Communities
and Local Government

The adequacy of refuges, escape stairs and management procedures

BD 2441

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Executive Summary

The overall aim of this project is to enhance fire safety, and specifically evacuation procedures for disabled people, in buildings.

The specific objectives of this project are to:

- identify the effectiveness and weaknesses of existing guidance on evacuation;

- identify the need for further work to revise or validate existing guidance.

This report summarises the findings from the consultation process into the adequacy of refuges and evacuation procedures. The literature review and consultation processes are described, summarising longer reports (213437 and 213442) produced previously. Finally it makes recommendations for potential changes to regulations and for future work.

The main findings are that:

- the physical state of refuges needs only minor improvements;

- the management of evacuation procedures, and of refuges and their alternatives, and the process that produces them, require a major overhaul;

- disabled users generally have a good understanding of the current arrangements and are concerned about them;

- within the construction sector there are widespread gaps in the understanding of the evacuation of people with disabilities.

To address these, a number of actions have been proposed, of the which the most significant are:

- to include management of egress in the fire risk assessments required under the Fire Precautions (Workplace) (Amendment) Regulations 1999[i];

- to create and promote the optimum design for evacuation;

- to measure the impact of the implementation of the Disability Discrimination Act 1995 (Amendment) Regulations 2003[ii] on management procedures;

- to research the relative effectiveness of different methods of vertical evacuation.

Contents

Chapter 1

Introduction

This report is the final output (213443) of the ODPM project, 'Adequacy of refuges, escape stairs and management procedures', contract reference BD 2441, part of the ODPM Framework Agreement CI 1/33/3 'Building Occupant Interaction'. It presents the conclusions from the whole project which has consisted of the following tasks:

- A literature review.

- A consultation process to increase understanding of the effectiveness of the current guidance that covers refuges and related management procedures.

- A workshop with experts.

Key findings and recommendations are put forward in terms of potential changes to current guidance, future research and other possible actions.

The project covered the technical design of refuges, and the management procedures that support them. It did not cover vertical evacuation using lifts, as this is due to be covered in other research. The research aimed to identify where the current arrangements and standards might be developed, based upon experience of using both the existing standards and developments within the construction industry.

1.1   Definitions

A fire refuge is an area within a building that is designed as a safe area where a person unable to use the stairs unaided can wait in relative safety until they can be assisted in their evacuation. These are normally located in or adjacent to a staircase, and have additional fire protection to that provided in the main spaces in the building.

An escape stair is a staircase provided for the purpose of evacuation, and so must therefore also have additional fire protection, and be designed to meet the needs of the building taking account of occupancy levels.

Chapter 2

Description of the project

2.1 Review of the literature

The review report[iii] (213438) included reference to: previous related studies, official public documents such as British Standards, research outputs from universities, guidance from various disability groups and policies from commercial and public bodies. It identified and briefly summarised guidance on the concepts of a refuge, escape stairs and management procedures. Research work on attitudinal barriers to evacuation was taken into account in order to be able to shape and inform the subsequent consultation with professionals and users.

As well as a desk-based literature review, the review also involved consultation with selected groups including: Ulster University, the Joint Mobility Unit, the London Fire Investigation Unit, BRE and Buro Happold Engineers. The review covered related work from the UK and overseas, including the USA, Canada, Australia, Japan and Continental Europe.

The literature review considered the following key questions:

- What is a refuge?

- Where does the idea come from?

- How are refuges designed?

- Do refuges work?

- How do management procedures work?

- What do people think of refuges?

2.1.1 Physical provisions
Most standards for refuges are broadly similar. The 2003 National Fire Protection Association (NFPA) construction code[iv] provides one of the most comprehensive definitions of a refuge outlining certain key features deemed necessary in an area of refuge in the United States. The following extract describes the approach taken:

- *A wheelchair space of 760mm x 1220mm for each 200 occupants or a fraction thereof, based on the occupant load served by the area of refuge.*

- *An effective evacuation route based on the occupant load should be a minimum of 910mm wide.*

- *Access to any designated wheelchair space should not be through more than one adjoining wheelchair space.*

- *The refuge must maintain 'tenable conditions' for a period of 15 minutes when the exposing face is subjected to maximum expected fire conditions.*

- *Illuminated signs complying with the requirements for exit signage reading 'area of refuge' and that include the international symbol of accessibility should be provided to identify the location of areas of refuge as follows:*

  - *At each door providing access to the area of refuge.*

  - *At all exits not providing accessible means of egress.*

  - *Tactile signage shall be located at each door to an area of refuge.*

- *The refuge shall be equipped with a two-way communication system and appropriate instruction.*

A British Standard introduces the principles of evacuation of people with disabilities, and highlights the need for an effective management procedure for such an evacuation. BS 5588-8: 1999[v] section 3.14 defines a refuge as an

> *"area that is enclosed with fire-resisting construction (other than any part of it that is an external wall of a building) and separated directly by a safe route to a storey exit, evacuation lift or final exit, thus constituting a temporary safe space for disabled people to await assistance for their evacuation…*

> *…refuges are relatively safe waiting areas for short periods. They are not areas where disabled people should be left alone indefinitely until rescued by the fire brigade, or until the fire is extinguished."*

Areas of refuge, also known as safe areas, staging areas, areas of rescue assistance or areas of evacuation assistance, are designed to provide a specified barrier against the passage of fire and smoke, to facilitate the delayed evacuation of people from a fire situation.

The need to provide an adequate means of escape from buildings for disabled people is not a recent issue. In the 1961 American Standards Association document 'Making Buildings and Facilities Accessible to, and Usable by, the Physically Handicapped'[vi] reference was made to the problem of emergency egress for people with mobility impairments.

'Because entrances also serve as exits, some being particularly important in case of emergency…

…it is preferable that all or most entrances (exits) should be accessible to, and useable by, individuals in wheelchairs and individuals with other forms of physical disability herein applicable'

The literature demonstrates that the safety of areas of refuge is heavily dependant on the features of that design, the types of fire exposure the area is subject to, the temperature conditions, and the reliability and performance of the smoke control system.[vii]

The literature highlights that the design of refuges tends to utilise the inherent fire-resistant properties of common building features. Relevant standards and legislation include:

- In the UK:

    - The Disability Discrimination Act[ii]

    - British Standard BS 5588-8: 1999[v]

- In the USA:

    - Americans with Disabilities Act[viii]

    - 2003 NFPA construction code[iv]

- In Canada:

    - National Building Code[ix]

    - National Fire Code of Canada[x]

- In Australia

    - Australian Building Code[xi].

These represent fire safety requirements giving general guidance for designers, builders and fire safety engineers.

2.1.2 Management

While the physical features of a refuge are vitally important to its success as a place of relative safety, its success as part of the evacuation process is heavily dependant on the management of that system. The review has shown that evacuation procedures can differ significantly under different systems.

In the UK system, it is the building owner's responsibility to provide an adequate evacuation plan, many of which operate a version of the 'buddy' system. This method, as discussed in the HSE document 'Fire Safety: An

Employer's Guide'[xii] identifies one or a few persons who, in case of an emergency, have the responsibility of looking after, or reporting the presence of, a person with limitations. Other systems rely much more on the responding fire fighters to complete a rescue rather than an evacuation. This procedure is dependant on the fire fighters referring to a list of people expected to need assistance during the evacuation[xiii].

All studied evacuation strategies assume that people with severe mobility impairments will be carried out by hand, or by using special devices. The US Fire Administrations 'Orientation Manual for First Responders on the Evacuation of People with Disabilities'[xiv] provides comprehensive instructions on techniques and the suitability of techniques available to assist evacuation for disabled people from buildings. The guide includes:

- Information on carrying techniques.

- Guides on types of disability.

- Information on special carrying devices.

BS 5588-8: 1999[v] sets out a number of key points to be considered regarding the management of a refuge space.

- Evacuation procedures should be pre-planned.

- Staff training and knowledge of the implementation are vital.

- Agreed procedures should be confirmed in writing.

- A fire drill, including the evacuation of disabled people, for both horizontal movement to safe zones and vertical evacuation, should be practiced once or twice a year.

- Lessons from this fire drill should be learnt and improvements implemented.

- Management should recognise the needs of disabled people, whether their relationship with the building management is a stable or transient one; and extra training should be given to staff in buildings where member of the public are present.

- In buildings where an overnight stay is intended, people requiring assisted escape should be encouraged to make themselves known to management during check-in procedures.

- Evacuation procedures for disabled people should start as soon as the alarm is raised.

2.1.3 Conclusions from the literature review

Anecdotal evidence was available on people's opinions concerning the success and appropriateness of refuges and management procedures. However, the initial consultation partners did not see the anecdotal evidence as adequately reflecting, or consistent with, the views experienced in practice. The information gained from the literature review implied that the consultation process should focus on the following key points:

• How well people understand the concept of the refuge.

• How well the use of refuges is implemented in management procedures.

• How people perceive the success of the concept of refuges, escape stairs and management procedures.

It was suggested that the consultation should gather information from two distinct groups of people:

• Professionals from across the supply chain, who ought to have an understanding of refuges and their operation.

• Building users, who may not have much knowledge of the theory of refuges, but may have first hand experience of their use.

Because these groups are distinct, it was identified that a different approach would be needed for each.

