Department for Communities and Local Government Final Work Stream Report:

BD 2887

Compartment sizes, resistance to fire and fire safety project

Work stream 7 – Means of escape for disabled people

286861 (D29V1)

CPD/04/102

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25 February 2015

FIRE

BD 2887

Compartment sizes, resistance to fire and fire safety project

Final Work Stream Report for Work Stream 7 – Means of escape for disabled people

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Executive Summary

Building Regulations Division, Department for Communities and Local Government (DCLG) commissioned BRE to carry out a project titled “Compartment sizes, resistance to fire and fire safety”. The main aim of this project was to produce robust evidence and data based on research, experimental fire testing, computer modelling and laboratory testing, where necessary, on a number of linked work streams in relation to fire safety and associated provisions in Schedule 1 of Part B of the Building Regulations 2010.

This Final work stream report describes the findings of the research for Work stream 7 – Means of escape for disabled people. The principal aim of this work stream was to produce robust evidence and data to explore whether the guidance in Approved Document B Fire safety (AD B) for means of escape for disabled people is sufficient to promote and support safe evacuation (unassisted where necessary), along with the levels of compliance that are currently achieved to fully understand the implications. This work stream also explored and examined alternative options, to those detailed in AD B i.e. lifts, (including their costs and risks) that could facilitate and aid means of escape.

The work conducted under this work stream has involved: canvassing the thoughts of industry stakeholders; a review of mobility impairment, access aids, facilities and compliance with existing guidance; a review of anthropometric data and the sizes of wheelchairs and undertaking a cost analysis of alternative solutions for five different evacuation solutions (four lift types and three mobility aids (evacuation chairs) at three different building heights. The purpose of this is to provide data to assist the building design team in choosing appropriate means of escape solutions for their particular circumstances. This work stream does not make recommendations that would pre-empt the judgement of the design team.

It is recognised that alternative fire engineered solutions, including suppression and smoke management systems, could be adopted to address disabled egress arrangements within a building. Consideration of these were outside of the scope of this work, however, any such systems can be considered by the building design team, as appropriate.

This work stream has also involved the participation of an industry Steering Group.

The conclusions of this work stream are as follows:

- In the opinion of stakeholders, information provided in current guidance, AD B, is generally considered to be sufficient to provide minimum guidance to meet the Building Regulations. However, there is a general consensus that additional supporting information on the functional objectives behind the provision of disabled egress facilities and equipment would be considered beneficial to designers and users.
- Different guidance documents provide varying dimensions etc. for access and egress provisions within buildings. Designers and building users should make themselves aware of these differences and ensure that any building work undertaken satisfies all the relevant requirements of the Building Regulations.
- Based on the survey of sizes of wheelchairs and other mobility aids, the recommendations for the number and dimensions of disabled refuges in AD B would appear to be suitable for the majority of wheelchairs and building configurations.

- In the opinion of stakeholders, building designers (and design teams) do not generally fully consider the management implications of their design proposals for end users.
- In the opinion of stakeholders, Regulation 38 is not always fully complied with; Thereby, strategic fire safety design information is not readily available for building and facilities managers.
- The cost analysis has produced a table of estimated costs to enable cost comparisons to be made to inform decisions on the provision of different evacuation solutions (different types of lifts or evacuation mobility aids) for newly-constructed commercial buildings for three different building heights. These costs include appropriate capital and, where applicable, on-going training costs.

Contents

1 Introduction and Objectives

This Final work stream Report is delivered as part of the Department for Communities and Local Government (DCLG) project BD 2887, titled “Compartment sizes, resistance to fire and fire safety project”, DCLG Contract reference CPD/04/102/010. The main aim of this project was to produce robust evidence and data based on research, experimental fire testing, computer modelling and laboratory testing (where necessary) on a number of linked work streams in relation to fire safety and associated provisions in Schedule 1 of Part B of the Building Regulations 2010. The project has been broken down into specific work streams.

This report describes the findings of the research for Work stream 7 – Means of escape for disabled people.

The guidance contained in Approved Document B: Fire Safety – Volume 2 (AD B) [1] is clear that final exits should not present an obstacle to wheelchair users and other people with disabilities, and sets out where ramps should be provided on escape routes. This particular provision was first introduced in 2006, along with more guidance and clarity around the design of means of escape for disabled people.

For non-domestic buildings Approved Document B (Volume 2) [1] makes reference to BS 5588-8 Fire precautions in the design, construction and use of buildings; Code of practice for means of escape for disabled people [2] (which has been withdrawn and replaced with BS 9999 Fire safety code of practice for the design, management and use of buildings [3]). This provides guidance on the use of lifts for evacuation purposes. Guidance is also provided on refuges for wheelchair users and others, which means that most multi-storey buildings are provided with protected refuges associated with each stair where a person who may need assistance to leave the building can wait in relative safety (enclosed in fire resisting construction) for a short period of time prior to their evacuation.

DCLG has suggested that there is growing concern associated with a number of aspects, including:

- That the provisions of unrestricted access (Part M (Access to and use of buildings) [4] and the Equalities Act 2010 [5] the design of buildings to cater for people of all abilities) are not reflected in the provisions for escape.
- How many refuges should be provided, where they should be placed, how large should they be and how should people be assisted from the refuge to the final exit?
- Is the guidance setting out where ramps should be provided on escape routes being uniformly applied as the guidance intends?
- Is the existing guidance sufficient for any changes of body dimensions of people over the last few decades since the guidance was produced, and are the ergonomics representative of up-to-date anthropometric data (human body measurements across populations) and future trends, particularly with regards to sizes of wheelchairs and bariatric people?

The principal aim of this work stream was to produce robust evidence and data to explore whether the guidance for means of escape for disabled people is sufficient to promote and support safe evacuation (unassisted where necessary), along with the level of compliance with recommended solutions to help us understand whether the guidance is sufficient. This evidence and data is intended to assist the building design team in choosing appropriate means of escape solutions for their particular circumstances.

It is recognised that alternative fire engineered solutions, including suppression and smoke management systems, could be adopted to address disabled egress arrangements within a building. Consideration of these were outside of the scope of this work, however, any such systems can be considered by the building design team, as appropriate.

This work stream also explored and examined alternative options to those detailed in AD B, i.e. lifts (including their costs and risks), that could facilitate and aid means of escape.

