogenous work group13, 14, 15.

2.1.1 Desk-based research

2.1.1.1 Review of fatal and major injury accidents

Desk-based research was used to review the fatal and major injury accidents and to identify those activities that contribute to incidents when working at heights.

Statistical data were requested from HSE’s Statistics Unit for all ‘fatal and major injury accidents within the construction industry for those persons who work at height’. All relevant fatal and major injury records were extracted from COIN, (whether they had been investigated by the HSE or not), where the site has a standard industrial classification (SIC) code beginning with 45 (construction) and the ‘kind of accident’ was coded as ‘fall from height’. Further, the records were restricted to those injury records with an incident date between 2004/05 and 2010/11. The identification of persons involved in the incident as a ‘lone worker’ is not routinely recorded on COIN. The category of ‘self-employed’ was used to select ‘possible’ lone workers.

After an initial review of the summary data provided by the Statistics Unit, four full reports for the fatal accidents were requested based on the information from the ‘case description’ category, i.e. how the incident occurred. These reports were requested to better assess the incidents and to gather more detailed information about the causes.

2.1.1.2 Assessing criteria using a literature review

The results of the desk based analysis of accident statistics did not reveal sufficient information to inform adequately the interview question set development for the qualitative stage of this study. Therefore, a request for a literature search on fatal and major injury accidents within the construction industry for persons who work at height was undertaken. The following criteria were used:

- Work at height
- Domestic/small scale work at height
- Competency requirements
- Underlying causes of construction fatal accidents
- Solutions for work at height

Corporate Operational Information
• Common activities, which contribute to incidents from work at height on domestic properties
• Commercially available equipment to reduce the risk of fall from heights
• Suitability of equipment to the needs of workers in micro enterprises/lone workers

The material was reviewed to assess aspects of working at height that did not emerge from the review of the incidents.

The information gained from the desk-based research of accident statistics as well as the literature review was used to inform the interview schedule used for the interviews.

2.1.1.3 Review of access equipment and systems

Desk-based research was also used to review commercially available access equipment and systems. An Internet-based search was undertaken on “access products”, “work at heights products”, “work at heights access products”, “roof access products”, “temporary safe roof access”, and “lifeline systems”. After this initial search, the researcher completed a further Internet search on access hire, which identified thirteen equipment hire companies. The online catalogues for the respective companies were either examined and/or a hardcopy of the catalogue was requested.

The review concentrated on novel solutions e.g., folding tower systems rather than traditional solutions, such as scaffolding.

2.1.2 Qualitative method

Face-to-face semi-structured interviews for workers in micro enterprises and those who worked as sole traders were used to generate the data.

2.2 THE INTERVIEW SCHEDULE

The interview schedule was devised by the researchers at HSL based on the research objectives, the review of accident data, the literature review and the assessment of available equipment. It provided background and context of the process for the interviewees. This schedule was agreed between the HSE and the HSL prior to the interviews with the potential participants to ensure it met the aims of the work. The schedule is provided in Appendix I.

2.3 THE SAMPLE

HSL contracted a professional recruitment company with previous experience in recruiting hard-to-reach populations to recruit the sample. The recruitment company contacted potential participants and arranged dates for HSL staff to visit and interview them.

As it was expected that the sample required for this project might be difficult to engage, a financial incentive was provided to participants for their time and to better facilitate the interaction process. The financial incentive was a voucher not linked to any particular retailer.

2.4 THE INTERVIEWS

All of the interviews were face-to-face and audio recorded. At the start of each interview, the participants were informed of the study, its objectives and the confidential nature of the interview. The researcher recorded the interviews to ensure that all the information was
collected verbatim. The respondents were given the option of not having their interviews recorded, but they all agreed to the process.

The interviews lasted between 22-59 minutes, at the end of which, the participants were thanked for their time and offered the opportunity to ask any questions.

2.4.1 The Analysis

The recorded interview data were transcribed verbatim. The data were analysed by reading the transcripts to identify the main themes and/or messages to emerge for each question and to verify that the responses were in line with the questions. An inductive approach was used to allow themes to emerge from the data\textsuperscript{13, 14, 16}. While reliability within qualitative analysis is not a priority\textsuperscript{17} as it is difficult to replicate exactly the study\textsuperscript{18}, one of the ways to promote reliability within the analytic process is for the researcher to use a structured approach to the process to ensure consistency\textsuperscript{17}.

Thematic analysis allows a check of the consistency of the data to the overarching research question\textsuperscript{18}. However, depending on the nature of the data collected, this method may be adjusted to ensure that full saturation of the data is achieved. In qualitative analysis it is important to achieve saturation of the data, i.e., when no new themes emerge from the data and all overarching themes are highlighted.

It is important to note that while themes will emerge from the data; these themes may not reflect the views of each of the participants from his particular interview. As the participants are from the same population, their perceptions and views would be similar. However, as individual differences are key components of all persons, the participants respond as appropriate to their experiences and mindsets. As such, each participant may not raise each of the issues that are highlighted subsequently as themes in the research.

2.5 Limitations of the Research

The usefulness of a qualitative approach is that it allows an in-depth assessment of a particular issue, which limits the results to one particular group at one particular time. The insights from the results from this research, while very useful and allow an understanding of perceptions and behaviours, should therefore not be used to generalise to all sole traders and those employed in micro enterprises who work at height on domestic premises.
3. RESULTS

3.1 REVIEW OF FATAL AND MAJOR INJURY INCIDENTS

3.1.1 Fatal incidents

The incidents that occurred between 2004 and 2011 were reviewed. For the incidents that resulted in fatalities, most of these occurred with men, with only 22 of the incidents out of 2337 records showing that a woman was involved. The ages of those involved in incidents varied from 16 to 79. These figures exclude children and those young people on work experience. It can be assumed that incidents will occur among individuals, regardless of age, but are more likely to occur among men. Research has corroborated that men experience more accidents than women\textsuperscript{19, 20}, as do those who work in the construction sector\textsuperscript{21}.

When the accidents were restricted to those that occurred on domestic premises and resulted in a fatality (16 out of 2337 records), all of these occurred with men. Eight of them were self-employed and companies employed the other eight. The size of the companies was not listed.

These 16 individuals were employed in different types of work and these ranged from labourers, roofers, carpenters/joiners painters/decorators, scaffolders, stagers, riggers and bricklayers or masons. Of the falls\textsuperscript{d} that led to a fatality nine were from high heights, three from a low height and four did not specify a height. High falls could be described as over 2 metres (m) or above head height, while low falls could be described as up to and including 2m or below head height.\textsuperscript{e} The specific height for these fatalities, either below or above 2m, was not listed on the database.

The reasons for the falls were due to walking on unsecured material (roofs, decking); slipping from: ladders, floor joists, roofs, scaffold; and experiencing a health condition, e.g. a stroke or heart attack and falling back from the ladder.

Based on the content of the initial information about the fatalities, further information was requested for four individuals to gain a better understanding of why the fatality occurred, and obtained for three of these. The analysis of the detail concerning these three fatalities showed that one individual was carrying a tool case weighing 7 kg, and lost his footing or handhold while descending the ladder. Another individual was carrying a bucket of debris and as he walked on the roof to dispose of the debris, he lost his footing and fell through the skylight. One other individual was asked to make a new window sash for a flat and was asked to measure the window from the inside of the flat, with the tenant allowing him access to the window. The individual decided to use his own ladder to gain access to the window via the carport roof. The reasons for the fall were not known, but he was found lying on the ground with severe head injuries. An aluminium ladder was lying beside him. The specific reasons for the fall of the fourth individual were not listed.

The common links with the three individuals for whom more detail was assessed, were that they were engaging in activities that might be seen to complete the task quicker. This haste might have increased the risk of unsafe work practices among these individuals.

\textsuperscript{d} A place is ‘at height’ if a person could be injured falling from it, even if it is at or below ground level. Accessed at The Work at Height Regulations 2005 (as amended). A brief guide. Health and Safety Executive INDG401(rev1) 04/07, p.1. http://www.hse.gov.uk/pubns/indg401.pdf

3.1.2 Major incidents

In respect of major injuries, 145 occurred on domestic premises, all involving men. The same parameters as described in the fatal incidents were used in assessing these statistics. Thirty-five were self-employed, with 110 listed as either an employee (101) or employed by other (9). The size of the companies was not listed. The workers were aged between 17 to 67 years. The type of work they did was similar to those who suffered fatal accidents and similarly, the falls that led to their injuries were from different heights: 98 were high falls, 35 were low falls and 12 were unspecified. The majority of injuries were fractures (112). The full list is shown at Table 1.

The reasons for these falls were due to slipping on ladders; falling off roofs; putting weight onto material that could not sustain this weight and subsequently falling; inadequate scaffolding components; experiencing a health condition, such as a fit, and then falling; dismantling or carrying material, the weight of which could not be sustained by the ladder or scaffold; and ladders slipping due to not being secured or to weather conditions.

<table>
<thead>
<tr>
<th>Injury</th>
<th>Number that occurred</th>
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<tr>
<td>Concussion / Internal damage</td>
<td>1</td>
</tr>
<tr>
<td>Contusion</td>
<td>2</td>
</tr>
<tr>
<td>Dislocation</td>
<td>1</td>
</tr>
<tr>
<td>Fracture</td>
<td>112</td>
</tr>
<tr>
<td>Laceration</td>
<td>3</td>
</tr>
<tr>
<td>Multiple injury</td>
<td>18</td>
</tr>
<tr>
<td>Other known injury</td>
<td>2</td>
</tr>
<tr>
<td>Strain / sprain</td>
<td>1</td>
</tr>
<tr>
<td>Superficial injury</td>
<td>2</td>
</tr>
<tr>
<td>Unknown injury</td>
<td>3</td>
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A few of the descriptions for the reasons for the falls are provided:

- The worker was dismantling scaffolding when the scaffold board snapped and he fell approximately 2.1 to 2.4 metres.

- The worker stepped on to the bank of the road and the ground gave way. The edge was not fenced off. He has a replacement knee and the knee gave way and his femur was shattered. He fell about 3 to 3.5 metres.
The worker was on the scaffolding moving the boards along, the scaffolding was not fixed properly and where the board moved he fell around 6.4 metres onto a concrete surface.

The worker was climbing a ladder in order to carry out carpentry tasks on the scaffold. The weather conditions were warm and sunny and he was wearing a safety helmet and a visible jacket. The ladder was of the correct height and in the right position and had not been displaced in any way after the fall. The exact nature of the fall was not known as there were no witnesses.

The worker was climbing up the ladder onto a scaffold, he missed his handhold, and his hand slipped causing him to fall down the ladder. The ladder was tied on at the correct angle.

The worker was coming down a ladder and he lost his balance and fell to the floor. The ladder was tied and secure but there was a perception that the worker may have been carrying something in one hand.

3.2 REVIEW OF ACCESS EQUIPMENT

The review of the equipment showed a predominance of traditional equipment, inclusive of ladders, stepladders, podium steps and scaffold towers. The researcher identified products that might be suitable for sole traders and those employed in MEs. However, due to the cost of some of these pieces of access equipment, the STs and MEs may wish to rent the equipment, rather than investing by purchasing any of the access equipment listed.

The full review is available at Appendix II.

The sections that follow provide the results from the participants, their responses to the main questions and then their responses to the pictures shown of work at height access equipment.

3.3 THE PARTICIPANTS

Of the fifteen participants, six were sole traders with the other nine working within a ME. See Table 2. All were involved in some aspect of domestic work, with some undertaking a substantial proportion of their work on industrial or commercial premises.

Of those interviewed, nine were active in the field, with the other six having more of a managerial/supervisory role, responsible for directing and supervising employees who work at height. These managers/supervisors had worked at height before moving into the positions they held at present.
The participants were all male and ranged in age from 31 to 64, with an average age of 51. They had worked as contractors from between 5 to 49 years, and had worked for 28 years on average. They had worked at height from 5 to 50 years, and had worked at height for an average of 29 years.