2.2 The consultation process

2.2.1 Note on statistics and sample size

In the sections that follow, it is important to be aware of the small sample size and the effect this has on the descriptive statistics. The professional survey included 35 people across different disciplines, which is sufficient to give a range of opinions, but not a large enough number for small differences in percentages within the answers to be reliable. Each person then represents 3% of the sample. Results are presented in graphical form for clarity, but the small sample size should be considered when examining these.

Similarly for the 'users' sample, although 53 people were consulted, only 17 completed the questionnaire. These were also self-selected rather than being chosen according to a systematic or random approach. It is, therefore, important to emphasise that the findings are indicative rather then absolute, and may not be representative of all users.

2.2.2 Consultation with professionals

The main aim of the consultation with the professional group was to understand whether the current guidance is understood properly by those responsible for building design, management and evacuation. In addition, because many of those questioned are experts in the field, with experience of

using the current guidance, we were also seeking to ask for views on where and how changes to the guidance might be made.

A questionnaire was designed and used on a sample of 35 professionals from different backgrounds. The results were analysed through the following processes:

• Numerical analysis of directly quantifiable answers.

• Compilation of answers to other questions from questionnaires – some of this was numerical.

• Combination of all results into conclusions from the consultation process.

2.2.3 Background questions

These questions (Table 1) were designed to test the respondents' understanding of the existing arrangements for refuges. Most people had a reasonable understanding of the concept, but there were less reliable answers for a number of the management-related questions.

Table 1 Part one of the professionals' questionnaire						
1. What is your occupation?						
2. Please explain who you understand is responsible for the evacuation of disabled people from a building.						
3. What is the purpose of a fire refuge?						
4. Please describe how you understand an evacuation strategy for disabled people based on fire refuges works?						
5. Where in a building could you expect to find a fire refuge?						
6. How would you find the nearest fire refuge?						
7. Please describe what a refuge should contain.						
8. Do you have direct experience of a fire evacuation using refuges?			Yes		No	
If yes, please describe:						
9. How does a disabled person get from a fire refuge to a place of safety?						
10. Describe any possible flaws in a system based on fire refuges.						
11. Please describe the purpose of a Personal Emergency Evacuation Plan.						
12. Whose responsibility is it to ensure that the building will allow disabled people to evacuate (please tick)?						
Building Management	Architect	Fire Engineer	Building Control	Client	Access Consultant	Employer
Please explain your answer:						

Question 2: Please explain who you understand is responsible for the evacuation of disabled people from a building.

All respondents stated that the responsibility for the evacuation of disabled people from a building was on the building occupier, employer or facilities management team. A number of people also actively made the point that it was not the fire service's responsibility.

Question 3: What is the purpose of a fire refuge?

All participants knew that it was a temporary safe space where disabled people could await assistance for their rescue. This indicates that the current guidance provides adequate clarity in defining the physical meaning of a refuge.

Question 4: Please describe how you understand an evacuation strategy for disabled people based on fire refuges works.

Varied responses were received. Participants could not rely on BS 5588-8: 1999v to provide them with a prescriptive answer. It was clear that they relied on their own understanding on how a refuge could fit within an evacuation plan. However, no-one stated that the evacuation process may depend on the disability of the person using the refuge. Only two people made reference to a Personal Emergency Evacuation Plan (PEEP) which dictates how an individual is to make their escape.

Question 5: Where in a building could you expect to find a fire refuge?

This question was answered well and in accordance with the current guidance.

Question 6: How would you find the nearest fire refuge?

The majority of participants (55%) said that they would rely solely on signage, see Figure 1. The next largest group (21%) said that they would use a combination of signage and training in finding the nearest refuge. This clearly indicates that, whether or not signage is the best method to locate refuges, the majority of people are going to rely on it. At present, the guidance offers no standard method of signage for fire refuges.

Figure 1 Distribution of answers to Q6: How would you find the nearest fire refuge?
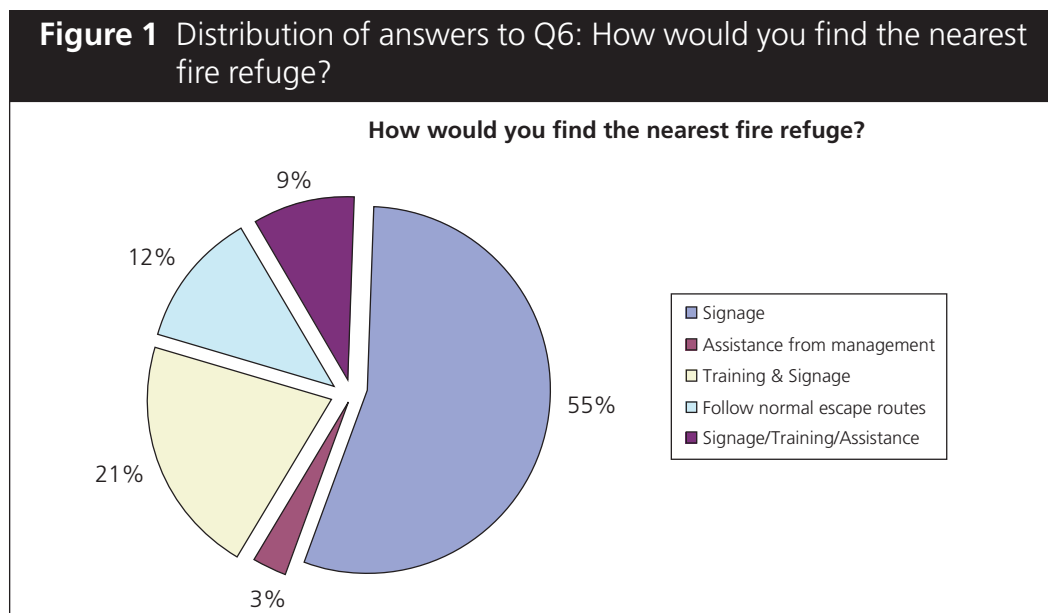
Question 7: Please describe what a refuge should contain.
The results were surprising. It appears that people are unclear about the type of equipment that should be provided within a refuge. The range of equipment suggested is shown in Figure 2 below.

Sixty percent said that some form of two-way communication device would be required. The guidance in BS 5588-8: 1999v does not currently *require* the inclusion of such devices, although it is indicated. This topic is discussed further in section 3.1.1.

There was no clear consensus on any other equipment and only 30% believed that signage would be necessary within the refuge. BS 5588-8: 1999 makes a number of recommendations for the design details of refuges, including the provision of:

> *"a system of two-way communication between those people who are temporarily waiting in each refuge and those members of the building management who are organizing the evacuation of the building. The two-way communication system needs to be readily operated by, and comprehensible to, disabled people."*

This need was reflected in its prominence amongst the responses. However, it was suggested by respondents that the form of such a system could be more clearly defined within the code.

Figure 2 Distribution of answers to Q7: Please describe what a refuge should contain
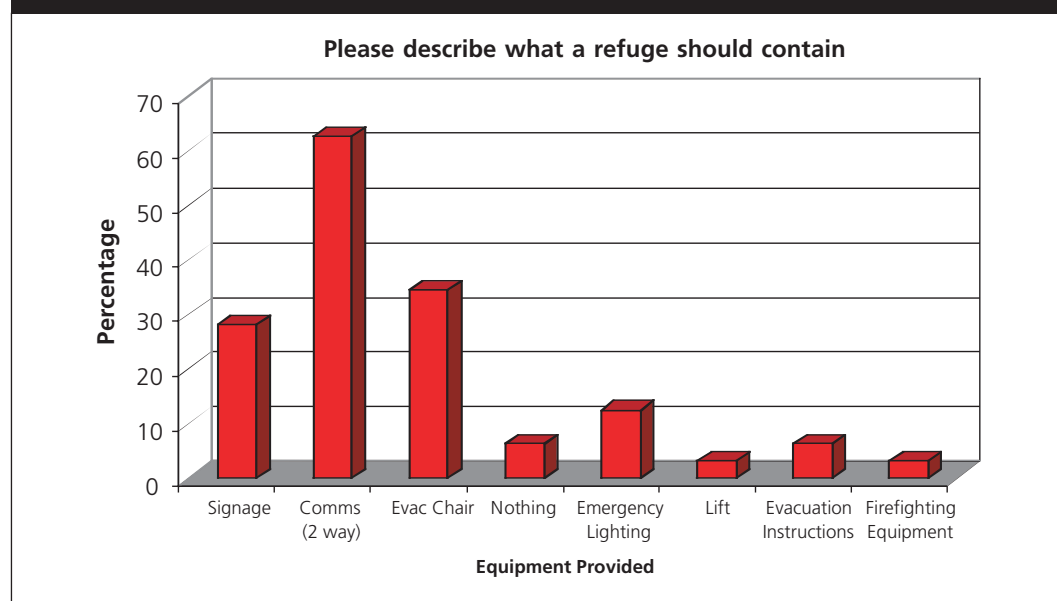
Question 8: Do you have direct experience of a fire evacuation using refuges?
Only four of the 35 people questioned had any direct experience of using a fire refuge. The four who had used a refuge did so as part of training for emergency service roles. A better understanding of the evacuation procedure

may be gained by incorporating such activities in first aid or other workplace training activities.

Question 9: How does a disabled person get from a fire refuge to a place of safety?

The results from this question were mixed, as seen in Figure 3 below. Only 13% of those questioned related the disability of the occupant and their Personal Emergency Evacuation Plan to the method adopted for their evacuation. The largest proportion of responses focused on assistance and the use of evacuation chairs.