The Work stream 7 tasks were:

- Task 7.1 Identification and engagement of stakeholders
- Task 7.2 Review of mobility impairment, access aids and facilities and compliance with existing guidance
- Task 7.3 Review of anthropometric data and the sizes of wheelchairs
- Task 7.4 Risk cost benefit analysis of alternative built in solutions
- Task 7.5 Reporting.

2 Programme of work

2.1 Scope of the project

The scope of the project was defined as follows. This work stream considered AD B Volume 2 buildings where comprehensive guidance is given in AD B:

- Common areas of blocks of flats
- Residential Institutional (other)
- Office
- Shop and commercial
- Assembly and recreational
- Industrial
- Storage and other non-residential.

This work stream did not consider buildings where other guidance documents (or fire precautions additional to AD B) are cited (generally paragraphs 0.21 to 0.35 in Volume 2 of AD B):

- Healthcare premises
- Unsupervised group homes
- Shopping complexes
- Assembly buildings with fixed seating
- Schools
- Atria
- Sheltered housing
- Buildings of special architectural or historic interest.

2.2 Stakeholder engagement

This work stream has involved the participation of an industry Steering Group, Satellite Steering Group C. This group provided input during the course of the work, giving feedback on the research methodology as

well as key deliverables and milestones. This group met three times: the first SSGC meeting was held on 31st October 2012; the second on 25th February 2013 and the third on 30th September 2013.

The organisations represented at the Steering Group are as follows.

Organisations represented at the Steering Group
• Building Regulations Division, Department for Communities and Local Government (DCLG) • BRE Project team • Association of British Insurers (ABI) • Association of Building Engineers (ABE) • Association of Specialist Fire Protection (ASFP) • British Automatic Fire Sprinkler Association (BAFSA) • British Institute of Facilities Management (BIFM) • Business Sprinkler Alliance (BSA)* • Chief Fire Officers Association (CFOA) • Centre for Accessibility Environments (CAE)* • The Chartered Institute of Building (CIOB)* • Fire Brigades Union (FBU)* • Fire Industry Association (FIA) • Institution of Fire Engineers (IFE) • LABC • National Register of Access Consultants (NRAC) • Passive Fire Protection Federation (PFPF) • RICS Building Control Professional Group (RICS) • Royal Institute of British Architects (RIBA) • Scottish Building Standards (SBS) • Shore Engineering • University of Ulster • Welsh Government (WG)*

*papers only members

At the first SSGC meeting, there was significant discussion around the subject of means of escape for disabled people with all SSGC members present contributing to the discussion. The following "trends/themes" were identified at this meeting:

- Overall, the normative provisions in the guidance in Approved Document B, for purpose groups 2 to 7, may be sufficient; and the inclusion of additional informative guidance would greatly assist designers, architects, fire safety engineers, access consultants and approval authorities.

- Current guidance and codes of practice are very limited in the information contained for supporting the provision of facilities and means of escape provisions for disabled people. For example, although AD B provides guidance on the provision of refuges, with respect to size and location, there is minimal information for the user on the number of refuges to be provided (one per stairway per storey served by the stair) for the building population, or how the different provisions for the means of escape for disabled people will impact upon the fire safety management requirements once the building is occupied. AD B notes that "*the number of refuge spaces need not necessarily equal the sum of the number of wheelchair users who can be present in the building. Refuges form a part of the management plan and it may be that more than one disabled person will use a single refuge as they pass through as part of the evacuation procedure*".

- This work stream activity may raise evacuation strategic considerations (potentially regarding AD B purpose group 1) on the nature of facilities and means of escape provisions for disabled people as well as consideration of alternative physical recommendations.
- The perception of SSGC members was that the number of fatal fires involving disabled people, in buildings in AD B purpose groups 2 – 7, is very small, therefore limiting the scope for additional provisions in a cost benefit analysis. This perception is supported by, the November 2011 publication from CLG "Fire Statistics 2011" [6] which quoted: 388 fire deaths in all, of which 306 were in dwellings, and 19 were in other buildings. These other buildings had a total of 24,900 fires recorded. The prevalence of disability within the general population is about 20%.
- The concept of "extraordinary effort" should not be forgotten in the context of disabled people in emergency situations.
- Regulation 38 is not always fully complied with; thereby, strategic fire safety design information is not readily available for building and facilities managers; hence, they may not be familiar with the strategies in place supporting the provision of facilities and means of escape provisions for disabled people. Information from the stakeholders during the project should address this issue.
- Compliance with interpretations of the requirements of the Equalities Act which do not consider the wider design context may not be practicable. With a more informed approach, fire engineered approaches may provide better resolution to specific design challenges.
- The term 'disabled' does not only refer to people who use wheelchairs; some other disabled building occupants who do not use wheelchairs may also have difficulties in navigating stairs. Others may be able to manage a limited number of flights of stairs, etc.

Access consultants were one of the representative groups of key stakeholders to provide input into this specific work stream. The key points that they raised were;

- There is a significant lack of current ergonomic data on body shape and size, together with trends; previous data relates to studies conducted on accessibility of cash points.
- Building designers (and design teams) do not generally fully consider the management implications for end users (sometimes because the managers and/or occupants of the building are not known at the design stage). When a building is occupied, managers can place too much reliance on evacuation aids, such as an evacuation chair, rather than providing a strategic approach, procedures and training for disabled (assisted or not) escape.
- Current informative guidance in AD B is very limited, with no supportive information for designers to enable them to make informed decisions about the situations when alternative approaches or levels of provision may be appropriate or future impacts on building managers and occupants of providing different facilities to support the means of escape for disabled people.

At the second SSGC meeting, the findings from the meeting with the access consultants and the key responses to the questionnaire, canvassing the thoughts of a broad range of organisations were presented (see section 2.2.1).

Following discussion and feedback from the SSGC members, BRE presented an overview of this work stream and the issues that had been identified to the City of London Access Group AGM (including users) . The outcome from the meeting was very positive. In summary:

- None of the user group members identified any significant concerns with the approach undertaken and the findings to date.
- Many anecdotal examples were provided by the user group, most of which were not directly relevant to this work.
- However, it was noted that guide dogs and hearing dogs should be considered as mobility aids, and as such should not be separated from their owners.