For those organisations with employees, the number of these within each enterprise ranged from one to nine, with an average of five employees on staff.

Fourteen of the fifteen participants had worked in previous jobs and these ranged from a variety of sectors inclusive of manufacturing, the armed forces, the nuclear sector and engineering.

The work undertaken included: repairs, roofing, electrical, lighting (internal, external), installation of solar panels, moving cables on the outside of a building, fascias and soffits, window installation, house decorating, wall tie replacement, cleaning and installation of gutters, installation of bi-fold doors and building conservatories.

For those who provided information on where they worked on the premise eight of them worked on the outside, with six noting that they worked indoors.

### 3.4 THEMATIC ANALYSIS

As noted in the method section, the occurrence of a theme shows an issue that the participants wished to raise. However, a theme does not necessarily need to be highlighted by all of the participants.

A thematic analysis was used to extract the main elements from the data, and a total of 12 themes emerged as outlined in Table 3 in Appendix III. These were: work at height equipment, training, support, control, trust, experience, safety, knowledge management, communications, judgement/decision making, risk and tools, and are presented in the order in which they arose with any subsequent sub-themes, i.e. a theme within a theme, such as low control within an overall theme of control, allocated accordingly. Within some of the sub-themes, other minor themes emerged, but these will be considered as part of the sub-theme unless they highlighted a major issue. This approach will be used across all of the analysis.
3.4.1 Work at height equipment

The first theme to emerge centred on the type of work at height equipment that the participants used. This theme consisted of six sub-themes: Type of equipment used, Access to equipment, Checking equipment, Reasons to use equipment, Knowledge of equipment and Sources of knowledge.

3.4.1.1 Type of equipment used

This sub-theme showed that the participants used mainly scaffold or ladders to access height to do a task. On occasion, they might use harnesses or safety nets, but these were only used for a specific purpose, and usually when working as a sub-contractor for a larger enterprise, which tended to exclude domestic premises. As Participant 06 noted:

“We don’t, we don’t need a lot of equipment for height. Our basic stuff is tower scaffold, scaffold or ladders or steps and that’s it really. We don’t have a, we don’t use a big variety of like hoists or anything like that, we don’t, and we don’t work out of cradles or anything like that.” P06

A few of the participants did state that while they did not use harnesses when at certain heights, they acknowledged that they should; while others noting that harnesses may contribute to injury or were cumbersome to use.

Overall, the participants were comfortable using these specific pieces of equipment as illustrated:

“The main way of getting up onto a roof is usually by a ladder isn’t it? And I don’t really think that’s ever gonna [sic] change, it’d be nice if it did. But they’re basically never gonna [sic] stop making ladders are they and they’re never gonna [sic] stop using them. It’s just a case of making the person what’s [sic] using it aware of how to use it safely and obviously how.” P01

Personal protective equipment (PPE)

All of the participants used personal protective equipment, but this did depend on the tasks in which they were engaged. A few of them noted that although they owned steel toe cap boots, they would not wear them if climbing a ladder or walking on roofs, as they felt they did not provide the proper grip. Another situation when they did not wear steel toe cap boots was when they needed to walk through front rooms in a customer’s home, and as such they would wear trainers to avoid dragging mud through the house, as would happen if they were to wear heavy boots. One individual added that the wearing of steel toe cap boots is a danger on a ladder as they add weight. While another stated that he wears trainers, as he was not lifting anything heavy.

Quite a few noted though that if they were working on a building site, they would wear hard hats and follow the required safety practices, as they would be removed from the site if they did not comply.

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1 The text in italics, which are within paragraphs, are to emphasise the themes and sub-themes to emerge.
2 The text in italics that is enclosed within quotation marks relates to verbatim comments from the respective participants, P01 = Participant 01
3.4.1.2 Access to equipment

All of the participants either owned their own equipment, mostly ladders, or hired in what they required, mostly scaffold. Most of them commented that when they hired the equipment, that the equipment hire company would deliver the equipment to site and remove it from the site. One individual had a friend, with a larger vehicle, who would take larger pieces of equipment to the site, if and when required. The majority of participants noted that they used competent scaffolders to erect scaffold and would replace the scaffold if they felt that he was not competent. Some of them stated that if they have any queries about the structure of the scaffold, they would call the contracted scaffold to address their queries.

3.4.1.3 Check equipment

The next sub-theme to emerge was the checking of equipment. This sub-theme allowed a few lower order themes to emerge due to some differences in how the participants approached this issue. Some of the lower order themes involved checking equipment regularly, doing visual checks on ladders etc., when checking equipment adjust if necessary, e.g. replace couplings on tower scaffold if not fixed right or check equipment regularly even if erected by other contractor, e.g. scaffold.

Less than half of the participants noted that they checked their equipment regularly, with more than half stating that they used visual checks on their equipment. One participant acknowledged that some equipment required daily checks, with another focusing on the daily mechanical checks that were essential on for example, scissor lifts before using. However, most of the participants noted that they did not need to check the equipment as they relied on the competence of the person erecting the equipment, such as the scaffoldor. Quite a few others stated that the method statement or certification from the person erecting/hiring the equipment would cover everyone.

3.4.1.4 Reasons to use equipment

The participants provided various reasons why they used equipment, and these were inclusive of accessibility, the height of the premises, for convenience, the cost and because there was no other way to get to the height. This last point is illustrated in the quote that follows:

“There’s no way around it really. I know obviously window cleaners now, they don’t do any climbing any more, it’s all done off [sic] water on a pole, it’s taken their aspect of danger out of the work they actually do but you can’t, you can’t paint from a pole, you’ve got to get up there and do it off a set of ladders, there’s no other way. Yeah.” P11

Some of the participants acknowledged that while using ladders would be suitable for most jobs, they considered always the safest method possible to get the job done and if this involved using scaffolding, then this was done as highlighted in the quotes below.

“Whenever possible I like to have scaffold put up. Obviously there’s [sic] situations where it’s not viable, you have to obviously work a safer method out, i.e., using harnesses. Obviously ladders to get onto the roof to start with, then wearing harnesses if you’re working near the edge, or obviously if it’s in the middle of a big flat roof then as long as you’ve got a, you know, a straight access route on the top of the ladder then it’s not a major problem. But I mean, as a safeguard whenever possible I like to have scaffold put up.” P01
“Right, right, well as I say ladders are...it depends on...well the first thing is safety obviously, you want to survive the experience so there are, you know, if you was [sic] flat, it was good flat and you’ve got a good space and you could get the right angle for the ladder to use it you don’t want the ladder too far in for instance because that good gust of wind and you’re gone. So you’ve got to work out the, you know, you’ve got to work it out in your head whether it’s safe or not and you get to know that through experience, I mean I’m sure it’s written somewhere but I, you just know, you get to know. And if I had anyone working for me I would make sure they knew what they were doing as well. And just using the equipment for the job, as I say some jobs you’ve got where the ground is sloping away, and you’ve got to use for instance...it depends on the height, if it’s quite high you’d have to use a proper foot long scaffold which actually goes into the brickwork as well as being supported, you know, on the floor and you’d have to get somebody in to do that because you’d have to get a scaffolder in to do that and if I’m doing a job like that, usually that will be part of the specification but they would provide that, you know, whoever is having the job done, so they’d get a company in and it’d be done for you so all you’d do is climb on it and get on with it really, internal and external ladders on the scaffold, on the...obviously the guardrails as well, they’re well up on the laws, there’s scaffolding that you need to, you know, at certain heights. So it depends on the situation really.”

“You know, you come across jobs obviously, things with conservatories, that sort of stuff, you can’t work around them, it’s, you can’t walk on them, you can’t stand on them, it’s. Or you’ll get where houses are so tightly packed together these days you can’t, you can’t get the angle with a ladder up against the wall because it’s so narrow between the house and the fence or the house and the neighbours it’s, you know, it’s just not possible to do it. And then I would always say, you know, I think I’ll have to use scaffolding for this.”

“Well I guess any piece of equipment I would only use it if it was necessary to use so. As in, as in cost, yes ladders. I’d use ladders all the time as opposed to using a scaffold obviously, you know, I have my limits you know, for safe working at height. There’s a lot of big houses around, you know, Victorian big houses, it’s kind of, you know, I’d probably sooner say no, I’ve come across houses and said look, you know, you’re going to have to have a scaffold and they’ll say well, you know, the last guy did it off a set of ladders. And I’m thinking the guy must be pretty brave.”

Two of the participants commented that it was unsafe to work when on a ladder, but most of the participants highlighted the cost implications of using any particular piece of equipment. For example, they stated that if the job was not lengthy, then they would not erect scaffold, but that they found it cost effective to erect a scaffold if the job required an extensive amount of work.

With response to what the participants considered lengthy, one participant stated that for jobs lasting five minutes, then it was not feasible to erect a scaffold, while another noted it would not be suitable for a job lasting fifteen or twenty minutes to use a ladder. Another commented that once a job entailed working at height for any length of time, then the company would use a scaffold. These perceptions are illustrated in the quotes that follow.

“...but there’s [sic] certain jobs you’ve got to have a scaffolding, simple as that, but usually with such a job that would be just agreed with the client before you started it and be factored in and usually on the [named area] and then you know if, well... There’s [sic] a lot of shops on the [named area] but I think most of them are
listed buildings to be honest, you couldn’t just throw a ladder up there, you know, you’ve got to have scaffolding, it’s as simple as that and they’re in quite bad condition a lot of them, there’s a lot of work involved in putting them right, you wouldn’t do it off a ladder, you’d be spending too much time on a ladder. So if you’ve got to spend more than, I don’t know, say fifteen, twenty minutes in one position you really don’t want to be using a ladder, because your feet and the fatigue on your legs would be, you know, you’re putting yourself at risk.” P02

“Duration of the installation. The cost implications, it depends on, if we’re doing a five minute job up on the wall you wouldn’t ask a, an external contractor to come and put you up a huge scaffold in for something that’s gonna [sic] take you five minutes. It’s dependent on the actual installation if, but it’s always deemed, we use, I mean we always have done, we always use the safest possible route and they’re not, the lads aren’t asked to do anything out of their capabilities, or from [sic] what they’re comfortable doing.” P04

“We have just done a job in [named town] moving some cabling on the external of a building. We used two pop up scaffolds that it was, either side of quite a large door so they, the lads had, rather than working from a ladder which was not deemed feasible, they had a scaffold either side of the door so they could get up to it and there wasn’t a risk of them coming off the ladder or coming, or falling. I mean it’s generally common sense that you actually, when you look at a job if it’s, if it looks high, higher than what you expect somebody to go up on a ladder for then you’d get a scaffold in. We use a lot of scaffolding, we use a lot of scissor lifters as well on the sites that we do. But it’s, if, you want to minimise the risk of somebody falling off it and you know full well if, when you get to a site if that, if it’s at a particular height with an extended amount of time being worked at that height you would get a scaffold in.” P04

“I think the factors that would come into it would be the height, the duration of the job, the degree of difficulty in doing what you’re planning to do from choice of equipment A or choice of equipment B. Whether in fact we would need more than one person at that level and if we did would a single, single stretch platform scaffold platform suffice or would you need a double length platform. We would take into account what the weights of the people are; we would take into account what the static weights of the equipment is that we’re going to lift up there so that we’re not going to over stress the safe working load of the equipment that’s being used for access. So they are the types of consideration we would look at.” P12

The majority of the participants explained that one reason to use equipment was to ensure safety and to reduce risks as stated:

“...so it’s common sense, you know, if you’re doing something that requires a lot of work, a lot of preparation where you’re stood [sic] in one place for any length of time you would use a scaffold, you’d be very stupid to use a ladder because after a while you...I don’t know, if you don’t use ladders, if you’re stood [sic] on a ladder at any height your feet are actually...you can feel it on the calves, you know there’s a lot of strain and you would put yourself at risk if you were doing it for any length of time.” P02

Six of the participants noted that they worked indoors, and the reasons for choosing any particular piece of equipment depended on different factors, such as the height, shape or
size of a room, or to make sure that the equipment could adjust for elements, such as stairs, as illustrated below:

“It depends on the height of a room. You know, modern houses I can do it, I have a little walk board with two steps up each side, it stands about like that, and usually I can reach the ceiling from that, you know. So you don’t even need your steps on a lot of jobs now. You need, you might need a pair of steps and a plank or just do it off the steps. But like with ceilings, you’re, you’ve only to go round the edge with the brush and then you get a pole and a roller, you know, and do it from the floor so there’s no height work there. It’s so easy now is decorating, you know.” P07

“Inside it’s just steps yeah, okay, yeah. And then externally you’d need to obviously get the ladder to that sort of position, but obviously there you might not get the ladder into that...” P03

“Yes well obviously because it’s just a small room I’d just use a pair of stepladders and I just climb up my stepladders and paint the ceilings and the walls with my stepladders. If it’s a higher ceiling obviously I’d use a lot taller ladders, yeah.” P09

“Well I’ve got two sets of ladders in there and what it does it adjusts so you can have one longer to the other and you actually stand it on the stairs. ... Whereas with a normal ladder if you just had it like that you couldn’t put it on the stairs because they’d be leaning over but my ladders are suitable for stairs. So one leg goes shorter and the other leg is longer.” P09

3.4.1.5 Knowledge of equipment

Just over half of the participants felt that they had a good knowledge of equipment; while several others felt that their knowledge was limited. Regardless of the level, their knowledge of equipment had been gained from doing the same type of work for many years and by reviewing new products that come on the market. For those who reviewed the new equipment; they reviewed these by looking through the catalogues that are available from hire companies or by suppliers sending the latest publications directly to the MEs.