Figure 3 Distribution of answers for Question 9: How does a disabled person get from a fire refuge to a place of safety?
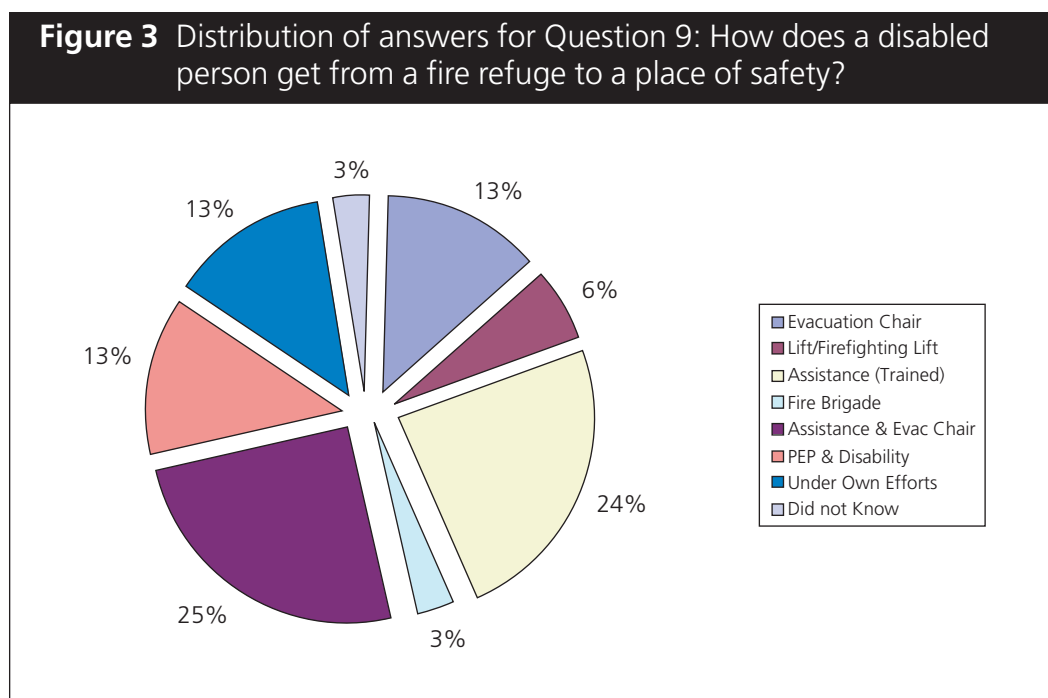
These data indicate that the methods adopted could vary significantly from building to building, depending on the management's approach to the evacuation of disabled people. They suggest that the disability of the occupant is unlikely to be one of the factors influencing the method implemented.

Further information is required to direct designers and employers to Personal Emergency Evacuation Plans and their use in assessing the type of equipment that should be provided within a building. This ensures that the disabled evacuation strategy is dynamic and can accommodate changes in population needs.

**Question 10: Describe any possible flaws in a system based on fire refuges.**

The participants highlighted the reliance on human-based systems. Issues raised included:

- Your 'buddy' being away from work, out of the office or injured themselves.

• Poor facilities management.

• A lack of adequate training.

The statistical data drawn from the study can be seen in Figure 4. Only one person believed that the system had no flaws.

Figure 4 Distribution of answers for Q10: Describe any possible flaws in a system based on fire refuges
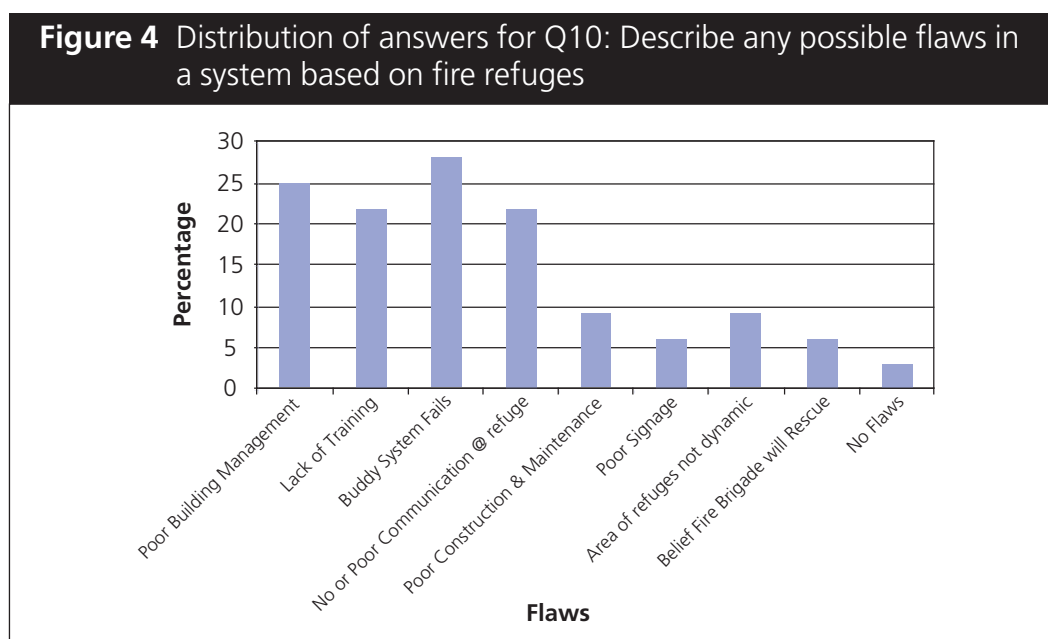
Question 11: Please describe the purpose of a Personal Emergency Evacuation Plan.
All those questioned understood the principle of a Personal Emergency Evacuation Plan (PEEP). They believed that they were an excellent method in workplaces, as the occupant will know in advance the procedures to be used in the evacuation. However, many made the observation that if the individual is not a regular occupant, as will be the case for public assembly buildings, a PEEP will not be feasible. Many believe that there must be some distinction between the different purpose groups (occupancies) and that alternative arrangements need to be used in non-workplace environments.

The PEEP is required in tandem with the refuge system. It provides the occupant with information such as how to communicate during an emergency, who will offer assistance and how their evacuation will continue after arrival at the refuge. This removes confusion, stress and anxiety for disabled people, and informs employees about the use of the refuge system.

The PEEP makes the whole refuge system dynamic. Without such a scheme, the use, location and part played by a refuge may be unclear to users. The PEEP identifies the people who will require the use of the refuge, how to use it and whether the refuge provision is adequate. Over time, the number of disabled occupants in a building may vary. These fluctuations may mean that there could be more potential refuge occupants than can be catered for by the existing refuge arrangement. In such circumstances, alternative strategies

need to be implemented within some occupants' PEEPs to avoid the inappropriate use or overuse of the refuge during an evacuation.

Question 12: Whose responsibility is it to ensure that the building will allow disabled people to evacuate?
The choice of answers available can be seen in Figure 5. The majority felt that all of those listed had a duty of care. But it was clear that there is some confusion, with all the possible answers appearing in the results.

Figure 5 Distribution of answers for Q12: Whose responsibility is it to ensure that the building will allow disabled people to evacuate?
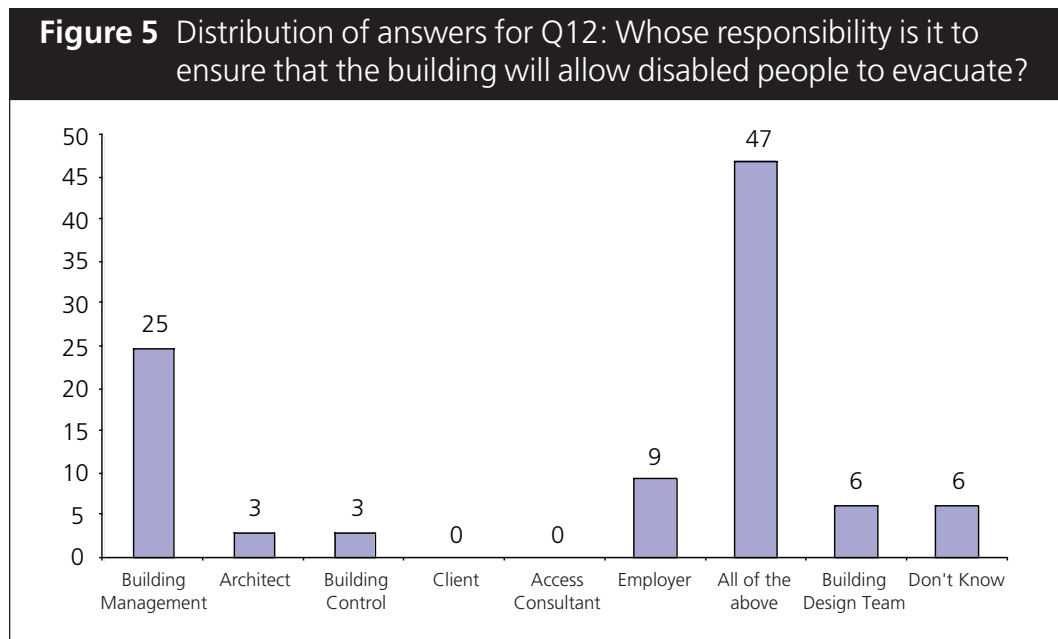
2.2.4 Numerical analysis
The numerical questions are presented in Table 2, along with the weighted average of the answers. Each person was offered a set of statements and asked to respond with one of the following:

- Strongly agree   2

- Agree   1

- No opinion   0

- Disagree   −1

- Strongly disagree   −2

In the weighted averages a negative score means that the average response was not in agreement with the statement, while a positive one, highlighted, means that an overall average response which is in agreement with the statement. Note: these weighted averages include the zero weighting for those with no opinion.