2.2.1 Questionnaire to stakeholders

2.2.1.1 Method

A questionnaire, canvassing the thoughts of wider members of the organisations being represented in SSGC, was prepared and issued, see Appendix B. There was a good return of 13 questionnaire responses, from across the spectrum of Stakeholders, from designer, to end user, to facilities manager. Note that these 13 responses each represent the collated experiences of the members of each organisation, thus the sample size is larger than 13 individuals.

For some questions, individual anecdotes are given to illustrate and expand on the minimal yes/no answers.

2.2.1.2 Questionnaire responses

Q1 – When considering means of escape for disabled people, which guidance do you primarily follow?

Guidance in BS 9999 [3] is the prevalent single document followed. However, using various documents (AD B, AD M, FSO guides [7]) is the most favourable approach. See Figure 1.

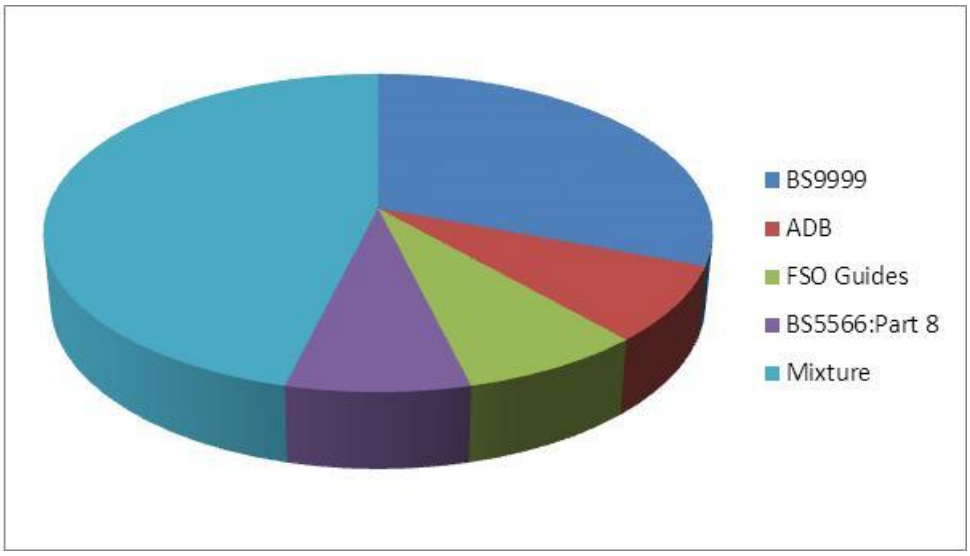

Figure 1 – Question 1 responses

Q2 - Do you consult with any other guidance for the design of means of escape provisions for disabled people?
Overall, the response was a spread of different options (BS 5588-8, AD B, AD M, BS 9999, Disabled focus groups, HBN 00 04 [8]). See Figure 2.

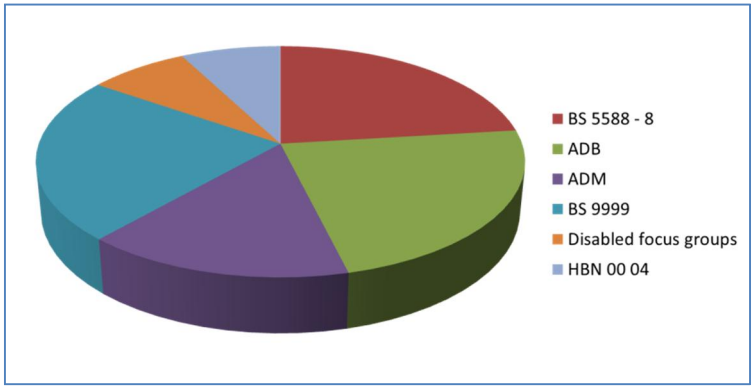

Figure 2 – Question 2 responses

Q3a – Do you consider the overall approach for disabled means of escape to be correct for buildings in AD B purpose group/s: 1a (Flats)?

The majority response was 'No'. The 'Yes' and 'No' responses are reflected in the following statements.

- 'Yes'. "On the basis of the 'defend in place' principle. It has though become compromised by a combination of poor construction, poor accountability and maintenance."
- 'No'. "There is no requirement for communal refuge areas and to expect people to feel safe in a block that is on fire (treating each flat as a separate fire compartment) raises a whole host of social and psychological issues."

See Figure 3.

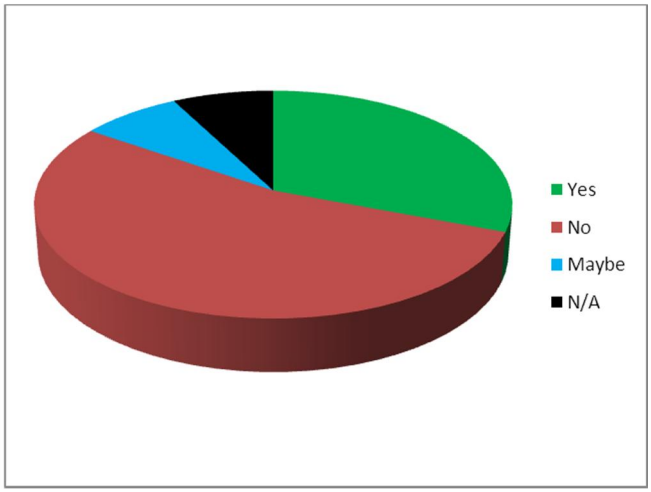

Figure 3 - Question 3a responses

Q3b - Do you consider the overall approach for disabled means of escape to be correct for buildings in AD B purpose group/s: 2 – 7? (Other non-domestic buildings, e.g. offices, shops, warehouses)

The majority response was 'No', with a higher percentage than for question 3a. The 'Yes', 'No' and 'Maybe' responses are reflected in the following statements.

'Yes'. "…..a sensible cost effective provision provided that there is rigorous and skilled enforcement and greater accountability of competent persons."

'No'. "The guidance is minimal and does not account for wheelchair users and others working alone in a building. Means of escape provisions should be about disabled people being facilitated to evacuate independently, with manual handling methods as a last resort."

'Maybe'. "The principles are correct…, however technical guidance is limited by virtue of the impossibility of making often expensive provision for all possible disabled circumstances."

See Figure 4.