One participant thought that the information about ladders is ambiguous. This was due to his perception that the information that he was getting was conflicting. In addition, he thought he should improve his knowledge on the ‘regulations’ and ‘guidance’ on working at height, especially as he worked as a sole trader with limited resources to access knowledge thoroughly.

“But I don’t know, I mean I could do with learning, being a bit more up to date perhaps on what I can and can’t do, I don’t want somebody coming along and I’m on a ladder, coming up and they can say, you know, ‘oh you’re not allowed to do that,’ and give me some kind of ticket or whatever. Because it’s a bit ambiguous at the moment as regards ladders, I don’t know what’s...” P02

“Well I mean the...how many sites have I been on [sic] the last two years, about two sites in the last two years I’ve been on and as I say I got shouted at for not wearing a hat and this kind of thing, so I know there’s things I don’t know. But as far as ladders are concerned I don’t know, that’s the only thing I’m not sure about because I’m getting different information from different people and I don’t know what’s actually the law, you know, and what’s just hearsay, you know, and people just think...” P02
Others felt that they were not sure where to get information; that the knowledge they had was limited to the equipment that they used; and that as they used the same pieces of equipment continuously, they knew what should be used. Also, they felt that their knowledge had diminished since starting their own business and were not in a specific workplace. Further they felt that the information on equipment would not have changed over the years, i.e. from when they were trained.

### 3.4.1.6 Sources of knowledge

Most of the participants, both MEs and STs, relied solely on the equipment/tool hire companies/builders’ merchants to obtain their information. A few others were more focused in their approach and used sources of reputable information, e.g. the HSE website; or they had contracted a competent health and safety professional to provide advice; or had joined a scheme to provide updates, e.g. on legislation. Those participants who used health and safety professionals worked as MEs, while a mixture of MEs and STs used the HSE website.

Very few of the participants, both MEs and STs, obtained information from colleagues or other tradesmen, and through this they were made aware of different types of equipment; but other participants, all STs, were reluctant to ask other tradesmen as these individuals thought that they should know as they are in the ‘trade’; or they were not sure what is right when they get advice from others in the trade. These latter points are illustrated in the quotes that follow.

“Yeah they would help as well obviously but some of them just keep theirselves to theirselves [sic] and we don’t like to go up to another painter and decorator and say how am I gonna [sic] do this job because he’d be thinking, well you’re a painter and decorator, you should know. So really I take general information from, like I say [named company], the hire company, they’ll give you a bit of advice, and the Internet, yeah.” P09

“Well first of all you’ve got to decide on the height, work out the height you’re working on. I’m not totally 100% with the latest ruling on height as regards ladders, I mean I...people say different things, we use what they call in the trade treble twenty ladders sometimes, sometimes you have to pull them up with rope because they’re very...to go up to about forty feet, forty-five feet. There are people they tell me you’re not really meant to use them, they still get used. But if you were to use them it would be a two-man job you’d have to have somebody footing the ladder, you know, as a matter of course.” P02

Very few were not too sure where to get information, or would not go looking for information; while one individual had retained his health and safety manual from his last job and referenced it frequently. A small number had gone on courses to improve their knowledge and were always learning to keep their knowledge as relevant as possible.

### 3.4.2 Training

#### 3.4.2.1 Provide training as essential

Only a few participants, all from MEs, stated that they either trained employees or ensured that employees are trained to a level of competence. This included sending employees on courses regularly, which would at times act to renew training as required or to act as refresher courses as shown:
“I suppose in a way it does make them, you know if they get a bit lax and a bit, you know, over-confident it does obviously bring them back down a peg or two and it just, yeah they’re refresher courses aren’t they, that’s basically what we look on them as.” P01

3.4.2.2 Equipment training

The training for those who received it, mainly MEs, included: work at height equipment training (Construction skills certification scheme and Construction skills certification scheme (CSCS) - working at heights); CSCS card; Prefabricated Access Suppliers’ and Manufacturers’ Association (PASMA) for tower scaffolding; courses to erect scaffold; The International Powered Access Federation (IPAF): Mobile Elevating Work Platform (MEWP) and manual handling.

One participant noted that he had not heard of training courses for ladders and stepladders and used ‘common sense’ to guide his actions:

“The use of ladders, they don’t really have a training course, sorry ladders and stepladders, I’ve never heard of a training course for those, it’s just common sense really. I’ve done manual handling, but that’s not really relevant to that. I suppose it is in a way.” P05

When the content of the courses were considered, some of the participants thought that they would not be as relevant for experienced employees, and were more suitable for young inexperienced employees; and that the content of courses had not changed much over the years.

3.4.2.3 Impact of training courses on work

For those companies (MEs) that provided training, there was an awareness of the impact that this training could have on the day-to-day functioning of the company. They were concerned that a lengthy course meant time away from work and that it was easier to justify lengthy courses when they were run one day over several weeks e.g. the Site Management Safety Training Scheme (SMSTS). They had to consider that they were paying the employees’ wages as well as the cost of the course; with one participant only providing training if it was relevant to the present work and equipment.

However, one participant who had attended a course felt that some of the individuals who may not have understood the material had passed the course and qualified as a worker with safety knowledge.

3.4.2.4 Limited training

Few participants noted their limited training, but did not perceive that their lack of training was a hindrance to their jobs, as they felt that the training would not have much of an impact on what they did, as illustrated:

“Yeah, yeah, no, absolutely, yeah. If it, other than going on a course, I don’t have a lot of time but yeah if you can send me some information I’ll certainly look at it and, you know, if I thought I shouldn’t be doing that and it was of some benefit I’d probably, I’d change my ways. But it’s generally down to what I actually do really, it’s kind of it’s not always possible to do, you know, everything in a, in a safe and proper way, you can’t guarantee that, you know, it’s 100% safe.” P11
Some of the reasons given for their limited training was due to not doing any training since leaving college; that the training in the college was theoretical, and not practical; that they received training on building sites from other contractors; that safe practices and procedures were enforced on building sites; that they would do training if they thought it beneficial, but were not sure; that they work in a specific area so may not need very detailed training; that they had received training from a new learner, e.g. from a son who was on a college course that included training on working at heights; and that they did not feel that they needed training as the work was very specific and constrained, e.g. only going up two storeys. This perspective is shown in the dialogue below:

“Okay. How much knowledge do you have about work at height equipment and types of work at height equipment?” I k

“Very little these days because when I worked, like at engineering we had Bosun’s chairs and all sorts of stuff like that what we used to have to use, but like I say, I left there when I were [sic] thirty-two so all that’ll be redundant now I should imagine, it’ll all be different practices.” P07

“Hmm, okay. And what training have you attended in the use of equipment generally on work at height equipment?” I

“Well before I were [sic] thirty-two a lot of it, we had to do a lot, you were your own safety man when I were, [sic] so you had a, especially when you were around electric cables and stuff like that you know. We did a fair few where we had to go and do ladder courses and stuff like that. But like I say I haven’t done it since I were, [sic] since I left the engineering.” P07

“Do you remember what the names of the courses were or how long they were?” I

“No, it’s a long time, well it’s thirty-three years ago, you know.” P07

“Yeah.” I

“Long before that really.” P07

“And you haven’t done anything since?” I

“No. I don’t, with just going up two storeys, I don’t see, you know.” P07

A few others did state that they may benefit from learning some aspects of work at height equipment; and did have working at heights training planned for the future. The training mentioned was to obtain certificates for working at heights.

3.4.2.5 No official training

There were a few participants, cutting across both MEs and STs, who had never received any training. Some of the reasons given were similar to those with limited training and centred on thinking that they did not need training; the lack of knowledge on where to attend any courses for working at heights; and the need to focus on the work, which did not leave any time to go on courses. This last reason is highlighted in the quote:

k I = Interviewer
“I’d like to, yeah I’d like to pursue it but at the minute with the work that I’ve got at the minute I just can’t fit nothing [sic] in at the minute so work seems to be coming first before me going onto a course and doing things. But I genuinely want to do something like that so I’ve got a better knowledge of working at heights.” P09

3.4.2.6 Transfer of skills

Two of the participants (one ST and one ME) noted that they had thought about hiring an apprentice to ensure that the skills of their job were transferred. However, one of them (ME) noted that he was reluctant to take on someone due to the risks of the job, but that if he did take on an apprentice that he would send the person on a course to learn how to erect scaffold equipment, as highlighted:

“I suspect if I expanded and I was taking other people on then I think it would be, I think what would probably happen is I would end up putting people on a, like say it was a youngish lad, putting him on a course for scaffold erection and things like that you know. I mean I can pass on me [sic] knowledge but I’m also acutely aware that you’ve got to, you’ve got to follow the guidelines and you’ve got to have certificates for just about everything these days. But when I see what goes on on the building, it’s all, a lot of it; it’s just a paper chasing exercise. All they’re interested in is satisfying the legislation.” P12

3.4.3 Support

Support emerged as the third theme and consisted of two sub-themes: Good level of support and Limited/low support. Most of the participants were able to access some level of support, citing various ways in how this occurred, while others were only able to list a few instances.

3.4.3.1 Good level of support

The level of support within the MEs focused on, for example, ensuring that the manager/supervisor saw the employees during the day; that they checked that things are being done as they should; to carry out administrative tasks, e.g. the pricing of job; as well as visiting sites with employees; believing in employees’ capabilities and judgement; and making sure that welfare facilities are in place before starting the work.

The support for the STs involved having a relative/colleague who can take over/assist with work responsibilities.

3.4.3.2 Limited/low support

The information for this sub-theme was mainly gained from the STs, who noted that they do not have colleagues with whom to discuss issues/solutions, or assist as needed; that they had a very limited network; and were only able to get assistance at times. Their perceptions are demonstrated in the following remarks.

“Other, I don’t really, I don’t have any work colleagues either, you know, I work for myself and other than, yeah I, I guess, you know, I only have myself to question or, you know, look at things obviously if I need to build something or assemble something I’m going to assemble it correctly.” P11

“…I tend to do most things myself [sic], but I don’t take as big a [sic] jobs on as I used to do, you know, because there’s too many things go wrong these days, you know, and I don’t know, just can’t get the staff, you know, people say, “oh do this,
and do that, ” and you know, it’s they don’t do it right so I’ll just do it myself and then...less headache.” P02

“I just type it in yeah, yeah. But it’s like in various jobs if I need any help I do actually go on the Internet and it does explain quite a lot on there of how to get around situations and things, yeah.” P09

“No because like there’s only me normally, there’s only me so it’s just me and the clients.” P09

3.4.4 Control

Control was the next theme to emerge, with one sub-theme of high control.