Question	Statement	Weighted average response
	Table 2 Responses to statements, in original order	
13	Current guidance clearly explains the management procedures needed for a refuge.	−0.4
14	Current guidance is very clear on evacuation techniques.	−0.9
15	There are other methods of evacuating disabled people than systems based on refuges.	0.7
16	Existing guidance clearly demonstrates who is responsible for evacuating disabled building users.	−0.4
17	Disabled people understand what a PEEP is.	−0.5
18	Every person who requires a PEEP has one.	−1.1
19	Refuges work well as a method of evacuating disabled people.	−0.3
20	In my experience refuges work well as a system in real fire situations.	−0.1
21	Refuges rely on management procedures.	1.5
22	Refuges rely on physical provisions.	1.2
23	Refuges are well understood by my profession.	0.1
24	Management procedures are always followed.	−0.9
25	A system based on refuges is most likely to fail because of management issues.	0.5
26	A two-way communication device is always required in a refuge.	0.7
27	EVAC-Chairs and other similar devices are a satisfactory way of evacuating disabled people.	−0.1
28	All wheelchair users can use an emergency evacuation chair.	−1.2
29	Refuges should be equipped with an evacuation chair.	0.1
30	Emergency evacuation chairs can climb stairs.	−0.7
31	Emergency evacuation chairs are easy to use.	−0.7
32	A system using refuges provides equal life safety for all building users.	−0.8
33	Refuges work well for people who are unfamiliar with the building.	−0.9
34	Refuges work well for people who are familiar with the building.	0.2
35	Carrying a disabled person can put the disabled person at risk of injury.	1.0
36	Carrying a disabled person can put the assistant at risk of injury.	1.1
37	Disabled people should evacuate a building the same way they access the building.	−0.4
38	Building management are aware of their responsibilities in a fire evacuation.	−0.7
39	People can re-enter a building once the fire alarm has sounded.	−1.3
40	Refuges are easy to find.	−0.7
41	Refuges are a good system of escape from new buildings.	−0.2
42	Refuges are a good system of escape from existing buildings.	0.0
43	Current guidance clearly describes the concept of a refuge.	0.1
44	Current guidance clearly describes the technical aspect of a refuge.	0.2
45	Current guidance clearly describes management needs of a refuge system.	−0.3
46	Disabled people themselves least understand the concept of refuges.	−0.3
47	The concept of a refuge is clearly understood by everyone concerned with the process.	−0.7
48	Current guidance clearly describes the alternatives to refuges.	−1.0

These responses may be looked at in groups of answers by topic, or by the strength of response. Both approaches were used in the full report on the consultation process (213442). The main observations were as follows:

• Physical provision is mainly thought to be reasonable.

• Communication and signage can be improved.

• Management arrangements are an important area of weakness.

• The system of refuges (involving leaving vulnerable people in a building longer than others) is one that people are uncomfortable with.

2.2.5 Consultation with users

Interviews were carried out with 53 disabled people, of whom 17 filled in the questionnaire. The questionnaire was similar to that used for the professionals, but adapted to the user's perspective. The graphs shown below are based on the sample of 17 who filled in the questionnaire, but the comments include information gained from the larger sample.

Statement: I know what a fire refuge is
A system based on refuges is only effective if the end users of that system fully understand it and are confident to use it. With this in mind, consultation showed that the majority of users knew what they were supposed to do in a fire evacuation situation. Users commonly reflected that they knew what a refuge was, see Figure 6, and had heard the term, but were unclear about the details of a refuge.

Figure 6 Distribution of user responses to "I know what a fire refuge is"
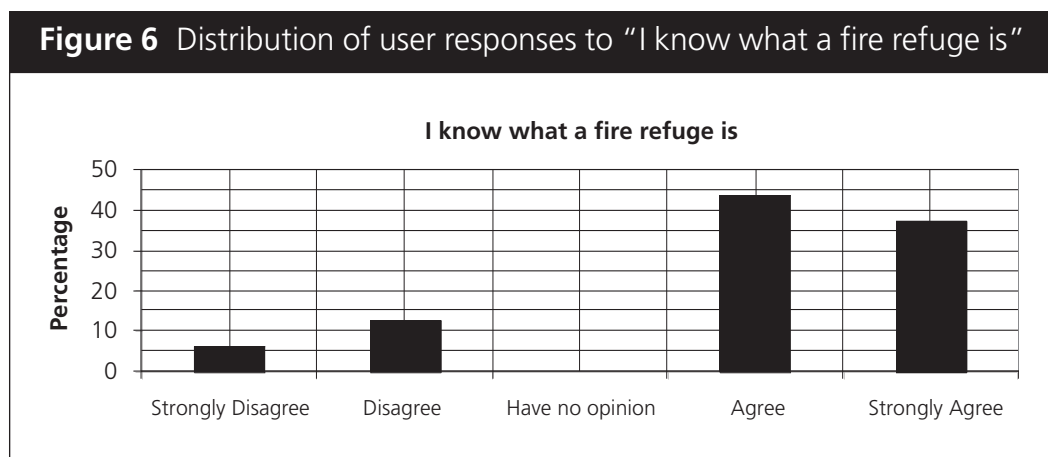
Statement: I know what I am supposed to do in a fire
It was apparent from speaking to many disabled people that most perceived that they were aware of the course of action they should take in a fire evacuation situation, see Figure 7.

Figure 7 Distribution of user responses to "I know what I am supposed to do in a fire"

I know what I am supposed to do in a fire
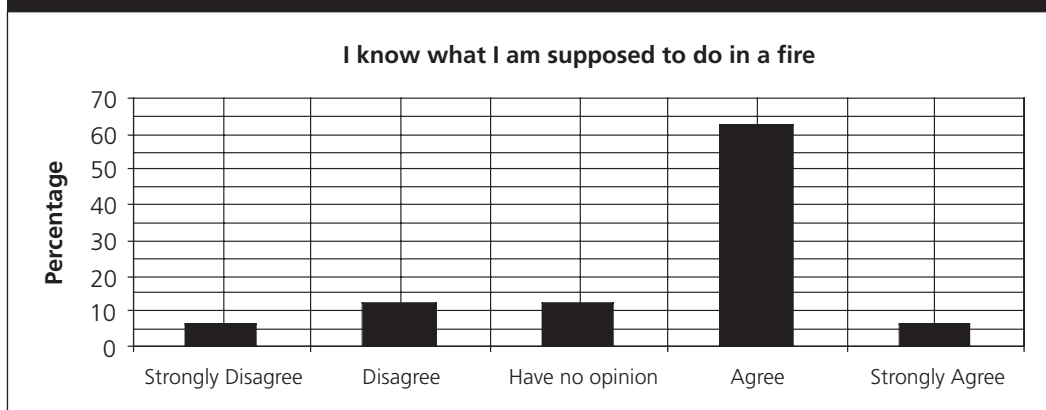
Statement: I am confident to use a refuge

It is vital that any system of fire evacuation fully considers the users of that system. It is therefore worrying that users themselves seem to have so little confidence in the system, see Figure 8.

Figure 8 Distribution of user responses to "I am confident to use a refuge"

I am confident to use a refuge

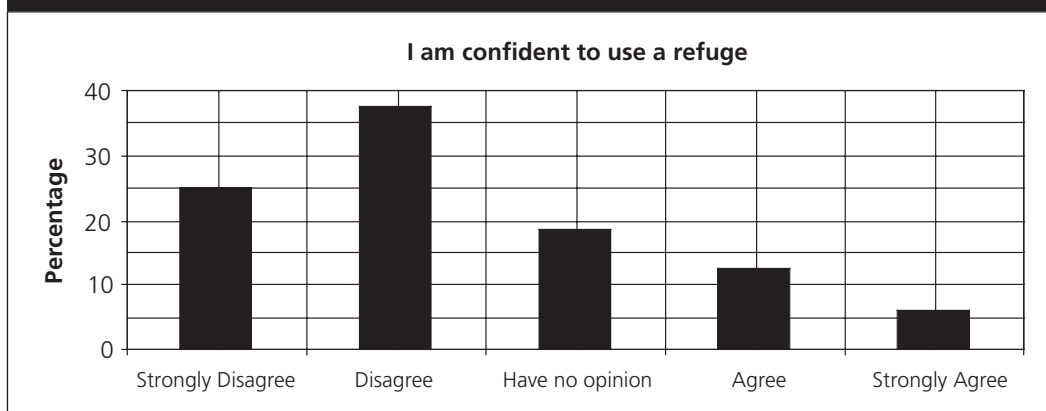The spread of results for this statement reflects the mix of responses from users. Almost two thirds of the sample, who would need assistance to negotiate stairs, disagree that they are confident to use a refuge. Nearly 20% indicated they agree or strongly agree, while a further 20% had no opinion on the matter, generally because these users had not experienced a drill, or real fire situation, and thus felt they could not comment. While this figure needs validating with further work, the result has serious implications for the credibility of the refuge method.

A lack of confidence in the system is reflected in the following representative disabled user comments to the question, "What action would you take in the event of a fire alarm?"