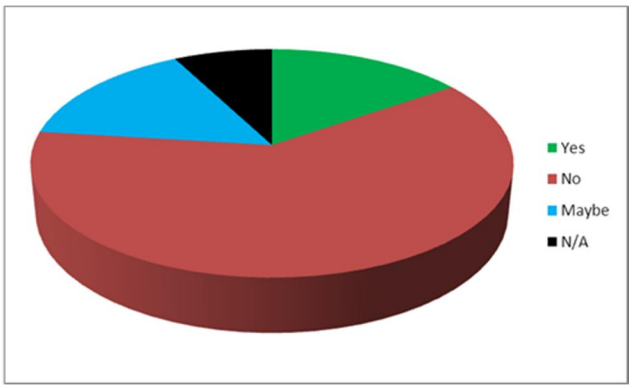

Figure 4 – Question 3b responses

Q4a - Is the guidance provided in AD B for disabled means of escape sufficient for AD B Purpose Group 1a (Flats)?

The majority response was 'No' - "The guidance needs to provide informative text to avoid designers and enforcing authorities deviating, getting confused about whether evacuation lifts and refuges are required."

See Figure 5.

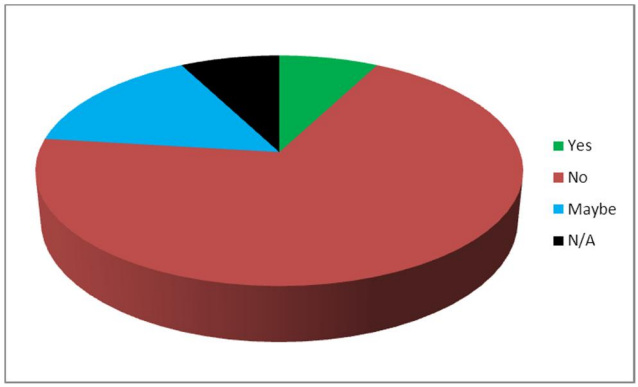

Figure 5 – Question 4a responses

Q4b - Is the guidance provided in AD B for disabled means of escape sufficient for AD B Purpose Groups 2 - 7? (Other non-domestic buildings e.g. offices, shops, warehouses)

The majority response was 'No' reflected in the following statements.

- 'No' - "Needs to explain that the ADB recommendations are a minimum provision and it would be sensible, where possible, to involve the 'Responsible Person' in the design to ensure that the provision reflects their intended fire safety management plan."
- 'Yes' - ".....as good as we are going to get. Provision is made for horizontal evacuation but vertical evacuation is very much left to persons responsible for premises..... If Building Regulations provide the infrastructure then adequate bespoke ad-hoc measures can usually be provided."

See Figure 6.

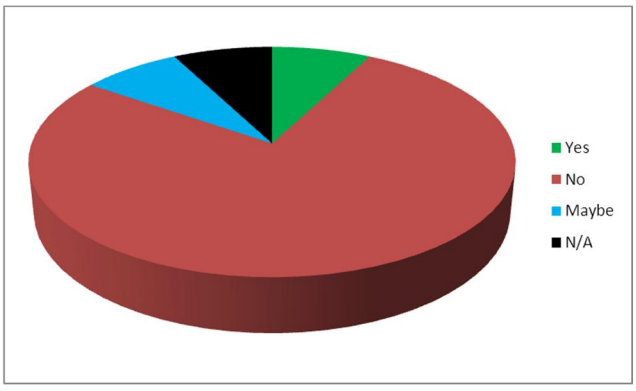

Figure 6 – Question 4b responses

Q5 - Is there sufficient supportive information associated with the design of facilities for means of escape for disabled people within AD B?

The majority response was 'no', reflected in the following statements.

- "Much more needs to be done to educate designers about the wide range of needs that arise."
- "Definitely not. The world needs much more practical guidance on managing evacuation of disabled people."

See Figure 7.

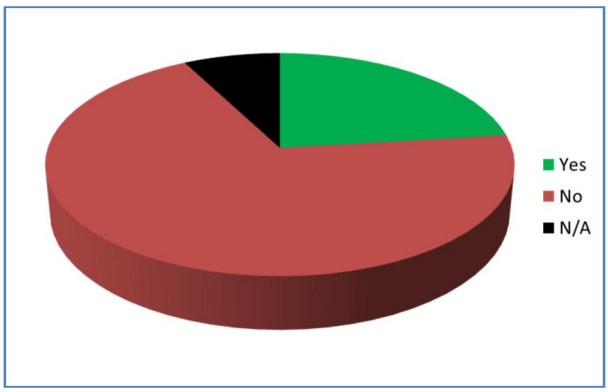

Figure 7 – Question 5 responses

Q6 - Do you consider that the same provisions should be provided for downward vertical escape (from buildings above ground floor) as upward vertical escape (from basements)?

The response was yes and no, reflected in the following statements.

- 'Yes'. "We seem to have forgotten that accessibility is not just about getting people into buildings: the same priorities must be given to getting people out safely and in a dignified manner."
- 'Yes'. "In my experience the same number of people and required strength are needed in each case where no facilities are provided. However equipment could be specific to the task."
- 'No'. "There are extra difficulties involved in manually moving persons up stairs which need to be thought about…..This has been a long standing omission (e.g. not talked about in the HMG FRA guide)."
- 'No'. "Arguably, upward evacuation is more important, especially from windowless accommodation below ground level."

See Figure 8.

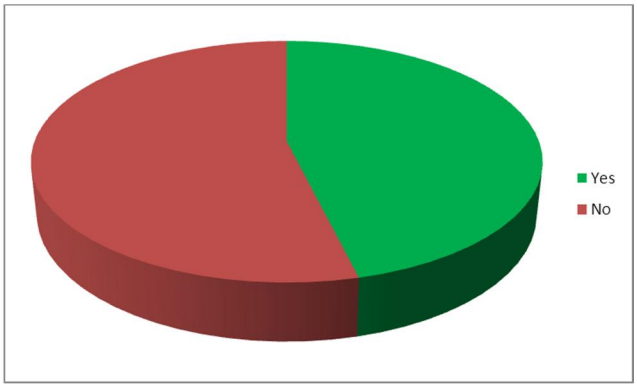

Figure 8 – Question 6 responses

Q7a - When designing means of escape for disabled people have you always been able to follow the guidance of AD B?