3.4.4.1 High Control

Few participants provided examples of maintaining control within the work environment, and most of these were from MEs, with only one ST providing examples. The focus of high control involved, ensuring employees are doing tasks as they should be done; fully explaining to the employees what the job entails; checking the equipment to ensure that it is suitable for the task/job; making sure that a friendly working relationship does not affect work practices, and thereby making sure that safe practices are followed; and ensuring that the work to be done is agreed by all parties. The balance between a relaxed, friendly work environment, while maintaining control on work practices is shown in the quote that follows:

“The lads, in some respects I’m quite fortunate because the lads are, they’ve worked for us a lot of years, we’re sort of like on friendly terms. Well one lad, he used to go to school with my brother, he’s worked for us fifteen, sixteen years. We are like a friendly, you know, we’re on a friendly basis with us [sic] employees and, I mean it still don’t [sic] stop me obviously from keeping an eye on them and making sure that things are being done right for my own peace of mind and, you know, feeling that I’m doing my job right really.” P01

The control theme also cut across the experience theme and this will be explored within the section for the experience theme.

3.4.5 Trust

Trust was the next theme to emerge and involved only one sub-theme of a high level of trust.

3.4.5.1 High level of trust

Few participants highlighted behaviours that could be seen as illustrating the sub-theme of a high level of trust, with two participants (MEs) illustrating this trust for employees, i.e. that all employees are fully aware of what they need to do; and they do not need to tell employees how to do the job. The other element from this sub-theme, i.e., the trust given to large companies (equipment hire companies) to follow safe practices, which would mean that there was no need for independent (individual) checks, e.g. on equipment, was noted by a few of the participants, mainly STs.
3.4.6 Experience

More than half of the participants highlighted their great deal of experience on working at heights. The experience theme illustrated also that, employees know what to do; that experienced employees do not like being told what to do; that the ability of how to engage in safe practices comes through experience; and that with age comes wisdom as they have seen too many near misses, and are less likely to take chances. Moreover, this experience was used to ‘train’ and ‘protect’ those new to the job, as it allowed the participants to pass on knowledge to others (i.e. younger colleagues) that was gained from their experience of working at heights; and to not allow inexperienced employees to work on their own or to use equipment on their own.

As one participant noted:

“As I say it’s, it’s been acquired over a long, long time. I’m now nearly sixty-five and I started in the building trade at fifteen so I’ve had a few years to gain that experience.” P10

While with another:

“Well, I don’t like to, yeah I suppose, well quite knowledgeable I suppose. I’ve worked in roofing for, I’ve worked with ladders, I’ve worked on roofs for twenty-five years. That experience with, my dad did it twenty years before that. So it’s really, its experience and obviously some of his knowledge has been passed on to me and that knowledge has been passed onto the lads what we have working for us now. And, as I say, we have some longstanding employees what [sic] obviously pass their knowledge onto any younger ones and, like I say at the moment we’ve only got one really inexperienced one which [sic] is my, my son which [sic] obviously he never, he’s never using a ladder on his own or never doing work on his own so he’s always with somebody what, you know, if it’s not me what’s [sic] telling him then it’s one of the other lads so. Really, it’s experience.” P01

“To access, you know, the job in hand that we have to do, because sometimes it’s difficult, you know. All the lads who work for me are very experienced men and they’ve all had good training to work at height anyway and safely. If they doubt anything [about] working at height they don’t do it. They will call me and I’ll go out to site and discuss what the problems are. And then if it’s not safe or anything like that they come away until it’s made safe.” P06

For a few MEs, the need to allow experienced workers some ‘control’ over their work practices, but at the same time retain some ‘control’ to make sure that they are doing what needs to be done, was an issue they needed to address, but one that was essential for safe practices:

“Sometimes, sometimes you get a situation where they don’t like me telling them what to do because obviously they’re experienced people but obviously it’s my job title to do that and I still have to do it, so.” P01
3.4.7 Safety

The theme of safety had three sub-themes, consisting of a high level of safety, the cost of safety and a low level of safety.

3.4.7.1 High level of safety

All of the participants listed ways that showed they followed a high level of safety. This included, among others: working out the height of the premises; assessing each job individually; surveying the area; determining the manpower required; ensuring employees have the right equipment/tools to do the job safely; allocating staff to tasks/jobs according to their training; ensuring employees use the right equipment to do the job safely; having safe practices in place that should be followed; reviewing new products to make the job safer and easier for employees; ensuring the site is safe before sending employees to do the work; refusing to do a job if they believe that the site/job/equipment is not safe; admonishing employees if they are not following safe practices; having an awareness of risks; carrying out method statement/risk assessment; having toolbox talks and having all of the staff carry a safety passport booklet.

Some of the working practices adopted by STs included:

“It depends on each job really. Like I said to you before if we’re only doing little bits I would only use a tower scaffold, but if it’s a major job like stripping a whole roof off or anything more than sort of twelve, fifteen foot, instead of getting tower scaffolds and keep moving them, I’d just get a big scaffold erected and it’s just a lot quicker and a lot more cost-effective really.” P08

“Well if I was going onto a roof no, I’d have it scaffolded, I never use a roof ladder, if I’m going on a roof it has a scaffold round it and that’s it.” P08

“If it’s a larger building, I tend not to go up ladders over the two lots of steps. If it’s anything that’s quite tall, say the top of a house I’d normally get scaffolding because I’d price the job with scaffolding because I’m not so keen on going up three lots of ladders to the top and hanging on. I normally use scaffolding, definitely.” P09

One participant showed his awareness of the risk involved in working at height:

“I’d like to think I know what I’m doing, I mean obviously I’ve worked at heights for a long time, and I wouldn’t put myself at risk or anyone who works for me at risk, I certainly wouldn’t do that and just [sic] I know what’s safe, whether that’s the same in the eyes of the law I’ve no idea, I really don’t know, but I mean people keep telling me things but you never know what’s right, I mean some of these lads know more about it than I do. But some of them say, “oh you can’t use them treble twenty’s now they’re illegal,” and this kind of thing, and if you’re above a certain height you’ve got to have a guardrail on now after a couple of metres or so and, you know, this kind of thing.” P02
3.4.7.2  Cost of safety

Most of the participants mentioned the element of cost in being able to do the work safely. For a few, it was essential that the customer accepted the financial cost of erecting/renting equipment for safe access, while for others, one aspect of the cost of safety was that some of the home owners are resistant to the cost of safety or safe practices as shown:

“With private work it’s hard sometimes making the customer understand what it entails and what it costs to do work safely. And it’s quite annoying sometimes when I go to a, especially in your local area when you go to look at a job, you’ll allow obviously to do it in a safe manner. And then you see somebody else the next day, I had an example, you know, a week or so ago I go down the village and it were [sic] doing some ridge tiles on a clay, a flat, or a clay flat tiles, Rosemary tiles, one of the awfillest [sic] roofs to access, full stop. And, well I advised scaffold and this, that and the other, obviously the job were, [sic] it went into a few hundred pounds and, well basically the next week I saw somebody there scrambling across ridge [sic] doing the ridge tiles without any, Christ knows how they’d, sorry, I don’t know how they’d got up there to start with but they were basically just working on the ridge without any protection whatsoever. They’re the things what you come across and, you know, it’s frustrating sometimes but it’s just summat [sic] what you have to live with.” P01

“Well yeah, it’s quite funny actually yes because I priced a job a couple of weeks ago and it was just for gutter in a house, but it was old cast iron guttering that was on and it takes some lifting off, so it needs two of you really to lift it off and I’d just I’d allowed for two tower scaffolds, it only put sort of three hundred pounds on the price, but the woman actually said, “what have you included in that?” and I said, “well I’ve included obviously raw materials, scaffolding, this that and the other,” and she said, “my son says what do you need scaffolding for?” I said, “well to get the...” she said, “but it’s only light,” I said, “the new plastic gutter is light, fair enough, but the old gutter is cast and you’ve got to literally break it and get it off, you can’t stand there on the top of a ladder breaking it with the hammer in one hand and holding it with the other and just standing freehand,” she said, “it would be a bit...” I said, “well I would be a bit cheaper love, yeah, but I’m not doing it for the sake of two...I aren’t [sic] breaking my neck for two hundred and fifty quid,” [sic] it’s just one of those isn’t it? But I’d rather...if I’m too old now not...I might have done ten years ago, I might have give [sic] it a go ten years ago but not anymore.” P08

Despite this reluctance by some customers to meet the cost, around half of the participants stated that they would not reduce cost of the job at the extent of safety and safe ways of working:

“Well when, obviously when we can’t get access cost doesn’t come into it because it’s the safety of the men that’s imperative anyway. So that’s not an issue with me, the cost.” P06
3.4.7.3  Low level of safety

Around half of the participants noted that some contractors do not engage in safe practices, with very few acknowledging that engaging in low levels of safety is not worth the consequences.

As one participant stated about the unsafe practices of contractors:

“Only if legislation said I had to and I needed it, that’s when I would do it. Because I, I just, I go back to this job we did, the HSE thing and what I saw the main contractors were letting people get away with. There was, on this floor there was [sic] boards, and I might be diversifying here but there was [sic] boards sticking up on a concrete base and they should have been ground off. Now we were carrying heavy windows and I nearly, I nearly tripped, no fault of mine, I couldn’t legislate for that, I couldn’t do a risk assessment on that, a method statement or whatever you want to call it, they should, the contractor should have cut them off. And I think well, I think meself, [sic] well I’m a little bit better than that because I would have made sure they were cut off for other people.” P12

However, some of the practices listed by the participants included: not needing to tie/foot the ladder if they were only going up to windows/first storey; and not carrying out risk assessments/method statements.

However, some of the participants justified their actions according to previous experience or what was most practical for them in doing their job, as shown:

“Yeah, yeah, no, absolutely, yeah. If it, other than going on a course, I don’t have a lot of time but yeah if you can send me some information I’ll certainly look at it and, you know, if I thought I shouldn’t be doing that and it was of some benefit I’d probably, I’d change my ways. But it’s generally down to what I actually do really, it’s kind of it’s not always possible to do, you know, everything in a, in a safe and proper way, you can’t guarantee that, you know, it’s 100% safe. I’m trying to think of examples where you’d come across it. I can’t, I can’t think of any off the top of my head, but see there’s certain things, I suppose it’s even, you know, in the sense of wearing safety equipment. You know, you’ve got to wear a hard hat. Well, you know, if nothing’s gonna [sic] fall from the sky and hit you why do you have to wear a hard hat? Or you should wear gloves when you’re doing a certain sort of thing. Well you can’t, if you’re wearing gloves, safety gloves, you can’t always feel what you’re trying to do, you know, you need your fingers to get, you know, that sort of thing. Obviously steel toecaps and that sort of thing are great things but not so much for myself [sic] because I’m always on my knees so I wear kneepads to look after my knees. And steel toecaps, you can’t get steel toecaps so when you bend down and you’re on your knees the steel toecap just digs into the tops of your toes so it’s uncomfortable so you probably wouldn’t wear steel toecaps. But I don’t, I don’t need to wear steel toecaps. Ear defenders always because I do have, you know, glass cutting machinery. Eye protection, pretty much always but also eye protection steams up as well so it makes it even, your visibility is even more impaired. Yeah, dust masks, that sort of thing, everyone should use those. But yeah, yeah so I’m sure, I’m sure there are things, there are ways, you know, things which, you know, me personally myself or other people could do better but it’s, it’s not always practical or, you know, it’s not, you can’t always, you can’t always, use or do things in a safe manner or how it should be done by the book I guess, yeah.” P11
3.4.8 Knowledge management

Most of the participants discussed elements of knowledge management in their interview. In one respect, these focused on building a base of knowledge within the company by passing on knowledge to others in team/colleagues/co-workers; going on training course and passing on the knowledge to the staff; and belonging to a training group through which training was done, so he was able to keep up to date with the new types of equipment on the market.