"Grab nearest able-bodied person and ask for help in leaving building."

"Leave the building by the nearest fire exit as quickly as possible and encourage/assist others to do the same."

"Go to the nearest fire exit and get someone to carry me out of the building. (Or I would see if the lift was still operational and use that). If that was not possible and I was left on my own, I would probably throw my chair down the stairwell and bum it down the stairs."

"I would not wait for anyone to help me. I would bump my way down the stairs."

Statement: I feel as safe as a non-disabled person in a building.
Although there is a clear majority who do not feel safe in the building, there is an interesting spread across all of the answers, see Figure 9.

Figure 9 Distribution of user responses to "I feel as safe as a non-disabled person in a building"
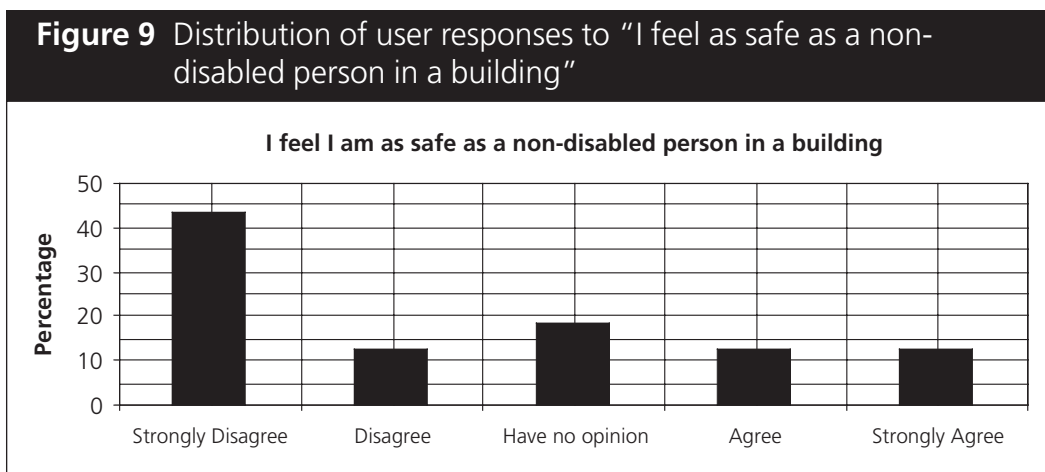
The figures suggest a severe lack of confidence in fire evacuation techniques. This lack of confidence is best expressed by users' responses to the question "How do you feel about being asked to wait in a building during an evacuation?"

"Vulnerable, to say the least."

"Very uneasy!"

"I personally would not do this."

"I am happy to wait in a building for a while in a safe area while the reason for the evacuation is ascertained."

"As a last resort a refuge would have to do."

"Frightened and not confident others know what to do."

Statement: In my experience, refuges work well as a system in real fire situations.
Whilst the number of respondents to answer this question is limited, it is nonetheless concerning that seven out of the eight people, who expressed an opinion, felt that using a refuge in a building evacuation did not work well, with only one person agreeing, see Figure 10. The other eight respondents in this section did not have direct experience to relate to.

Figure 10 Distribution of user responses to personal experience of real fire situations

In my experience, refuges work well as a system in real fire situations
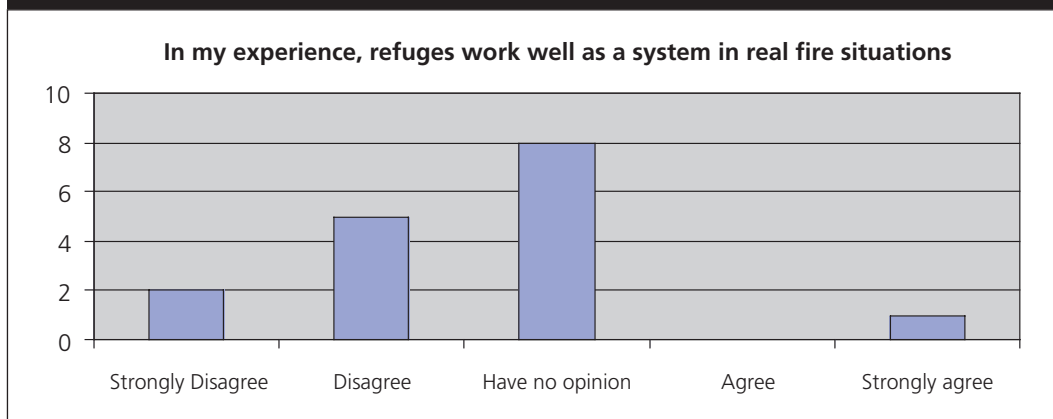
Evacuation chairs

Figure 11 Distribution of user responses about evacuation equipment

I am ok about using an emergency evacuation chair/
Evac-chairs and other similar devices are a good way of
evacuating disabled people

■ I am OK about using an emergency evacuation chair
■ Evac-chairs and other similar devices are a good way of evacuating disabled people
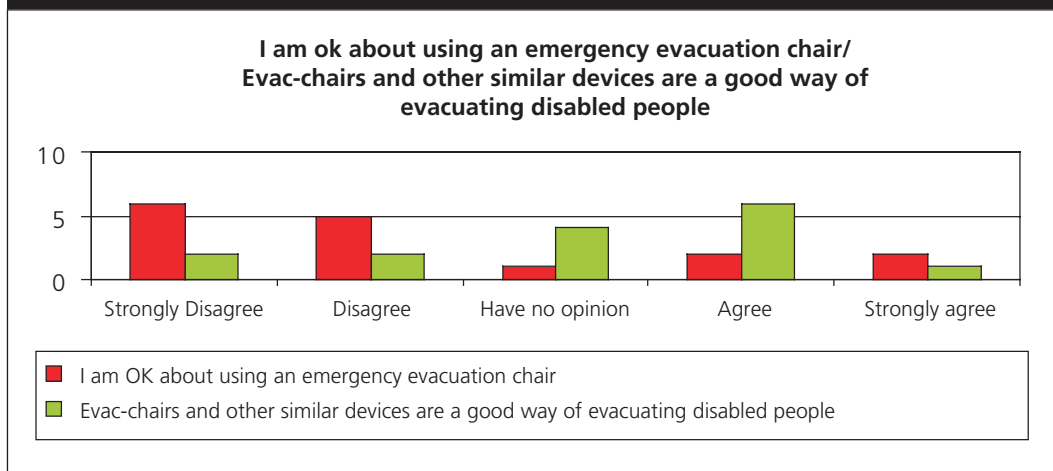
The two questions about evacuation chairs, see Figure 11, give an interesting result. The majority view of users is that they are not happy about using evacuation chairs. All those involved in the project who have experience of them agree that they are uncomfortable and hard to use. At the same time the users recognise that the idea is not completely unacceptable and say that they would use them in an emergency.

2.2.6 User experiences

Some of the user responses to the question "If you have used a refuge, please describe your experience" imply that a step change in guidance, and designs of fire evacuation systems, are necessary.

User 1 "Re evacuation chairs. I would be happy to use one of these if it was necessary, i.e. if there was no other way to get out of the building, and it was established I needed to get out. Otherwise I am not happy using the chair. Not only is it uncomfortable but I find the experience of using it very undignified and embarrassing.

I think an individual should have some say over their evacuation. Some people are happy to use EVAC-Chairs, others are not. I feel that those in charge of evacuation tend to concentrate on the obvious and important need to get a disabled person out of a building, but forget about maintaining the dignity and independence of that person during the procedure."

User 2 "I have also experienced the lack of evacuation plans in a public building. During the fire fighters strike I was refused entry to a cinema because I could not evacuate the building in an emergency (I used a wheelchair at the time). The cinema had no evacuation procedure and relied on the fire brigade."

User 3 "I've used a refuge many times. I was on the 7th floor. I was happy using the refuge area and usually someone waited with me. I felt safe waiting there and would be happy to do it again. The only problem was with the general procedure, re evacuation. Instructions at the refuge area were to use the phone point there to ring a specified number and inform porters of your location. This did not work well. If someone answered the phone they generally did not know what to do. It was also difficult to talk over the sound of the fire alarm.

It was never clear what the procedure would be once the refuge area had been reached – i.e. if and how I would be evacuated from the building."

User 4 "I was left on the stairwell by the usher who told me that a) I had to wait there on my own while my friend was to be evacuated with everyone else, b) someone would be sent in to get me once the rest of the building was evacuated. I don't remember being told whether there was a phone/intercom to contact anyone outside. To be honest I was both shocked and horrified at the idea of being left alone in the hope that someone outside would remember that I was still in there, and if I was in that situation now, I would make damn sure that someone carried me out. Nobody actively volunteered information."

User 5 "I had to wait in the stairwell while the engineer was called. The intercom system was not working but the janitor guy had a walkie-talkie and did stay with me while I waited. He expected me to wait till the lift was fixed (could give me no indication of a time) but one of the girls in my class phoned the fire brigade out. They came and were good enough to carry me down the

8 flights of stairs. I don't know if there was an evacuation chair as they just lifted me in my chair.

There is no way that if there was a fire I would be willing to wait in a burning building or a fire refuge, in the hope that someone would remember that I was in there."

User 6 "I am well used to being carried about by my friends so am confident enough in situations like that to be able to instruct people as to the best methods by which to lift me. As long as they are comfortable enough doing it, I am happy enough to be carried- but then I have the benefit of being strong, confident and of a light build, with a light, manual wheelchair.