The majority response was 'no', reflected in the following statements.

- 'No' "Sometimes we have to do more when we know that the end user won't be able to cope with just refuges and evacuation chairs."
- 'No' "…..designers who are able to follow the recommendations often fail to identify the need to make adequate escape provisions. For example, where the building dimensions require alternative MOE then alternative MOE should also be provided for disabled people."

See Figure 9.

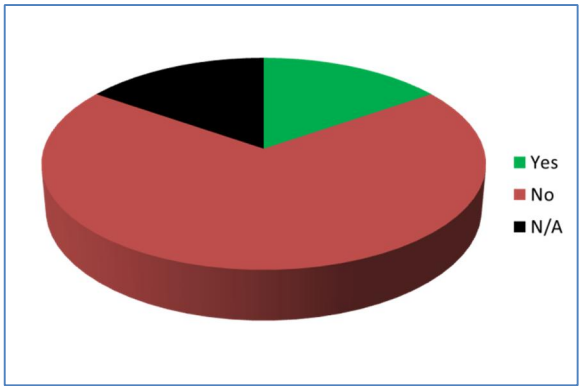

Figure 9 – Question 7a responses

Q7b If 'No' what alternative solution did you implement to comply with the Building Regulations?

- "The issue of lone-working involving people with certain disabilities also needs to be addressed on occasions."
- "I have looked to seek guidance from DD 9999 (now BS 9999) also any disabled groups that have had a vested interest in the scheme."

See Figure 10.

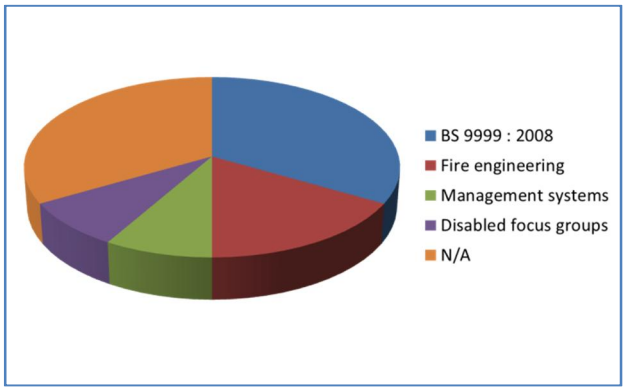

Figure 10 – Question 7b responses

Q8 - In occupied buildings has sufficient fire safety design information been provided relating to the facilities for means of escape for disabled people to enable robust fire safety management of the building?

The majority response was 'no', reflected in the following statements.

- "…....FM's are not well equipped in organising this in terms of knowledge or equipment and too little thought is given to this at design stage. Passenger lifts are very rarely designed to evacuation standards……, because the outlay for the additional features to the lift would be incurred in the front end development cost, it rarely happens unless the occupant is already known and consulted on the design."
- "…....the construction industry is currently engaged in a race to the bottom fuelled by the desire to build (and approve) for the least cost."
- "……management are not aware of the fire safety design that is in place. Often the strategy has not been passed from design team to end user."

See Figure 11.

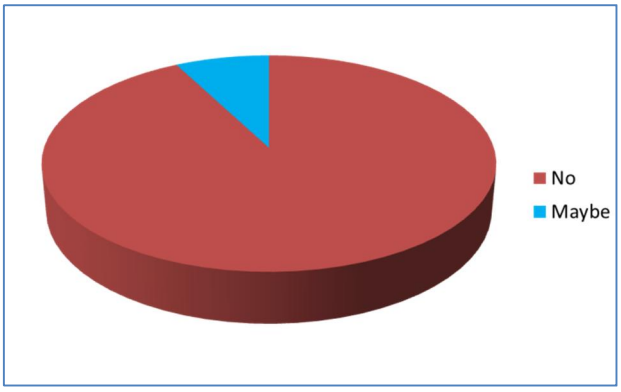

Figure 11 – Question 8 responses

Q9 - Within existing buildings, where provided, are the means of escape provisions for disabled people suitable and sufficient for the building population?

The majority response was 'No', reflected in the following comments:

- 'No' "Existing buildings that have been retrofitted to allow access by disabled people are often the worst culprits: hotels, schools, colleges, local authority buildings, to name but a few."
- 'No'……generally not for buildings where you would expect a higher than normal number of disabled persons to be present…… With one evacuation chair it will take about 30 minutes to get 6 disabled persons out of a typical medium rise office building. Developers and Design & Build Contractors are only interested (generally) in doing the absolute minimum to secure Building Regulations approval."
- 'Maybe' "We have come across both situations, quite often it's the provision to get the persons into the building that are in place, however without the forward thinking to get them out in an emergency is the issue."

See Figure 12.

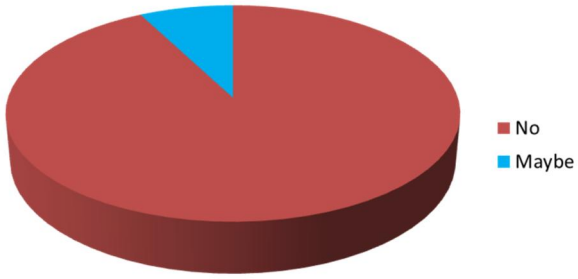

Figure 12 – Question 9 responses

Q10 - When undertaking fire drills do you fully test/ utilise all the facilities for means of escape for disabled people?

The response was inconclusive, reflected by the following statement.

- "This seems to vary enormously depending on the knowledge of individual managers or the organisation, the size of the building and the nature of occupancy. Installation and testing of communication devices in refuges and maintenance of equipment is usually in place in larger buildings and organisations but the management processes for using these refuges are often lacking. It is generally recommended that disabled people are involved in the arrangements including drills – however this is with the understandable exception of manual carry down or up on stairways, the risk of which is unacceptably high for a non-emergency situation."

See Figure 13.