The other aspect of this theme was the lack of a consistent approach in organising or retaining knowledge within the organisation, as each situation was addressed individually, with a perception of not having knowledge, nor knowing where to source knowledge on work at height equipment.

3.4.9 Communications

The next theme to emerge was on communications, with one sub-theme of a good level of communications.

3.4.9.1 Good level of communication

Quite a few of the participants mentioned this sub-theme, mainly those from the MEs. The levels of communication were mainly in one direction, to the employees, by explaining what is required for the job; telling employees to maintain safe practices; and providing health and safety information to employees. The MEs and STs received information from the equipment hire company when it explained in detail how to use the equipment before releasing to the contractor.

However, there were a few instances mentioned of the employees contacting their employer to query tasks that the customer had asked them to do that they believed were unsafe.

3.4.10 Judgement/Decision making

From the theme of judgement/decision making, three sub-themes emerged covering good judgement, acceptable judgement, and poor judgement/decision making could improve.

3.4.10.1 Good judgement

The elements of good judgement included, using evidence gained, for example, through researching the topic to come to a decision on safe practice; discussing the issue/situation with a competent person; and not asking employees to do anything that is outside of their capabilities.

3.4.10.2 Acceptable judgement

The participants listed various behaviours that were incorporated under the sub-theme of acceptable judgement. These included, among others: discussing the issue/situation with the customer; using the Internet to get information on how to accomplish tasks; using a heavy object at the bottom of ladders, e.g. a sandbag or timber to stop them slipping; and accepting that the risk could be reduced by the quality of the ladders used. A couple of the participants felt that they think they know what is safe and acted accordingly:

“But I think I know...I know enough of what...as I need to know as regards my job. I believe I do, but I could be wrong.” P02
However, the majority of the participants used common sense to decide on their actions and this was gained by their great deal of experience on working at heights and by acquiring the ability of how to do safe practices through experience as illustrated:

“If it’s, it’s like, you don’t need to tell somebody how to suck eggs or anything like that because, I mean they’re experienced men, they’ve worked off ladders and scaffolds and tower scaffolds all their working lives. And it’s not as though we’re, and I know people can get hurt from falling from three foot or thirty foot, [sic] you know, if you bang your head you can have the same problems, but a lot of safety element is common sense as far as I’m concerned. And if people aren’t using common sense they shouldn’t be working for me. Am I correct?” P06

“But you use your common sense don’t you? You know, you wouldn’t go up a ladder that you thought were gonna [sic] fall would you?” P07

3.4.10.3 Poor judgement/Decision making could improve

More than half of the participants provided examples that could be considered as poor judgement or that their decision-making could improve. These included, feeling that as the ladder is big, is heavy, is weighty, is more rigid and therefore more reliable; not having a fear of heights; having never fallen off a ladder; not discussing the issue/situation with anyone else; not asking employees to do anything with which they are not comfortable; feeling safe on ladders at specific height, for example at 12 feet; being aware of the risks, but feeling the need to do specific actions to accomplish tasks; thinking that the time of the person footing ladder is wasted, but could justify this action if the person is taking material from the person on top of the ladder.

These are illustrated in the quotes that follow:

“...but you get to know what’s safe and what isn’t, you can tell, you know. I mean the thing is, it’s like with motorbikes, if you get a big heavy ladder you feel safer on that than these flimsy things where a gust of wind would just take you away, you know. I’ve never felt unsafe on a ladder, you know, I’ve never done that and on the big stuff you’d only come off once anyway, you know, there would be no...” “There would be no second time; you don’t bounce when you come off that. But no the...you can tell they’re safe and because they’re heavy and you’ve got the weight, their own weight tends to make them more rigid and more reliable.” P02

“And you’re safe enough at twelve foot high, on a ladder as a rule.” P07

As one participant noted, there was an awareness of the risks, but some of them felt the need to do specific actions to accomplish tasks:

“But yeah, yeah so I’m sure, I’m sure there are things, there are ways, you know, things which, you know, me personally myself or other people could do better but it’s, it’s not always practical or, you know, it’s not, you can’t always, you can’t always use, use or do things in a safe manner or how it should be done by the book I guess, yeah.” P11
3.4.11 Risk

3.4.11.1 High risk

The majority of the participants mentioned different aspects of the risks involved in their jobs, and this included being aware of the need to reduce the risks to employees/self; and acknowledging that they work in a high-risk job. However, this awareness differed among participants with some of them noting that they could not tie ladders as it was not possible at times; and that they put themselves at risk if using unsuitable equipment. Some of them highlighted that there is a risk element involved in working on a roof as they have to get on to the roof before they could hold onto something and then to set up the rest of the equipment and tools.

The participants noted the element of injury that could occur and the consequences, if risk awareness was low. For example, they noted that risk awareness increases if they had minor incidents over time; that there is a risk that one incident could be life threatening; that minor accidents that have occurred due to the error of the persons involved; and that they knew that when they used heavy industrial ladders they were a struggle to operate on their own.

“My ladders, the ladders which I particularly use, they, I’ve got two sets and one of the sets will go just slightly beyond nine metres but that’s, that’s my limit anyway, you know, they, they’re quite industrial heavy ladders; they’re quite a struggle to operate on my own anyway.” P11

Two participants acknowledged having fallen off ladders, with one sustaining a serious injury. The participant who sustained the major injury felt that his behaviour and perceptions had changed as a result of the fall and he was more aware of the risks involved in not following structured processes and practices, as illustrated below:

“Well I don’t know if I told you on the phone, I fell off the ladders thirteen weeks ago and broke my back. Before that incident I probably was a bit reckless, I probably was, it’s all I’ve ever done, I’ve been up ladders for thirty years now. And probably, when I think back I probably did take a few silly chances but since then, since I’ve gotten back to work its different, everything must be footed at the bottom and the farthest I’ll go up..., it’s, I do think about it a lot more.” P15

“But again, my opinion on putting scaffold up has changed since I fell off the ladders, I maybe would have tried and done it without scaffold. But not no [sic] more.” P15

“I would say, I would say so. I mean it’s all I’ve ever done. But saying that, I did fall off the ladders so. I would have thought there was nothing I could learn about safety but saying that then I shouldn’t have fell off the ladder should I?” P15

3.4.12 Tools

The final theme to emerge was of the tools used by the participants to help them when working at heights. Two sub-themes emerged from the tools theme, and included the transport used for taking equipment to jobs and how to get tools to where they needed at the jobs.
3.4.12.1 Transport used for taking equipment to jobs

The majority of the participants used vans or pickup trucks as the main means of transport of getting them and their equipment to and from the work site. The other participants used a car. For those who used a car, they stated that they required only limited material so these will fit in the car; that people would not think a lot of tools are stored in the car as they would assume that these are kept in a van; that the car has an alarm, so the tools are covered if the car was broken into. However, one participant did state that sometimes, he needed to make two trips in the car, as at times he was unable to take all the equipment that he required in one trip. One participant noted also that he used his car for family activities as well; so it was not feasible to purchase a van. While one person, had plans to purchase a van, but the cost was a factor at present.

A few of the participants stated that if they needed large pieces of equipment, that they could use a hire company to take equipment to site; or could ask a friend to take large pieces of equipment to site.

3.4.12.2 How to get tools to where they were needed at jobs

Fewer than half of the participants provided examples of how they were able to get their tools where needed. These involved: using a ladder; taking only tools up ladder as needed; using clothing appropriate for the job (e.g. trousers with lots of pockets); taking up tools in one hand as needed; using equipment with a hook that could hook onto clothing as they climb the ladder; using a scaffold; and erecting scaffold when they have to lift or carry things to a high level.

3.5 PERCEPTIONS OF THE SET OF PICTURES

At the end of the semi-structured questions, the participants were asked to look at a set of six pictures and to acknowledge if they had seen the type of equipment, if they had used it, if they would consider using it, and if yes, why and if not, why not. Illustrations of these pictures are shown in Appendix II.

Picture 1: Self Erecting Tower

Most of the participants had seen a self-erecting tower and either had used it or would consider using it, due to having used something similar, feeling that it was safe, or able to be used in an area that was not restricted.

Very few of the participants felt that they would not use it and this was due to their perception that it was: not suitable for domestic premises; that they would prefer a different type, e.g. motorised; that it did not look as though it was big enough for the external work that they did, and seemed more suitable for indoors; and that it was not suitable for the type of work that they did.

Picture 2: Telescoping Access Tower

All of the participants had seen a telescoping access tower. Most of them had either used it or would consider using it, due to owning one or using something similar, or thinking it ideal for when they work at awkward heights; or being able to walk along the platform, so there was no need for them to keep coming up and down; and that it was suitable if the ground was flat.

Three participants noted that they would not use the telescoping access tower, with one person expressing very strong views on why it should not be used. This participant noted that he had
experience of using something similar but that it had folded when he went in it, so he was reluctant to use anything similar after that. Other reasons for non-use were: a reluctance to let employees use equipment; they prefer to use equipment that is more solidly built; that it was not suitable for domestic premises; that it was too flimsy and did not last; and that it was not suitable for the terrain, but more suitable for inside work.

**Picture 3: Trailer-Based Access Tower**

The majority of the participants had not seen this type of tower, but most of them would consider using it. The reasons to use it included that it seemed to be stable in design and that it was appropriate to work at height safely.

For those participants who stated that they would not use it, their reasons varied from its unsuitability for domestic premises; that there were few jobs on which they could use the equipment, as they prefer to use a fixed scaffold when working on roofs as it allows a firm and level area on which to work; that the equipment looked expensive to hire; that they had other equipment that is more suitable for work that they do or that are limited in scope; and that it did not look right/safe.

**Picture 4: Scissor-Based Access Tower**

With respect to the scissor-based access tower, there was a fairly even split between those participants who had seen it and those who had not. A few participants noted that they had not used it, but most of the participants would consider using it due to its accessibility, but that its use depended on the working height. A very small number of the participants noted its sturdy legs and that it might prove useful for painting.

For those participants who would not consider using it, this was due to preferring to use fixed scaffold when they worked on roofs as it allowed a firm and level area on which to work; thinking that the cost of the equipment looked expensive to hire; having other equipment that was more suitable for the work that they did or that it had limited scope; and that it did not look right.

**Picture 5: Podium Steps**

There was a fairly even split between those participants who had seen podium steps and those who had not. Only one participant admitted to using it, with most of the participants noting that they would not use it. However, for those who considered using it there were conditions to this use. These included the type of site at which they were working; that the equipment was height restricted and was only suitable if working in a limited space.

Just over half of the participants noted that they would not use such equipment. The reasons varied and although a few acknowledged that it could be used to cut costs, but that they did not consider it safe; other reasons were due to that there were few jobs on which they could use the equipment; that it may be cumbersome to transport and erect; that for domestic jobs, it did not have a range of height, so they would use steps; that it looked like a piece of equipment that could incur cost, but that they could get a cheaper option; and that they have other equipment that is more suitable for the work that they do and it was limited in scope.
a) Ladder Platform

Most of the participants had seen the ladder platform, with only one admitting that he had not used it. There was an even number of participants stating that they would either use or not use the equipment. For those who would use, there were conditions to its use. This included: not liking the look of it, but as it has a platform, which will free hands and support legs, that they would use it; that it would need to be built by a qualified scaffolder; that it seemed quite accessible; that it looked able to take the weight of two people, so was a safer option for two people; and that they had the same type of equipment but that it had limited use.