'The last time I stayed in a hotel which had a fire alarm, it was the middle of the night, I was on the 5th or 6th floor or higher. No-one told us what was going on until I finally managed to ring on a mobile. No-one waited with me. I felt extremely unhappy and tried to make my way down the stairs after about 15 – 30 minutes, but had to give up. I would not be happy doing it again. In another hotel, it was after around half an hour and I could see everyone else outside. I tried to go downstairs on my bottom but had to give up. Eventually, someone came to help. In the previous situation described no-one came although there were a few disabled people staying in the hotel, and the hotel was aware of our situation. No-one was available to help at all in the initial stages. It is always extremely stressful."

User 7 "It is depressing to note that I was fully visible and had a Hearing Dog for Deaf People with me, so people could see I was disabled. But not one member of staff or the public took any responsibility for my being able to evacuate."

User 8 "A member of staff directed me to the refuge. I was on the second floor. I was talked to as if I was stupid and told to wait as the fire brigade would lift me out."

Professional 1 "A manager phoned me up saying he had an individual who wanted to return to work who'd been off for a couple of months with a broken leg. He'd now gone half way through the school holiday period! He actually felt he could go back and do desk work without any problems. So I immediately contacted the local safety consultant he set up a meeting with the line manager and the facilities manager. They looked at where the individual would be working, what the layout of the building was, what the means of escape was etc, an assessment was carried out and agreed with the individual, and practiced – key element, you've got to practice it. The guy started on the Monday morning, and on Wednesday the fire alarm went off for real, and the manager phoned me back up and said 'I hate to think what would have happened if we hadn't gone through this procedure, and actually practiced it, on the day, he said, everything went like clockwork, he said it worked absolutely perfectly".

2.3 Consultation workshop

2.3.1 Attendees

An invitation to attend the workshop was extended to around 50 people selected for their appropriate knowledge. Of these, 15 people accepted, as shown in Table 3.

Table 3 Attendees at the workshop held at the Building Centre on 22/7/04	
Expert affiliation	**Number**
Approved Inspector Services Ltd	1
BRE	2
British Museum	1
Health and Safety Officer	1
JMU	1
Lloyds TSB Bank	1
Scotland Building Regulations	1
Stride Treglown	1
Unite Group	1
Buro Happold	5

2.3.2 Stated workshop purpose and structure

In advance of the workshop, the following purpose statement was circulated:

"As part of the research project we have been gathering a range of views on the adequacy of fire refuges and related issues. For this workshop we will present our findings from this work, and test these against the experiences of the attendees. Then we will discuss the implications of these results. This may lead to suggestions for how the existing guidance should develop, or specific needs for further investigation."

The workshop consisted of three main parts:

• A presentation of the consultation findings, with extensive discussion.

• General discussion of issues and the way forward.

• Informal discussions over lunch.

2.3.3 General points made during the workshop

The following general points were made during the workshop, and inform the authors' overall thinking about the project:

- Professional bodies – should they be consulted directly? Response: yes, at the next stage of thinking about changes to standards/building regulations.

- A key thought for several people was to: 'make the use of refuges the system of last resort'. This relates to the tendency to treat the refuge as the lowest common denominator – it is seen as being able to keep costs down as compared to an evacuation lift for example.

- How many refuges are needed on each floor? There is a need for clarity on this issue within the guidance.

- It is important not to forget existing buildings, because different issues will apply in terms of what is possible as compared to new buildings.

- There is a strong need for inclusive design to be included in the education of the building designers of the future.

- There is a need for a 'rule book' for designers to use in order to meet their legal obligations. This could also help to make the approach clear for designers.

- The need for a statement from the Disability Rights Commission (DRC) during the 2002 fire service strike about management responsibility, showed the extent of misunderstanding. Some organisations thought that during the dispute, people with disabilities should not go to work, because they were expecting to rely on the fire service to evacuate them. This clearly showed that many organisations think this to be the case. The DRC statement tried to counter this, but with an unknown impact. The statement is currently available on the DRC website[xv]. Extracts are given below.

    Fire evacuation briefing: During the fire fighters strike last year some disabled people were refused entry to buildings because the building managers wrongly believed that the fire service is responsible for the evacuation of disabled people. Building managers should not be contemplating refusing entry to disabled people but should have plans in place that ensure the safe evacuation of all building users whether or not the fire service is available. This briefing is intended to outline the current standards relating to the evacuation of disabled people.

    Current legislation and standards state that all people should be evacuated if there is a fire. There is no document which states that disabled people should be left in a building to wait for the fire service during a fire. In fact, current legislative documents and standards state that it is the responsibility of building management to ensure their safe escape by introducing suitable escape plans.

    The responsibility is clearly with the building management or service providers to ensure there are suitable procedures in place to evacuate everyone including disabled people without relying on the fire service. Evacuation plans should already be in place and should be equally

applicable whether the fire service is operating normally or there is a fire fighters strike.

What to do

Building managers
If you are a building manager you need to provide suitable escape plans for your disabled staff and visitors to the building. You will need to consult with them to establish what their needs are. You are likely to find that they have a very clear idea of what it will take to get out of the building.

Once this is established if they require assistance then suitable people should be recruited to help. They should be trained in what to do. This includes moving and handling techniques where necessary.

Where the general public are present and therefore consultation is not possible it is essential that staff are trained in all methods of assisted escape.

Fire Authorities do have conflicting opinions in the use of fire fighting lifts. If the building that you operate has a fire fighting lift speak to the fire service to establish a method that you can use to operate the lift before they arrive.

The majority of building managers will have already drawn up these plans as part of their general evacuation system and these plans should be equally applicable whether or not there is a fire fighters strike. For the minority who haven't drawn up these plans then this must be undertaken immediately (for all building users not just disabled people).

Building managers in this situation who haven't planned in advance should not panic and attempt to exclude disabled people. Arrangements can be put in place straightforwardly based on the advice set out above and in discussion with disabled people themselves.

Discussing evacuation with disabled people is particularly beneficial in breaking down assumptions about their evacuation requirements.

Disabled people
If a disabled person is refused entry to a building due to the fire fighters strike they should explain the following points:

- Escape plans for disabled people should never rely on the fire service to provide for disabled people. Evacuation should be planned to facilitate the escape of all building occupants within three minutes. Therefore generally before the arrival of the fire service.

Explain what your evacuation requirements are. Think the process through and be as helpful as you can in raising the awareness of the manager.

2.3.4 Professional interviews: Responses to specific questions

The following points were made during the process of presenting the consultation findings to the workshop. Some relate to specific questions, but this evolved into a more general discussion.

Question 6: How would you find the nearest refuge?
- One participant would prefer not to have special directional signage for refuges, as this would compete with other evacuation signage.

- There is a problem relating to people with learning difficulties – will they understand the signage?

Question 7: What equipment should a refuge contain?
- There was a fault with the question: the use of the word 'should' is a bit ambiguous; 'must' would have been better. This was agreed.

- The building type makes a difference, as does the split between buildings that are open to the public and those for private use. Clearly, those for public use cannot rely on occupant knowledge. However, visitors to private buildings need also to be taken into account, and they are clearly a complication for these buildings.

- There is a need for Part M to be more specific, so that people know what must be included.

- A speaker mentioned a pager system for schools as an alternative to a refuge communication device – this can work because the building managers need to keep control of who is in the building, and can therefore use a pager or equivalent for communication.

Question 9: How does a disabled person get from a fire refuge to a place of safety?
- There is a need for a publication on planning for evacuation.

- The suggestion was made to look at first aid systems, for example the St John's Ambulance approach to moving people, and the 'carrying sheet' in particular.

- This relates also to manual handling aspects – there is a need for expertise on this.

2.3.5 Discussion relating to current guidance
- More description is needed about the alternative options to refuges (fire-protected lifts in particular), which many people believe are the only option.

- The question was asked, "Where does it say we 'have' to do it?"

- There is a need for greater competence of designers to adapt to the problems [with refuges] being found at present, and to find sensible

solutions. At the same time "we need documentation to help us fight the battle during so called Value Engineering".

• It was suggested that BS 5588-8: 1999ᵛ tries to cover everything, and it could be simplified. A whole chain of competence will be needed from clients through to designers developing the best solution for a project and the planning authorities being prepared to accept the outcome.

• There remains the problem that refuges are seen as the only solution.

2.3.6 Discussion on management issues

• Some designers feel that they are 'passing the buck' to management, and are concerned as to whether other people understand what they are committed to. In particular, this relates to the responsibility of the management of the occupied building to organise evacuation.

• There remains a misunderstanding over what the fire service will do or not do in terms of evacuation.

• Do fire services check on whether the correct management procedures are in place when they carry out fire inspections? This needs to be checked – some people said that they do, others that they do not.

• There are important differences between new and existing buildings, and between the perspectives of the owner/occupier/speculative developer, relating both to the differences in the physical buildings, and the degree of communication through the design process between the designers and the final building management. For a speculative building there will be no contact at all, and this may cause problems.

• The approach may be 95% management and only 5% physical systems for some types of building, as for example at the British Museum, where the systems depend on the staff present.

• PEEPs were seen as very important and not adequately supported.

The discussion led to the expansion of the 'Code of Practice' proposal which would require an approach to be taken through the design process, rather than relying on a prescriptive solution. This is discussed later, in section 3.6.