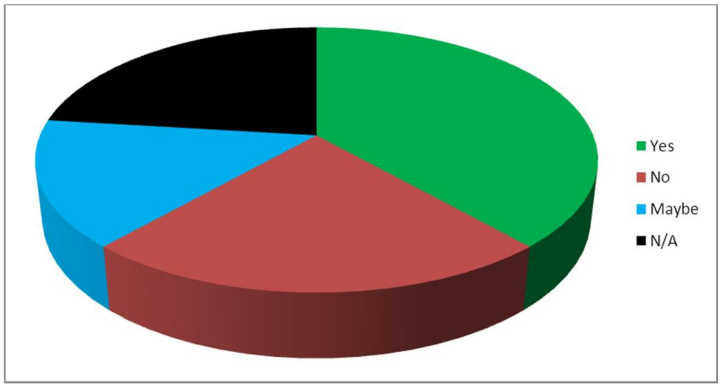

Figure 13 – Question 10 responses

Q11 - Through the development of a Personal Emergency Evacuation Plan (PEEP) have you had to provide additional physical provisions to support the means of escape for the disabled person?

The responses were evenly split between 'Yes' and 'No', as reflected in the following statements.

- 'Yes'. "Motorised and manual carry up/down devices, (as well as technology and training e.g. 2-3 person lifts, transfer aids, portable communication devices)"
- 'No'. "Only management procedures have been set in place. Absolutely pointless if the appointed 'buddy' is at lunch or on holiday. In twenty years of working in the field of accessibility, I have never known an organisation to invest in means of escape for disabled people. It is one of those areas that is viewed as unnecessary."

See Figure 14.

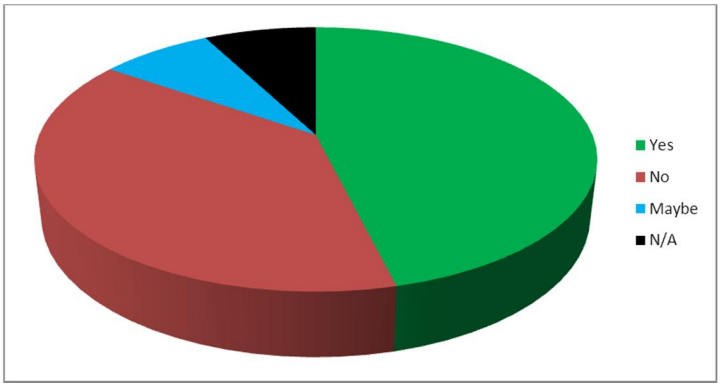

Figure 14 – Question 11 responses

Q12a - Have you been involved in an Emergency Evacuation of a building where the means of escape for disabled people were used?

The responses were evenly split between 'Yes' and 'No', with one responder expanding as follows.

- ‘Yes’. “Several times. Refuge areas with a live video feed to the security control room; hands free two way communication; evacuation lifts with back up generator or UPS; radio paging systems linked to the fire panel.”

See Figure 15.

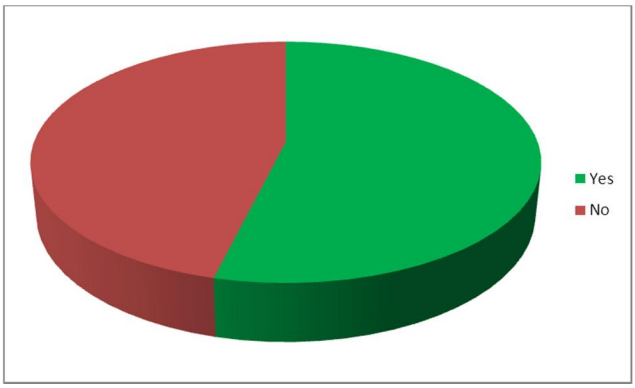

Figure 15 – Question 12a responses

Q12b - If ‘Yes’ were the provisions suitable or sufficient?

The responses to the follow-up question were more ‘Yes’ than ‘No’, with some responders expanding as follows.

- ‘Yes’. “Reassuring when the investment is made and the provisions are maintained properly.”
- ‘No’. “Not always. It was at a place of work and turned out to be a false alarm. One of the refuge communication devices failed to work. I am aware of clients who had insufficient space in a refuge, evacuation chairs not being maintained and operatives forgetting how to use them.”

See Figure 16.

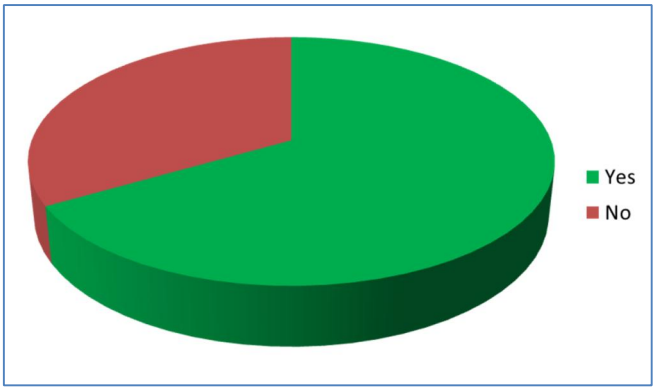

Figure 16 – Question 12b responses

2.3 Literature review

2.3.1 Methodology

The literature review involved: a review of prevalence of disability including mobility impairment, access aids, facilities and compliance with existing guidance and a review of anthropometric data and the sizes of wheelchairs.

There is a significant lack of current ergonomic data on body shapes and sizes together with trends, previous data relates back to studies conducted on accessibility of cash points.

The following guidance documents were reviewed during this study:

- CIBSE Guide E Fire Safety Engineering, Chapter 4, Means of escape and human factors [9]
- Approved Document M Access to and use of buildings, 2004 edition [4]
- BS 5588-8:1999 Means of escape for disabled people. Code of Practice. [2]
- Approved Document B Volume 2 (Buildings other than dwelling houses), 2006 [1]
- BS 9999:2008, Code of Practice for fire safety in the design management and use of buildings, in particular BS 9999 section 46: Evacuation of disabled people, and BS 9999 Annex G: Recommendations for refuges and evacuation lifts [3]
- Scottish Technical Standards 2 (Fire), 2010 [10].

Information on evacuation chairs was obtained from the websites of several manufacturers [11, 12, 13]. This information is supplied to provide illustrative data, and does not represent endorsement of the products by BRE or by DCLG.