For those who would not use it, the reasons ranged from, preferring to use a fixed scaffold when doing roof work as this allowed a firm and level area in which to work; that it could be used to cut costs, but was not safe; that there were few jobs on which they could use the equipment; that a contractor firm that had used it, but felt that it did not feel safe, as they were a bit unsteady; and that they never had to use one. One participant said that while it seemed like a good piece of ‘kit’, he believed that it was outlawed by the HSE. Others listed their preference for using scaffolding with ladders on the inside rather than the outside; while others acknowledging that they did not work on roofs.

b) Roof Ladder Platform

Most of the participants had seen the roof ladder platform, with very few of them admitting to using it or would consider using it. Those who would use it said it was because of the platform at the top to prevent them falling and as such they would use it if they had to work on chimneys. Most of the participants would not use the roof ladder mainly because they did not work on roofs. Other reasons given for its non-use were that they prefer to use fixed scaffold when doing roof work as it allows a firm and level area on which to work; that it could be used to cut costs, but is not safe; and that there were few jobs on which they could use the equipment.

c) Small Ladder Platform

A fairly equal number of participants had either seen or not seen the small ladder platform with very few noting that they had used it. In terms of considering using it, most participants stated that they would not use it, with a small number admitting that they would.

For those who would use it, they noted that it would provide less pressure on roof tiles; that they could use it to get to a roofline or for awkward access; and that they had come into situations when it would have proved useful.

For those participants who would not use it, they would prefer to use fixed scaffold when working on roofs as it allowed a firm and level area on which to work; or it could be used to cut costs, but is not safe; that there were few jobs on which they could use the equipment; that it looked scary; that it did not look secure, they did not understand how the track system would work; that it would probably be cheaper to use another piece of equipment, e.g. a telescopic arm or tower scaffold, as these would be more cost effective or cheaper; and that it looked unsafe.
4. DISCUSSION

This research explored the perceptions and knowledge of 15 contractors about access equipment when working at height. The perceptions and knowledge varied among the participants and these will be discussed. One of the reasons for this variation is due to their specific jobs. While they all ‘worked at height’; this could involve working as a roofer, as a painter, as a glazer/window installer or installing conservatories. Also, most of them had been in their jobs for 30 to 40 years and were therefore ‘settled’ into what they thought was required or needed to continue in their respective fields.

4.1 USE OF EQUIPMENT

The results show that the participants used mainly ladders or scaffold as access equipment when working at height. They were comfortable with the choice of equipment that they used and felt that within reason they were using the best access equipment for working at height. However, the types of equipment used are those from which falls from height occur within the construction sector\(^8,9\).

Their comfort level with the access equipment was based on many factors. These included, their experience, by preparing for the job and by having safe work practices in place. Some of these factors, such as the safe work practices were fairly structured for the MEs, while most of the STs relied on their experience. Overall, they all used behaviours that they felt were justifiable as a safe working practice.

However, despite these self-beliefs, it is always possible to increase knowledge and to identify better working practices for any particular task. These should be promoted among this group of workers, especially as research has illustrated that falls from height tend to occur mainly among micro-SMEs\(^11,12\).

The results showed that some of the participants were not sure where to get information; some felt that the knowledge they had was limited to the equipment that they used; and others noted that as they used the same pieces of equipment continuously, they knew what should be used. These perceptions were linked to their comfort levels with the types of equipment that they were using, as they had used them continuously in their trade. So while they knew generally how suited their present piece of equipment was to their ‘normal’ tasks, if they encountered different tasks, they needed to get additional information. There was a difference between MEs and STs in how they obtained information, with the MEs using health and safety professionals and more likely to use the Internet and the HSE’s website, with the STs using hire companies.

Most participants noted ‘common sense’ guided their actions in the choice and use of access equipment. While this type of decision-making may be ‘acceptable’ over the short-term it might be useful to encourage this group of workers to develop a more structured and evidence-based approach in their decision-making.

Just over half of the participants felt that they had a good knowledge of equipment and this could be supported in the research by their perceptions of how they felt they reduced risk when working at height. In addition, they were able to provide justifiable reasons for not choosing to use some of the equipment shown to them as part of the research.
The participants use mainly scaffold and ladders when they worked on domestic premises. They were aware that the cost of any job was an issue to some customers. However, more than half of the STs and MEs explained that they would not reduce the cost of the job at the extent of safety and safe ways of working.

4.2 SUITABILITY OF AVAILABLE EQUIPMENT

The participants felt that the equipment that they used met their needs, and some of them did review information on the new types of equipment that were on the market. They all used an external source to clarify if a particular piece of equipment was the most suited for the job. For the STs and some of the MEs, this was mainly the equipment hire companies. Some of the MEs, did have access to health and safety professionals or other resources that they could use to discuss how best to do the job.

Equipment is a key resource for this group of workers, and there is some concern that second hand equipment or machinery may still be in circulation and used by workers within this sector. However, from the information provided by these participants, they change their ladders regularly, and change other scaffold type equipment as needed. Some of them noted that they do not borrow equipment, nor do they use equipment that is offered by the customer. Moreover, if they carry out any commercial or industrial work, and are offered equipment that they may use as a temporary measure at times, they ensure that it has the required certification, that it has been checked and that it is ‘safe’ to use. However, while it is recommended that individuals who use hired equipment are sufficiently trained to identify any faults in the equipment, this present research shows that the participants trusted the hire companies in guaranteeing that the equipment was safe to use. Only a very small number of participants stated that they would check the equipment that was brought to site or erected on site.

The majority of workers within this group did not believe that the secondary checking of the equipment was necessary or practical, as they believed in the competence of the persons responsible for the installation of the equipment. Due to these perceptions, it would be useful to promote a higher consistency in checking equipment, either owned or hired, among this group, in promoting safe practice.

4.3 ENCOURAGE THE ADOPTION OF SOLUTIONS

One of the objectives of this research is to identify areas where better solutions are needed and consider how innovations might be encouraged. By agreeing to be interviewed and providing information on their work practices, it could be assumed that the participants were open to receiving feedback. Further, five of the participants were willing to receive work at height equipment documents (which were subsequently sent to them), thereby accentuating their openness in receiving information on this topic, and could be viewed as a first step in engaging with this group. In this small sample of 15 construction workers, one participant had experienced a fall from height with a severe injury, while one other had slipped from ladders, but did not sustain major injuries. These results are consistent with statistics among this group of workers as individuals who are more likely to experience injury, especially when working within the construction sector.

The findings from this present research reflect those from previous research, which suggests that several behaviours and factors tend to influence accidents, i.e., workplace, equipment, attitudes, motivations, knowledge, skills, supervision, health and fatigue. These and other factors need to be considered and addressed to facilitate safe working conditions; inclusive of the awareness of risk, proper planning, correct access equipment for the task and training to ensure competence. The participants were ‘aware’ of these conditions to varying degrees, but due to resources (time, person, cost) may not be able to act on all of them at any one particular
point in time. The lack of training for most of the participants, especially among the STs, was evident, but again this was mainly a resource issue due to the choice of doing the job and getting paid or taking time away from work, not getting paid and paying for a training course. The choice of work over pursuing training may be influenced also by the peripatetic conditions within this sector. A couple of the MEs had found agencies through local contacts, where they could receive training at no cost. This could be promoted to MEs and STs who work in this sector as one way to gain training and thereby increase competence.

For most of the participants, they felt that training was more beneficial to the inexperienced and for those young employees who were new to the trade. This misperception would need to be addressed. This is especially valid as training and competency are key factors in improving worker safety. The lack of ladder training across workers in construction have been recognised as ways to improve fall prevention. One participant in acknowledging his reluctance to take on an apprentice due to the high risks of the job did state that he would invest in scaffold training for any young person to whom he may offer an apprenticeship.

Most of the MEs used risk assessments/method statements and as this is one practice that may lead to them thinking of how best to carry out safe practices, the use of risk assessments/method statements could be promoted more strongly among STs. All of the participants mentioned getting information, assistance and guidance from equipment hire companies. It may be useful to explore if and how equipment hire companies could be endorsed as a viable stakeholder for sole traders and micro enterprises.

The participants, both MEs and STs, believed, through the ‘experience’ that they had gained over the years, and the ‘common sense’ that they felt was inherent, that they were following safe practices. Some of them did admit that they could learn new techniques and some had refused to do work, at a financial loss, unless they were certain that the site was safe on which to undertake work. However, the lack of training could be seen as one significant factor that may reduce the ability to encourage behaviour change. However, from the information provided by these participants, they would change their behaviours if they felt that the information was ‘reliable’. The feedback from the interviews, and especially from those who were sole traders, was that they received various ‘bits’ of information on site and from other tradesmen, and it was difficult for them to accept or differentiate what was reliable and what was not.

Interestingly, research shows that more fall-related accidents tend to involve employees rather than those who are self-employed, with a four to one ratio of employees to self-employed, but the self-employed have suffered more fatalities from high-level falls. In this present study, the MEs had a more structured approach in ensuring that workers were trained, that they were supported, and were given an element of control, while the employer ensured that checks were in place to maintain safe practices.

The workers in this present study did have elements of safe practices within their daily routine, but these could be improved and they may need to be encouraged through, for example training courses or through information that could be made available at hire companies. Safety and health awareness days (SHADs) have proven to be fairly effective in promoting safe practices and these could be considered as an option for this group of workers.

Although interventions are one way to promote behaviour change, there are questions around their effectiveness, especially as these interventions have not been rigorously evaluated. Despite, these concerns, there is some support that the use of regulations in conjunction with enforcement from inspectors does contribute to a decrease in fall injury rates. There is also some support that training may be effective in decreasing falls, as well as mentoring among
young workers or apprentices. With training and competency, workers are more likely to be able to recognize good and bad practice and know when something is wrong and how serious it could be. However, training is only one element within the process, as it must be combined with experience and knowledge of work practices.

While the participants rarely used harnesses and felt at times that they may contribute to injury, some research has suggested that the use of harnesses should be promoted as essential when using powered access platforms, but workers tend not to use these due to peer pressure and badly designed or unsuitable harnesses. However, the use of harnesses should be determined also through a risk assessment of the situation.

The participants were shown six pictures of alternative access equipment. Their reaction to these demonstrated that they thought about the suitability of each piece of equipment. One participant stated that he felt he was learning, just by looking at the pictures. Overall, most of the participants had either, not seen, nor used most of the equipment. Some of them had used similar types of equipment to those shown and depending on their experience of using these, led to their determination on how safe or useful were those displayed to them during the interview.

One of the participants, a ST, noted that he would only use two pieces of the equipment shown, if he had been trained in their use. This indicated his awareness of the training requirement that was needed for the safe use of equipment. Another participant, a ME, noted that the use of different types of equipment puts more responsibility on employer to train employees in their use and ensure they are using them safely. There is some acknowledgement therefore that training may be required before using types of equipment that they had not used before. However, some of the participants did note that they would not use some of the equipment shown, so they would not have considered getting trained in their use.

It is essential to promote a safe system of work, and most of the MEs in this study had systems in place; inclusive of standards, safety booklets, support, providing information and instruction as well as ensuring that they adequately prepared for the job and used the most suitable equipment. While smaller businesses are less likely to adopt formal processes than larger businesses, and have fewer resources in which to invest in health and safety issues, it is constructive if micro and small businesses could begin to see themselves as learning organisations. Some of the participants in this present research were engaged in knowledge management, even though they might not have necessarily considered that what they were doing was managing knowledge; and this shows a capacity to learn and transfer knowledge and skills, which is a major step in having in place safe practices and safe ways of working.
5. CONCLUSIONS AND RECOMMENDATIONS

Four objectives were outlined in this research in order to achieve the aim of identifying reasonable practical measures that could assist in reducing the death of workers in micro enterprises and those who operate as sole traders within the construction sector on domestic premises. The objectives were: 1) to review fatal and major injury accidents; 2) to assess commercially available access equipment and systems; 3) to identify why workers do not adopt better solutions; and 4) to identify areas where better solutions are needed. These objectives were met.

The review of the accidents showed that the fatalities were caused by unsafe work practices, with ‘haste’ a contributor to the way in which the work was done that led to the fatalities. This factor links to the strong perception from most of the participants in noting the use of ‘common sense’ when doing any type of work. This fairly common perception of what was required when working at height is often in part a product of someone’s experience. This use of ‘common sense’ in defining actions and choices made among small contractors has been raised in other research, and is one element with which they felt comfortable in ensuring that they used a ‘safe’ approach when carrying out their work.