2.3.7 Discussion around presentation of users' perspective

Buro Happold gave a perspective based on project findings from the users of refuges. Delegates raised other examples where problems had occurred, supporting the concerns identified in the presentation.

Evacuation chair

• Evacuation chairs should only be present if the building users know how to use them.

- A major issue is that for an evacuation chair to work many people will need to be available to help.

- There is concern over product misinformation. In particular, evacuation adverts for chairs can be misleading and don't adequately convey the potential problems in terms of the difficulty of transferring people to an evacuation chair, the strength required to operate one safely, and the difficulty of moving upstairs if this is required.

Communication for users
- Does the need for a button press on a refuge communication device work for a large enough proportion of users? [Note: there may be those with disabilities that require the use of Braille, large text or buttons for example].

- The widespread use of mobile phones is a big recent change – how should this be adapted to? [Note that they may not work in some parts of buildings, particularly in areas with dense concrete, which is often where refuges are placed in stairwells].

- Closed Circuit TV or card access could be used to know where people are, removing the need for communication devices. This might apply in some buildings, e.g. modern schools, where security is also an issue.

2.3.8 Wider discussion
Language
- It was noted that the words 'refuge' and 'refuse' are very similar and get confused on labels.

- What about dealing with non–English speakers, for example in a hotel? There is a need for very careful sign design.

Miscellaneous
- How many refuges are needed per floor? How does this relate to possible usage levels? For example, this is very complex in a museum where the number of people with disabilities can vary greatly and is hard to control.

- It would be useful to have a flip down seat in a refuge for the partly ambulant who are then able to rest during their evacuation.

- It would be better to aim for the guidance to be all-encompassing, i.e. covering means of escape for all people, not just those with disabilities. This makes everyone think through the issues more.

- Some classes of accommodation do not need refuges (currently), e.g. university accommodation, and this should be reconsidered.

Sizing refuges and evacuation lifts
- The current size of the refuge is not adequate – it is based on the size of a lift rather than specifically for a refuge which may be needed for several occupants

- The size of evacuation lifts and refuges need to be considered together – for example, it may be acceptable to use a smaller lift if there is a larger safe refuge area, which would allow more people to wait

- The current requirement in Part M for a lift is for one wheelchair only, and this may not be enough

- An 8-person lift is considered too small for wheelchair use; the 13-person size is better.

2.3.9 What next?

This final section attempted to pull together thoughts from the discussion to direct future actions.

Develop code of practice for design for evacuation
- If a code of practice is to be developed, one speaker would prefer it not to be a British Standard. These tend not to be very easily available.

- A 'map' should be included in the code of practice to give an understanding of the hierarchy of approaches to evacuation. There should also be authoritative documentation to meet the needs of the planning process. This could be from the HSE, an Approved Document or the Home Office.

- There was some preference for a Building Regulation – but a widely accessible document is needed.

- There is a strong need for a handover document to explain systems very easily for the occupiers, and that this needs to be retained with the building.

Other points
- The issue of whether it is acceptable to re-enter a building may need to be addressed, as a 'buddy' may have to return to the building to find their 'friend'.

- At a fundamental level it may be better to start the design process by considering egress rather than access, as egress is too often an afterthought.

- The provision of information to employers to explain to them what is expected would be useful. It was suggested this could be a Government leaflet.

A possible research topic
- Working with paramedics on how to carry out evacuation. This should cover Evacuation chairs, sheets and lifts.

The workshop was felt to have been successful in bringing together ideas, and it forms the basis of the proposals for the future put forward in the following sections.

Chapter 3

Findings from the consultation process

3.1 Relating to technical guidance

3.1.1 Communication devices

In its current form BS 5588-8: 1999[v] recognises the need for an accessible form of two-way communication system to be available from within the refuge, and that this system needs to be readily operable and understood by someone with a disability. However, guidance does not define such a system any further. It does not recommend appropriate systems of communication for different building types, or comment on what may be an accessible form of two-way communication system. The concern among professionals is that this section of BS 5588-8: 1999 is being used to support design solutions that may not be appropriate for the building type. This may include encouraging the use of communication systems that are reliant on a second person attending the refuge to assist the disabled person, rather than one that is easy to use by all people. In certain building types, a communication system reliant on trained staff members may well be the most appropriate solution (e.g. in a sports stadium).

It is suggested that guidance should recognise and promote the idea that providing a physical two-way communication device permanently within a refuge has a number of benefits in terms of refuge function, user perception, user education, and management of the refuge. The communication device can help because:

• The refuge space is more clearly defined by the presence of the visible communication device. This can reduce management needs by reducing the risk that the refuge is blocked by others, even temporarily.

• The research has shown that many industry professionals believe that a system using refuges is too heavily reliant on management procedures and most likely to fail because of a failure in these procedures. Using a well-designed physical communication device in a refuge can relieve pressure on staff training, staff availability and intensive management of the evacuation procedure.

- It would raise both industry and public awareness of the issue of the evacuation of disabled people from buildings.

- It highlights the location of refuges within buildings.

3.1.2 Signage

A common concern from both professionals and users was that there appeared to be a lack of perception of the need for directional signage to a refuge. Many users find it extraordinary that most people can refer to signage to escape from a building, and yet a disabled person often has no signage indicating the nearest refuge or escape route. This is reflected in guidance with BS 5588-8: 1999[v] stating *"a) Refuges and evacuation lifts should be clearly identified by appropriate fire safety signs."* However, there is no need defined for directional signage.

It is recommended that any improvements to the existing guidance include the need for directional signage to a refuge to be made mandatory and for a standard, similar to the 'running man' for fire exits, to be established.

3.1.3 Additional concerns

One clear risk associated with the refuge system is that the space may be taken up with other materials on a temporary basis, see Figure 12 for an example. Such a misuse of a refuge may prevent its proper usage when needed, as could also be the case for evacuation routes.

Figure 12 A blocked refuge area
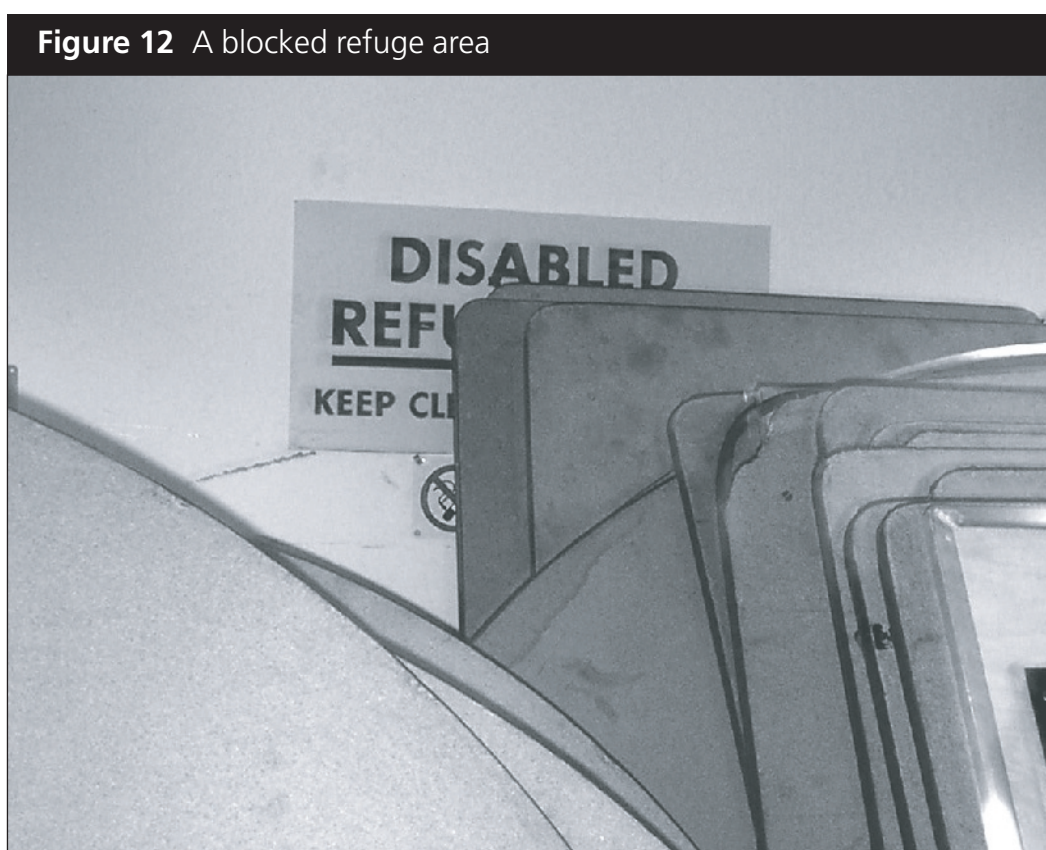
Another element of the technical guidance, that the consultation indicates needs to be developed, is the way in which the alternatives to refuges are described. The current guidance is felt to imply that only refuges can be used, and the provision of evacuation lifts or horizontal evacuation to a safe zone (in a large building) is not given equivalent treatment.

3.2 Relating to management guidance

The strongest finding from the consultation process reflected the view that building management was the key to ensuring that an escape system based on refuges works. Because there was such a large emphasis on management procedures, it was perceived to be the most vulnerable element of the system. Although BS 5588-8: 1999v states that the building management is responsible for evacuation (not the fire services) this is clearly not widely understood, and very many buildings are not organised appropriately.