2.3.2 Findings of literature review

The key findings of the literature review of the guidance documents listed above are as follows:

- The degree of information contained in the various documents is not consistent, both in content or quantity, in the information provided to assist in design of means of escape for disabled people.
- Corridor widths – difference between Approved Document M (minimum 1200mm, preferred 1800mm) and Approved Document B (minimum 750mm with a maximum of 60 people, preferred 850mm with a maximum of 110 people), BS 9999 (minimum 1200mm minimum).
- AD M recommends manually opened doors require a corridor 300mm wider than the door being accessed.
- Minimum stair widths 1000mm in AD B, 1200mm in AD M (and BS 9999).
- Evacuation lifts are fine to use; other types may also be used as well.
- The different guidance documents consider different building requirements, AD B Escape and Egress, AD M Access and Inclusivity. BS 9999 considers life safety with an appreciation of the access and inclusivity requirements for buildings.

- Within England, standard refuge dimensions of 900mm by 1400mm are consistent throughout all guidance documents.
- Sample of 130 wheelchairs: maximum dimensions 1150mm wide by 1900mm long (greater than refuge size). Typical size ~ 700mm wide by 1050mm long.
- Sample of 15 baby buggies (double width): median dimensions 750mm wide by 810mm long.
- Sample of 15 “pavement” style mobility scooters had median length of 1200mm.
- Compare these dimensions with those of a BS 5568:1978 [14] (referred to by BS 5588-8) for a type A folding wheelchair which has a width of 660mm and length 1065mm.
- BS 8300 [15] (referred to by AD M and BS 9999) also has a survey of mobility aid dimensions, turning circles etc. which is not consistent with other guidance, such as a conflict regarding wheelchair turning circle requirements with AD M.

The full details of the survey of mobility aids, conducted as a part of this work, are shown in Tables 1 to 3.

Table 1 - Dimensions of wheelchairs

	Wheelchair type				
	Transit	**Self-propelled**	**Bariatric**	**Tilt/recline**	**Electric**
Sample size	37	44	15	8	26
	Width (all dimensions in cm)				
Maximum	76	95	115	80	66
Minimum	43	42	66	66	47
Median	62.0	65.5	69.0	69.0	62.0
Mean	60.5	64.8	73.1	70.3	61.3
Standard deviation	5.8	7.5	11.9	4.3	4.2
80% fractile	63	68.4	73	71	65
90% fractile	64.8	71	74.8	73.7	66
	Length (all dimensions in cm)				
Maximum	115	190	115	190	122
Minimum	53	73	71	95	76
Median	93.0	105.0	93.0	107.0	104.5
Mean	93.8	104.8	98.3	120.6	103.3
Standard deviation	11.9	15.2	12.7	30.0	9.9
80% fractile	100	107.4	114	126.6	110
90% fractile	107.8	109	114.6	147.3	114

Table 2 - Dimensions of other walking aids

	Walking aid		Baby buggy		Mobility scooter	
	Rollator	**Tri-walker**	**Single**	**Double**	**Travel mobility**	**Pavement scooter**
Sample size	4	3	6	11	31	15
	Width (all dimensions in cm)					
Maximum	62	68	49	78	60	65
Minimum	61	61	47	59	43	46
Median	62.0	68.0	48.0	75.0	54.0	58.0
Mean	61.8	65.7	48.2	72.7	52.8	57.5
Standard deviation	0.5	4.0	0.8	6.0	4.2	4.5
80% fractile	62	68	49	76	56	60
90% fractile	62	68	49	77	57	62.4
	Length (all dimensions in cm)					
Maximum	74	57	80	115	118	130
Minimum	60	56	56	61	91	117
Median	67.0	57.0	59.0	81.0	102.0	120.0
Mean	67.0	56.7	62.3	87.3	102.3	121.5
Standard deviation	5.7	0.6	8.8	20.1	5.7	4.2
80% fractile	69.8	57	61	107	105	125.2
90% fractile	71.9	57	70.5	111.4	105	126.6

Table 3 - Turning circle of mobility scooters

	Mobility scooter	
	Travel mobility	**Pavement scooter**
Sample size	14	9
	Turning circle (all dimensions in cm)	
Maximum	180	180
Minimum	81	107
Median	108.0	133.0
Mean	108.2	134.6
Standard deviation	23.6	23.4

2.4 Risk cost benefit analysis of alternative evacuation solutions

A cost analysis (rather than a cost-benefit analysis) was carried out and the current AD B provision considered and compared with potential additional measures that may be incorporated into a building to provide greater benefit for disabled building users. The focus was on a cost analysis due to the very low number of lives lost in non-residential buildings and thus the financial benefits of any risk reductions are likely to be small compared to differences in the costs of different approaches.

2.4.1 Evacuation solutions and building types

The cost analysis was carried out for different evacuation solutions and for different building types. This was a theoretical approach, to provide illustrative data. It was not possible to examine every conceivable option. For example, in a building where the standard passenger lifts were in an open-plan atrium (rather than in a separate fire compartment), the cost of enclosing these in fire-resisting construction was not considered.

The five evacuation solutions were the provision of:

- A fully compliant evacuation lift, as per BS 5588: Part 8 [2].
- A fire-fighting lift, as per BS 5588: Part 5 [16].
- A “lift of beneficial use”; this lift arrangement will include separate and remote cabling, and additional lift controls to allow the use of a lift during a fire event within a building. DCLG guidance on the use of lifts for emergency evacuation [17] suggests that consideration should be given to the need for a duplicate (resilient and redundant) power supply. However for the purposes of this study the duplicate power supply was not included (so as to provide a better indication of the range of costs of different types of lift).
- A standard passenger lift, with fire resisting lobby provision at each floor.

- Suitable evacuation aids (evacuation chair) for a single stair; this arrangement will include sufficient trained staff (see section 2.4.5) to operate the evacuation aid, providing cover for sickness, holidays, etc.

Three mobility aids (evacuation chairs) were considered

- Evacuation transit chair requiring two to three people to assist one wheelchair user downstairs
- Evacuation chair requiring one person to assist one wheelchair user downstairs
- Powered evacuation chair requiring one person to assist one wheelchair user either up or down stairs.

The building types/heights were:

- Two storeys above ground (i.e. a ground floor and a first floor)
- Five storeys above ground (i.e. a ground floor and floors 1 – 4)
- Two storeys below ground and three above ground (i.e. a ground floor and floors 1 – 2).

These example buildings have been chosen as typical of those for which AD B guidance might be followed.