In addition to reviewing the commercially available access equipment, as defined by the second objective, a set of various pieces of equipment were shown to the participants to understand their rationale for using or not using ‘different’ equipment. The participants did not show a consensus for either using or not using the equipment, and gave valid reasons for their use or non-use. This indicates that they were aware of what would benefit them when accessing height for their jobs.

The third objective in determining why workers do not adopt better solutions was assessed through the interviews, with the results showing that while the participants did, for the most part, adopt good solutions, the lack of information is the main reason why workers may not adopt different or better solutions. The participants were aware of their limited knowledge on certain issues and would seek guidance from hire companies or health and safety professionals, as and when required.

The fourth objective, to identify areas where better solutions are needed, involved an overall assessment of all the data in the research. These data showed the need to increase the training acquired by this group of workers. Due to the size of the ‘company’ and the specific jobs in which the participants engaged, they focused on doing the work, rather than improving their skill set, or researching how else a job could be done. This is understandable as workers in this group have limited resources (time, money, person) in which to invest in ‘upgrading’ their skills, and would have to consider obtaining training versus paid employment. It would be useful to explore how best to increase the training obtained in this group.

The recommendations to arise from the research are:

- To explore the use of equipment hire companies as stakeholders for engaging with MEs and STs in respect of occupational safety and health.

- To explore the benefits that manufacturer/suppliers could gain by consulting a wide range of MEs and STs when developing new products for access.
• To promote the essential elements of continuous training to MEs and STs in maintaining an up-to-date knowledge base; and one that should be seen as essential in developing and maintaining safe practices.

• To explore how best to promote a higher consistency in checking all equipment, those that are owned and those that are hired and/or erected by other contractors, to enhance safety amongst this group of workers.

• To establish different ways to disseminate information on access equipment for work at height to this group.
6. REFERENCES


22 Health and Safety Executive (HSE). Key messages from the LFS for injury risks: Gender and age, job tenure and part time working 2000. http://www.ispesl.it/dsl/dsl_repository/Sch90Pdf08Marzo06/Sche90HSEkeyartGenderAgeJobobsDiffInjuries.pdf


32 HSE, Health and Safety Executive, no date, Mobile platform (MEWP) harness wearing, 
http://webcommunities.hse.gov.uk/connect.ti/workheight/view?objectId=10899

33 HSE, Health and Safety Executive, Working from a scissor lift. 
http://webcommunities.hse.gov.uk/connect.ti/workheight/view?objectId=13427

34 HSE, Health and Safety Executive, Preventing falls from boom-type mobile elevating work platforms, HSE Information Sheet MISC614, 2006. 

http://www.bis.gov.uk/files/file38307.pdf


37 IPAF, The International Powered Access Federation, What is a PAL Card? 
# 7. GLOSSARY

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bosun’s Chair</td>
<td>A boatswain’s chair (variant = bosun) is a seat suspended from ropes, used for work on the body or masts of a ship or the face of a building.</td>
<td>Concise Oxford English Dictionary, Oxford University Press, Oxford, 2002, p. 152</td>
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<tr>
<td>CITB</td>
<td>Sector Skills Council and Industry Training Board</td>
<td><a href="http://www.cskills.org/">http://www.cskills.org/</a></td>
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<td>Common sense</td>
<td>The basic level of practical knowledge and judgment that we all need to help us live in a reasonable and safe way</td>
<td>Cambridge Dictionaries Online. <a href="http://dictionary.cambridge.org/dictionary/british/common-sense">http://dictionary.cambridge.org/dictionary/british/common-sense</a></td>
</tr>
<tr>
<td>Common sense</td>
<td>Sound and prudent judgment based on a simple perception of the situation or facts</td>
<td>Merriam-Webster's Online Dictionary. <a href="http://www.merriam-webster.com/dictionary/common+sense">http://www.merriam-webster.com/dictionary/common+sense</a></td>
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<td>CSCS</td>
<td>Construction skills certification scheme and Construction skills certification scheme - working at heights safety test</td>
<td><a href="http://www.cscs.uk.com/">http://www.cscs.uk.com/</a></td>
</tr>
<tr>
<td>IPAF</td>
<td>The International Powered Access Federation</td>
<td><a href="http://www.ipaf.org/">http://www.ipaf.org/</a></td>
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<tr>
<td>MEWP</td>
<td>Mobile Elevating Work Platform</td>
<td></td>
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<td>NVQs</td>
<td>National Vocational Qualifications</td>
<td><a href="http://www.direct.gov.uk/en/EducationAndLearning/QualificationsExplained/DG_10039029">http://www.direct.gov.uk/en/EducationAndLearning/QualificationsExplained/DG_10039029</a></td>
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<td>PASMA</td>
<td>Prefabricated Access Suppliers’ and Manufacturers’ Association</td>
<td><a href="http://www.pasma.co.uk/">http://www.pasma.co.uk/</a></td>
</tr>
<tr>
<td>Property - Commercial</td>
<td>Heavy industry, shop Fittings, NHS centres</td>
<td></td>
</tr>
<tr>
<td>Property - Domestic</td>
<td>Housing</td>
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<td>Property - Industrial</td>
<td>Factories</td>
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<td>SHAD</td>
<td>Safety and Health Awareness Days</td>
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<tr>
<td>SMSTS</td>
<td>Site Management Safety Training Scheme</td>
<td><a href="http://www.smsts-training.co.uk/">http://www.smsts-training.co.uk/</a></td>
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</table>
8. APPENDICES
APPENDIX I: SEMI-STRUCTURED INTERVIEW GUIDE
Access Equipment for Domestic Work at Height
Semi-Structured Interview Guide

Introduction
State my name, position in the organisation and the purpose of the research.

- The aim of this interview is to get information on equipment that you may use when you work at heights; to assess your knowledge of the equipment; and to determine from where you get your information. This information will be used to write a report for the Health and Safety Executive (HSE) on knowledge and practices used by contractors who work at heights on domestic premises.
- The data collected during this process are confidential, and I will not use any identifying information in the analysis and subsequent report. I would like to record the interview and ask your permission to do so. If you do not wish me to record it, this is fine too. No one, outside of the persons doing the analysis, will listen to the recordings. Rather, I am using this recording to help me in my note taking process and to ensure that I capture everything that is said accurately.
- The HSE will not see the data ‘as are’, and will only see what has been used in the report after the analyses has been done.
- The interview should last between 45 minutes to one hour.

Do you have any questions before we start?

These questions serve as a guide to get an indication of the issues. The interviewer may not ask verbatim each specific question. Rather, the interviewer may wish to pursue other emerging issues that may be pertinent. Also, the interviewer may use probe or follow-up questions where appropriate.

Questions

1. Could you describe how you prepare for a job involving work at height on a domestic premise?

   Prompt: Type of property, number of floors, indoor/outdoor access to work
   Secure equipment, e.g. tie ladder
   How best to access equipment for work at height (Carry?)
   Use of safety net
   Use of harness
   Use of scaffolds
   Use of platforms
   Wear correct footwear

2. How do you decide which equipment to use when you work at height on a domestic premise?
Prompt: Always use a ladder
   Decide what is most suitable for the job
   Why choose X piece of equipment

3. Do you discuss the job with anyone before you start?
   Prompt: What to do
   How to do it
   Most suitable equipment to use
   Same practice or differ from job to job

4. How do you check the work at height equipment before using it?
   Prompt: Check only on first use; Check every time use
   e.g. Ladder - Missing mid rail, toe board
       Excessive gap in guardrail
       Inadequate ties

5. What are the main reasons for using X piece of equipment?
   Prompt: Time
   Suitable for job
   Suitable across all surface areas e.g. rough surfaces
   Cost - Too much, cannot afford.
   Safety

6. How do you obtain the work at height equipment that you use?
   Prompt: Own the equipment
   Rent the equipment
   Borrow the equipment
   If rented or borrowed, how do you check the equipment before use?

7. What type of transport do you use to get to the job?
   Prompt: 'Bigger kit' might need a larger vehicle
   Some work at height equipment can be taken apart and fit very
   neatly into a van
8. How much knowledge do you have about work at height equipment/types of work at height equipment?
   
   *Prompt:* Level of knowledge - Basic, extensive.

9. What training have you attended in the use of equipment (general) and work at height equipment?
   
   *Prompt:* Length of course
   How frequent
   Types of work at height equipment covered

10. Where do you get information on the work at height equipment that is available for your particular type of work?
   
   *Prompt:* Other contractors
   Salesmen
   Equipment hire companies
   Work colleagues

11. Have you ever seen work at height equipment like this? (Show pictures 1 to 6)
   
   Would you consider using it?
   Why / why not?

*Background Information*

12. What is your age?

13. What type of training have you done for your role as a contractor?

14. What is the length of time that you have worked as a contractor?
   
   Worked at height
   Any previous jobs? In construction?

15. What is your sex?

16. Are you self-employed or do you work for a micro company (<10 employees)?
Thank you for taking the time to answer my questions. Your assistance is greatly appreciated.
Picture 1: Self erecting tower
Picture 2: Telescoping Access Tower
Picture 3: Trailer-Based Access Tower
Picture 4: Scissor-Based Access Tower
Picture 5: Podium Steps
Ladder-Based Platform Access Systems

Picture 6a: Ladder platform
Picture 6c: Small Ladder Platform
8.2 APPENDIX II: REVIEW - WORK AT HEIGHT EQUIPMENT

In answer to the question, “What commercially available equipment is there to reduce the risk of such incidents and how suitable is this equipment to the needs of workers in micro enterprises and SMEs?” a brief review was undertaken of the commercially available access equipment and systems, and where appropriate included the information supplied by manufacturers and hire companies.

8.2.1 Method

The product review was entirely paper/electronic based. There was no intention to examine, measure or test the actual equipment.

An Internet-based search was done using the terms “access products”, “work at heights products”, “work at heights access products”, “roof access products”, “temporary safe roof access”, and “lifeline systems”.

Further, an Internet search on “access hire” identified a number of equipment hire companies, and the online catalogues for the respective companies were either examined and/or a hardcopy of the catalogue was requested.

A number of construction related tradeshows were also considered. However, these appear to concentrate on large-scale construction, building products (rather than equipment) or DIY and there appears to be little provision for this particular market. The trade show the researcher attended concentrated primarily on hand tools and products.

The following criteria were used in assessing the equipment:

- The products should be access solutions rather than other safety equipment for working at height (such as harnesses, etc).
- The products should not be established solutions such as ladders, stagings, access towers or scaffoldings, but could be variations thereof.
- The products should not be accessories for use with established solutions (such as ladder stability devices).
- Powered access should be avoided because safe use of this method requires training and preferably for the user to hold an IPAF PAL ticket.
- The product should be suitable for short to medium term work.
- The installation should require a maximum of two persons.
- The products should not require permanent or invasive attachment.
- The products should be able to fit within a transit-sized van, pick up or medium sized trailer.
  - The alternatives to this would be towable products, or products, which were readily available for hire (although this brings additional issues associated with receipt, storage and subsequent collection).
- The maximum purchase cost of £5000 (or available for hire).

8.2.2 Background

Two important trade organisations could potentially cover the types of product supplying this market. The Independent Powered Access Federation (IPAF) covers MEWPs (Mobile Elevating

Both organisations provide training and publish operator codes of practice. Additionally, IPAF runs a recognised training and accreditation scheme for varied MEWP type equipment. Interestingly, some suppliers deliberately market their products as falling outside the scope of both organisations and therefore requiring no operator training.

8.2.3 Findings
Traditional established products appear to dominate the market place (such as ladders, stepladders, podium steps, scaffold towers and MEWPS). There appeared to be little on the market beyond the long established product types. However, a number of products, which were variations/innovations on these themes and which, while (possibly) outside of the original selection criteria, may be of some interest.

Unless otherwise specified maximum working height has been assumed to be 2m above maximum platform height. The costs are included as an indication only and are not necessarily the cheapest available.

It should be clear that this does not represent an exhaustive list. This is a list of commonly encountered products that are within the hire fleets of major suppliers or which are easily available for purchase. There may be further products, which are just entering the market and have not yet fully established their presence.