It was suggested that several steps were needed to address this:

- The guidance needs to be stronger in its comparison of the pros and cons of different evacuation strategies, and in demonstrating the link between the design decision of using refuges, and the implications this has on day to day building management.

- Management procedures need to demonstrate more clearly that management of the system is an ongoing process.

- A more stringent training process for building staff should be supported. As an example, the British Airports Authority run a training scheme for fire safety, and something similar incorporating evacuation procedures should be developed and made more widely available.

- Incorporating evacuation procedures in the Access Statement required by Part M would help to bring to the fore the issue of evacuation for people with disabilities as part of the design process, and allow the design team, in conjunction with the building owner/client, to establish management procedures at the earliest stage.

- Another way to address management systems would be to include checks on them during fire brigade inspections. The approach taken under the Fire Precautions (Workplace) Regulations 1999i for fire risk assessments could be amended, to include a set of questions that the inspectors could use to understand whether the appropriate management procedures are in place. These would include:

  - how many people with which disabilities are normally present in the building;

  - what is the evacuation procedure for them;

– who is trained to use (named) items of evacuation equipment;

– the provision of the PEEPs for these people.

Concerns were also raised as to the extent to which the 'buddy' system could be relied on. This requires each regular building user with a disability to be assigned a buddy who will find and assist them in the event of an evacuation. Clearly this is vulnerable to the absence of that individual and cannot be relied upon at all times.

3.3 Evacuation exercises

Through the consultation there was anecdotal, but not firm, evidence of the effectiveness of evacuation exercises and whether they have a positive influence on a final evacuation scenario. It was indicated by the consultation, that refuges are thought to work better for people who are familiar with the building, and are thus likely both to have a PEEP and to have undergone some discussion, if not practice, of their evacuation procedure.

Almost two thirds of the sample of users who needed assistance to negotiate stairs disagreed with the statement that "they are confident to use a refuge". A further 20% had no opinion on the matter, generally because these users had not experienced a drill or real fire situation and thus felt they could not comment. While this figure needs validating with further work, the result has serious implications for the credibility of the refuge method.

There appears to be a very limited number of examples of studies about the appropriateness or success of the techniques suggested for vertical escape, and the means and methods by which either other building occupants, operating a 'buddy' system or the fire services, evacuate people. Testimonials of using devices such as EVAC-chairs seem limited to a handful of experiences and extreme cases, as highlighted in the literature review. Disabled People and Fire references a number of example evacuations in the course of the report. The report suggests a lack of understanding of evacuation procedures.

As many as 28% of professionals interviewed indicated that the failing of the 'buddy' system was the most common flaw in a fire refuge evacuation. Following closely were 'poor building management', 'no/poor Communication at the refuge' and a 'lack of training'. Overall there is insufficient information on the effectiveness of trials of evacuation procedures to comment in detail at this stage, and this is an area that deserves further consideration.

3.4 Public information issues

It was discussed during the workshop that, although many people with disabilities are aware of the systems employed, the vast majority of the public

are not. As a part of the wider information made available because of the Disability Discrimination Act (DDA), it would be appropriate to incorporate information on how people with disabilities will be evacuated from the buildings into which they are now allowed access. Actions of this type are usefully co-ordinated with a range of others, and the Disability Rights Commission would be a valuable partner for this activity.

3.5   Training issues

Professionals
Although many professionals are aware of the regulations and expectations of the use of refuges and the DDA, there are clearly very many who are not. In addition, our consultation inevitably received input from people with an interest in the subject, and who have greater knowledge. Nevertheless there were still gaps in people's knowledge, and the experience of individuals is that there are very many professionals with an alarming lack of understanding. To address this there must be a number of steps taken:

- identification of responsibility (for the egress of those with disabilities) within the design team, perhaps in partnership with Construction Industry Council (CIC);

- inclusion of access issues within the core material of the syllabus for architects (and others);

- wider update training for existing professionals.

An element that has emerged from the consultation is the value of personal anecdote and visual images of problems. We therefore propose that video sequences showing individuals describing their experiences, and of how equipment like evacuation chairs works, should be put together as part of the training package.

The wider community
While the main need for training is with the professionals involved in the design of buildings, there is a wider need to spread understanding of the issues of how the evacuation of people with disabilities should be handled. Therefore there should be wider publicity of the approaches needed, and guidance should be offered to all building operators.

3.6   A new approach to design for evacuation

The work on the adequacy of refuges, stairs and management has highlighted some important aspects, which need further consideration if the design for means of escape for people with disabilities is to be inclusive and appropriate for the built environment.

It is clear that the performance requirement laid down within the Building Regulations is acceptable, since it is a functional requirement and allows designers to meet these requirements by whatever means. However, too much reliance seems to be placed upon British Standards and Approved Documents to 'spell out' to designers and approvers acceptable methods of meeting the functional requirements. Potentially, more emphasis should be placed on education, to highlight the importance of inclusive design and escape provisions for people with disabilities.

In addition, two common misconceptions that have been shown from the research are that the design for people with disabilities is primarily for wheelchair users, and furthermore that it is the responsibility of the fire service to assist with their evacuation. The former is used since this could account for the worst case scenario for building designs, but over-emphasis on wheelchair users alienates many other members of society.

Current guidance documents are limited in their suggestions for providing methods of escape for disabled people. If all disabilities and alternative architectural proposals were to be considered, the options for escape for disabled people would be more extensive. This applies particularly to horizontal evacuation to zones of safety, and the use of fire-protected lifts.

It is suggested that the best guidance would include both optional structural provisions and adequate management provisions to cater for all these options. In order to facilitate this, a 'code of practice' or similar document with authoritative backing could be produced. This would provide a flow diagram to assist designers in choosing the most appropriate strategies for their particular buildings. This flow diagram would incorporate the range of disabilities present in the building users, the current level of structural provisions (such as stairs, lifts and any additional fire safety provisions) and the anticipated level of facilities management, so that the most suitable design can be obtained.

This process would also serve as a valuable audit trail for all parties, to demonstrate that no option was ignored during the design, and that a sensible decision was made, based on the information available. A process map of this type would benefit from being produced quickly, and then trialled on a number of projects to refine it. It could then be adopted by a number of appropriate public bodies, including the ODPM, HSE, Home Office and the Royal Institute of British Architects (RIBA).

Chapter 4

Suggestions for future research

Any future research will need to take into consideration related ODPM-funded research on how lifts can be used for evacuation. Many issues have become clear from the consultation and workshop, but there are areas where knowledge is lacking and it would be valuable to carry out further research to produce sensible recommendations for future changes.

4.1   Methods of vertical evacuation

Most people know that the refuge is a safe area where a disabled person waits for evacuation. It is less well known how the evacuation should be achieved. Research is needed into the relative effectiveness of the different options, and the circumstances and training needs associated with each. Options currently include evacuation chairs, stair climbers, 'carrying sheets' and methods using no equipment. This study should involve paramedics who have valuable experience of moving people safely, along with ergonomics and equipment experts.

4.2   Impact of stair widths and carrying people

An expectation of being able to carry an individual down stairs, usually involving several people to do the carrying, requires the acceptable width of stairs to be reconsidered. It may well add significantly to the building cost to achieve the required widths, and alternative options may be more cost effective, and therefore should be reviewed. This should include consideration of the widths needed, and the effect of increasing the number of people to do the carrying, for example in taller buildings. Furthermore, there are risks to both those being carried and those doing the carrying, and these are as great in an evacuation drill as in a real emergency.

4.3   Impact of the DDA

A small scale review could be made of how the efforts to address the DDA, and its requirements for access, are affecting the issues of egress. Rapid changes to the implementation of the DDA might be needed if it is creating problems in this respect.

4.4   Completing the process – what happens outside?

Notwithstanding that there are problems with the vertical evacuation stage, there is currently effectively no guidance on what happens once a disabled person has left the building. This is especially applicable to wheelchair users who have been evacuated without their wheelchair. While the main immediate danger may have passed, in the context of explosion or terrorist actions rather than fires, the ability to move far beyond the building perimeter still may be needed. This aspect has not been covered in current guidance, and would benefit from a review.

4.5   Testing of current procedures

Through the consultation process and workshop, anecdotal evidence of the failure of current management procedures was identified. It would be valuable to develop this, with case studies of a range of buildings to establish the range and extent of current implementation. This would help to direct training and inspection regimes.

4.6   Development of the design 'route map'

There is a case for the rapid development of a document to explain the path through the design process leading to an optimum design for egress.

Chapter 5

Conclusion and recommendations

This report assembles the findings from the consultation process into the adequacy of refuges and evacuation procedures. The headline findings are as follows:

- The physical state of refuges needs only minor improvement.

- The management of evacuation procedures, and of refuges and their alternatives, and the process that produces them, requires a major overhaul.

- Disabled users have a generally good understanding of the current arrangements and are concerned about them.

- There are widespread gaps in the understanding by the construction sector, and the wider user community, of the evacuation of people with disabilities.

To address these findings, a number of actions have been proposed within the previous sections, of which the most significant are:

- To include management of egress in the fire risk assessments under the workplace regulations.

- To create and promote a new form of approach to the design of buildings to facilitate the optimum design for evacuation, taking account of the different circumstances of projects for different clients.

- To measure the impact of the implementation of the DDA on management procedures.

- To research the relative effectiveness of different methods of vertical evacuation.

- The incorporation of evacuation procedures as a section in the Access Statement in Part M, or the inclusion of evacuation procedures in the Approved Documents.

Chapter 6

References

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