8.2.3.1 Folding tower systems

Self-Erecting Tower (see Appendix 1, Picture 1). This is a collapsible (flat pack) tower system that can be erected from ground level, with three set working heights (up to 4m). The flat pack nature removes any requirement for the tower to be assembled in situ (and the inherent margin for error in that operation).

<table>
<thead>
<tr>
<th>Self Weight</th>
<th>Packed Dimensions</th>
<th>Platform Height</th>
<th>Load Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>82kg</td>
<td>0.767 x 1.135m</td>
<td>2m</td>
<td>150kg</td>
</tr>
</tbody>
</table>

The operator instructions indicate that the tower is unsuitable for use on soft or uneven ground. The tower is likely to become unstable if the user leans out or undertakes work (potentially drilling, screwing, power washing and similar activities) exerting a significant lateral force.

The quoted costs were approximately £1500-£2000 to buy and £60 per 24 hour hire. These costs do not include delivery or collection charges.

Telescoping Access Tower (Appendix 1, Picture 2). A collapsible, telescopic scaffold type tower, available in aluminium or Glass Reinforced Plastic (GRP). It is supplied as a single unit.

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1 All of the listed costs were applicable at the time of gaining the information.
(i.e. no assembly on site) and can be erected by a lone worker. It has seven heights increments up to a working height of 4m.

<table>
<thead>
<tr>
<th>Self Weight</th>
<th>Packed Dimensions</th>
<th>Platform Height</th>
<th>Load Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>55kg</td>
<td>1.05x0.81x0.42m</td>
<td>2m</td>
<td>150kg</td>
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The quoted costs were approximately £1,200 to buy and £60 per 24-hour hire. These costs do not include delivery or collection charges.

8.2.3.2 **Smaller powered access**

Smaller powered access equipment is usually manually manoeuvred into the work position with powered vertical operation. Once again the small castors and narrow base dimensions tend to limit its use to inside (or at least to flat level ground). IPAF Guidance states that lone workers should not use any powered access, as the emergency lowering controls are located on the vehicle base unit.

**Mast type platform.** The platform is partially user assembled; it is transported in three parts (base, mast and cage) and put together in situ. The user instructions state that the tower is unsuitable for use on soft or uneven ground.

<table>
<thead>
<tr>
<th>Self Weight</th>
<th>Packed Dimensions</th>
<th>Platform Height</th>
<th>Load Capacity</th>
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<tbody>
<tr>
<td>63kg</td>
<td>2.9m long mast</td>
<td>2.32m</td>
<td>150kg</td>
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</table>

The quoted costs are approximately £65 per 24-hour hire. These costs do not include delivery or collection charges.

**Scissor type platforms (not shown).** Small scissor type platform without outriggers are available. The quoted hire costs are £85 for 24 hours.

<table>
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<th>Self Weight</th>
<th>Packed Dimensions</th>
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<tbody>
<tr>
<td>225kg</td>
<td>1.2x1.65x0.7m</td>
<td>1.63m</td>
<td>240kg</td>
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**Boom type platforms (not shown).** Small boom type platforms without outriggers are available. The quoted hire costs are £120 for 24 hours. These costs do not include delivery or collection charges.

<table>
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<tr>
<td>310kg</td>
<td>1.52x1.92x0.78m</td>
<td>3.1m</td>
<td>250kg</td>
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The narrow base dimensions and absence of outriggers on these smaller MEWPS potentially makes them highly sensitive to inclined surfaces.

8.2.3.3 Trailer-based access tower (Appendix 1, Picture 3)
This is a manually operated telescoping tower. The tower is integral with the trailer for transport. Appearances indicate a reasonable level of adjustment on outriggers and therefore a greater tolerance for use on uneven ground. The platform is winched into position from ground level. Lone workers could use these towers.

<table>
<thead>
<tr>
<th>Self Weight</th>
<th>Packed Dimensions</th>
<th>Platform Height</th>
<th>Load Capacity</th>
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<tbody>
<tr>
<td>380kg</td>
<td>6.5x3.4x1.3m*</td>
<td>4.5m</td>
<td>150kg</td>
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</table>

*The width can be reduced to 0.7m for restricted access.

The quoted costs are approximately £225 per 7-day hire. These costs do not include delivery or collection charges.

8.2.3.3 Scissor-based access tower (Appendix 1, Picture 4)
This is a manually operated scissor type platform. It has a similar base arrangement to scaffold towers, and is marketed as incorporating the best elements of both pieces of equipment.

The tower incorporates a (patented) tensioned wire system that can be controlled by a foot lever from the basket. Removing pressure from the lever locks the tower in position.

The castors are small (but comparable with a standard tower scaffold) and there does not appear to a large amount of adjustment in the outriggers. The company can supply a bespoke trailer for transport.

The quoted costs are approximately £225 per 7-day hire. These costs do not include delivery or collection charges.

<table>
<thead>
<tr>
<th>Self Weight</th>
<th>Packed Dimensions</th>
<th>Platform Height</th>
<th>Load Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>320kg</td>
<td>1.88x0.9x1.87m</td>
<td>4m</td>
<td>250kg</td>
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</table>

8.2.3.4 Enhanced steps
These are step or ladder types incorporating small working platforms. The height adjustment is likely to be limited which will severely impact on the versatility of the product; certain variants may be useful in external situations or more uneven ground.

Podium steps (Appendix 1, Picture 5). This is a low height folding platform with steps. The working height could be considered average (2.95 m) and the adjustment is minimal (0.25m). It is potentially useful for a repeat maintenance activity, but less so for a domestic builder.

<table>
<thead>
<tr>
<th>Self Weight</th>
<th>Packed Dimensions</th>
<th>Platform Height</th>
<th>Load Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>25kg</td>
<td>0.68x0.48x1.8m</td>
<td>0.95</td>
<td>150kg</td>
</tr>
</tbody>
</table>
The quoted costs are approximately £450 to purchase or £42 per 7-day hire. These costs do not include delivery or collection charges.

**Adjustable steps.** An adjustable step ladder with a caged working position and outriggers. It comes in a range of sizes up to 9 treads (4.23m working height), however each set of steps has a maximum adjustment of two treads or 0.47m.

<table>
<thead>
<tr>
<th>Self Weight</th>
<th>Packed Dimensions</th>
<th>Platform Height</th>
<th>Load Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.2kg</td>
<td>3.2m closed height</td>
<td>2.23m</td>
<td>150kg</td>
</tr>
<tr>
<td>31.2kg</td>
<td>3.2m closed height</td>
<td>2.23m</td>
<td>150kg</td>
</tr>
</tbody>
</table>

The quoted costs are approximately £800 to purchase or £85 per 7-day hire. These costs do not include delivery or collection charges.

8.2.3.5  **Proprietary roof access systems**

This system is a leaning platform system, based on both ladder and scaffold tower principles (and with the associated issues of both). This basic system has a platform that must be lifted into place (requiring at least two people and moderately hard manual handling) while the handrails etc., must still be carried up the ladder and installed at height. The system is available in a number of different configurations that are suitable for different types of work activity.

**Proprietary roof access systems**

<table>
<thead>
<tr>
<th>Self Weight</th>
<th>Packed Dimensions</th>
<th>Platform Height</th>
<th>Load Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depends on platform used</td>
<td>Depends on platform used</td>
<td>6.8m</td>
<td>300kg</td>
</tr>
</tbody>
</table>
8.2.3.6  **Lifeline Systems**
Many lifeline systems require permanent or semi-permanent installation, the issue being the strength and availability of anchorages. It is difficult to imagine what features on a domestic roof would be suitable for this application.

There are freestanding constant force posts suitable for use on flat roofs. This system comprises dead weights on a frame with a frictional basing and uses the patent constant force system for arrest. This is suitable for fall arrest and fall restraint for a single user.

8.2.3.7  **Ladder restraint and fall arrest systems**
There are ladder safety systems, which provide additional protection to users of conventional ladders. The system may consist of several separate components such as a harness, lifeline, ladder restraint, straps and wall anchor belts. These can be packed into a small bag or holdall. Technical details depend upon the ladder used.

The quoted costs are £400 to purchase.
### 8.3 APPENDIX III: OVERVIEW OF THEMES AND SUB-THEMES

Table 3 Themes and sub-themes to emerge from the data

<table>
<thead>
<tr>
<th>Themes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong> Work at height equipment</td>
<td></td>
</tr>
<tr>
<td>1.1 Type of equipment used</td>
<td></td>
</tr>
<tr>
<td>1.2 Access to equipment</td>
<td></td>
</tr>
<tr>
<td>1.3 Check equipment</td>
<td></td>
</tr>
<tr>
<td>1.4 Reasons to use equipment</td>
<td></td>
</tr>
<tr>
<td>1.5 Knowledge of equipment</td>
<td></td>
</tr>
<tr>
<td>1.6 Sources of knowledge</td>
<td></td>
</tr>
<tr>
<td><strong>2</strong> Training</td>
<td></td>
</tr>
<tr>
<td>2.1 Provide training as essential</td>
<td></td>
</tr>
<tr>
<td>2.2 Equipment training</td>
<td></td>
</tr>
<tr>
<td>2.3 Impact of training courses on work</td>
<td></td>
</tr>
<tr>
<td>2.4 Limited training</td>
<td></td>
</tr>
<tr>
<td>2.5 No official training</td>
<td></td>
</tr>
<tr>
<td>2.6 Transfer of skills</td>
<td></td>
</tr>
<tr>
<td><strong>3</strong> Support</td>
<td></td>
</tr>
<tr>
<td>3.1 Good level of support</td>
<td></td>
</tr>
<tr>
<td>3.2 Limited/low support</td>
<td></td>
</tr>
<tr>
<td><strong>4</strong> Control</td>
<td></td>
</tr>
<tr>
<td>4.1 High Control</td>
<td></td>
</tr>
<tr>
<td><strong>5</strong> Trust</td>
<td></td>
</tr>
<tr>
<td>5.1 High level of trust</td>
<td></td>
</tr>
<tr>
<td><strong>6</strong> Experience</td>
<td></td>
</tr>
</tbody>
</table>

*Table 2 continues*
<table>
<thead>
<tr>
<th>Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 Safety</td>
</tr>
<tr>
<td>7.1 High level of safety</td>
</tr>
<tr>
<td>7.2 Cost of safety</td>
</tr>
<tr>
<td>7.3 Low level of safety</td>
</tr>
<tr>
<td>8 Knowledge management</td>
</tr>
<tr>
<td>9 Communications</td>
</tr>
<tr>
<td>9.1 Good level of communication</td>
</tr>
<tr>
<td>10 Judgement/Decision making</td>
</tr>
<tr>
<td>10.1 Good judgement</td>
</tr>
<tr>
<td>10.2 Acceptable judgement</td>
</tr>
<tr>
<td>10.3 Poor judgement/Decision making could improve</td>
</tr>
<tr>
<td>11 Risk</td>
</tr>
<tr>
<td>11.1 High risk</td>
</tr>
<tr>
<td>12 Tools</td>
</tr>
<tr>
<td>12.1 Transport used for jobs</td>
</tr>
<tr>
<td>12.2 How to get tools where needed</td>
</tr>
</tbody>
</table>
Access equipment for construction work at height in residential properties

The construction sector has a high rate of fatalities resulting from falls from height, especially among workers employed in small firms. The sector consists mainly of micro-small and medium-sized enterprises (SMEs) with a large number of self-employed and is peripatetic in its make-up, with employment often short-term and occurring within the informal economy.

The aim of this project was to identify reasonably practical measures to reduce the number of deaths of workers in micro enterprises (MEs), and those who work as sole traders, in carrying out repairs at height on residential properties.

Desk-based research was used to review the types of access equipment that are commercially available as well as to review the fall from heights statistics, and for a brief review of the literature on working at heights. A qualitative method involving semi-structured interviews and a thematic analysis was used to obtain perceptions and information on work practices from a sample of workers from micro enterprises and those who are self-employed and work as sole traders.

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