2.4.2 Assumptions for the cost analysis

The assumptions are as follows:

- The building will be new construction.
- The building will be commercial in purpose; no specific purpose group will be assigned to the building.
- The building will be open to the public, however, no public access will be granted unless the building is staffed.
- The assessments will consider a life of 25 years (typical value for lift systems), and will consider initial capital investment costs only. Lift maintenance costs were not included, as it was considered that maintenance costs would be similar for standard passenger lifts, or alternatives suitable for use in evacuation.
- The storey height will be between 3 m ~ 3.4 m.

2.4.3 Summary of cost analysis examples

The cost analysis examples are summarised in Table 4.

Table 4 – Summary of cost analysis examples

Example	Facility	Two above ground storeys	Five above ground storeys	Two below ground and three above ground storeys
1	Evacuation lift	✓	✓	✓
2	Fire fighting lift	✓	✓	✓
3	Lift of beneficial use	✓	✓	✓
4	Standard passenger lift with fire resisting lobby on each floor	✓	✓	✓
5a	Evacuation transit chair	✓	✓	
5b	Evacuation chair	✓	✓	
5c	Powered evacuation chair			✓

2.4.4 Estimating costs for different lift systems

The different specifications for the lift systems require different components. The costs of each of these components is estimated, and added to give a total for the overall lift system. As many of the costs have uncertainty associated with them, Monte Carlo techniques have been used to estimate the distribution of overall costs.

In the case of providing duplicate power supplies, the uncertainty in this factor was so large it would have dominated all other sources. A sensitivity analysis was used instead to account for the uncertainty in this factor.

The components required by each of the different lift systems are shown in Table 5.

Table 5 – Components of lift systems

Component	Fire-fighting lift	Evacuation lift	"Beneficial use" lift	Standard lift + lobby
Lift car	✓	✓	✓	✓
Fire-fighting shaft – ventilation	✓			
Fire-fighting shaft – dry riser	✓			
Lobby	✓	✓		✓
Enhanced FR fire door	✓			
Communications system	✓	✓		
Water drainage	✓			
Backup power supply	✓	✓		
Separate and remote cabling	✓	✓	✓	
Lighting and signage	✓	✓	✓	✓
Control switches	✓	✓	✓	
Management training	✓	✓	✓	✓

The costs of the system components are mainly derived from Spon's Architects and Builders Guide 2012 [18]. Spon's prices needed to be converted to 2013 prices.

Additional information was provided by a NIST report on the Economics of Egress Alternatives [19]. This report was published in September 2010, so the NIST report prices needed to be converted to pounds sterling and to 2013 prices [20].

Some information on the cost of fire-fighting shafts came from a BRE report for CLG [21] which was published in March 2006. As Spon's price index for Quarter 1 2006 was the same as the average price index for 2013, no uprating of these prices was necessary.

All the following costs are quoted in current (2013) prices.

2.4.4.1 Lift cars

The cost of an eight-man lift, given by Spon's Guide, is in the range £52,850 - £71,900.

2.4.4.2 Ventilation

For storeys above ground, windows may be used for ventilation of a fire-fighting shaft. The windows should have an area of 1.5m^2 per storey. The cost of windows, given by [21], is £300 per storey.

For storeys below ground, it is necessary to provide a smoke shaft, with a cross-sectional area of 3m x 3m. This shaft needs to be of fire-resisting construction. Spon's Guide gives a cost for "shaftwall" in the range £60 - £78 per m^2. For each m of building height, the cost is in the range £720 - £940.

The smoke shaft takes up a fraction of the building area, which cannot be used for lettable space. This would lead to a loss of rental income over the building lifetime, of approximately £300 per m^2 per year [21]. Alternatively, the building footprint could be increased (with additional construction cost) in order to achieve the same lettable space as if the shaft were not present. The additional construction cost is in the range £775 - £1,750 per m^2 (see Table 6).

2.4.4.3 Dry riser

Fire-fighting shafts require a dry riser; the cost, given by Spon's Guide [18], is £8,450 per riser (regardless of height).

Example costs for dry rising mains of greater heights from one contractor were provided to BRE by a Satellite Steering Group C member [22]:

- 20 m = £9,000.00
- 30 m = £12,000.00
- 40 m = £16,000.00
- 50 m = £20,000.00

It is not clear if these costs cover "as fitted", or supply only. However, this information is only included for completeness; it was not used in the cost analysis study as all the example buildings considered were of lower heights.

2.4.4.4 Lobby

A fire-fighting lift would require a lobby, of minimum size 2.5m x 2m. It has been assumed that lobbies for other types of lift would be the same size. Half of the perimeter would need to be of fire-resisting construction (the other half assumed to be lift shaft or external walls, which are already accounted for in the overall cost). Spon's Guide gives a cost for "shaftwall" in the range £60 - £78 per m^2. For each m of building height, the cost is in the range £270 - £350.

The lobby takes up a fraction of the building area, which cannot be used for lettable space. As above, this could either lead to a loss of rental income amounting to £300 per m^2 per year, or increased construction costs in the range £775 - £1,750 per m^2 (see Table 6).

2.4.4.5 Enhanced resistance fire door

For a fire-fighting lift, the fire door to the lobby requires an extended fire resistance period of 1 hour. Spon's Guide gives a cost for such a door, in the range £1,050 - £1,600.

2.4.4.6 Communications system

Costs specific to lift communication systems were not found. Spon's Guide [18] gives a cost for other forms of communication system (e.g. PA system), in the range £6,650 - £20,100.

2.4.4.7 Water drainage

In order to prevent ingress of water into the lift shaft, a drainage system is required. The NIST report [19] gives the cost as £900 per storey.

2.4.4.8 Backup power supply

Different options for backup power were given in Spon's Guide, ranging from an Uninterruptible Power Supply (UPS) in a healthcare occupancy, to a full duplicate power system. The costs ranged from £34,350 - £148,000.

2.4.4.9 Separate and remote cabling

An alternative, or additional, means to ensure continuity of power to the lift is to provide additional cabling, remote from the primary circuits. The NIST report estimated this cost at £225 per lift.

2.4.4.10 Lighting and signs

All lifts would require emergency lighting, and signs indicating whether and how they could be used in an emergency. From the NIST report, the cost was estimated at £3,300 per storey.

2.4.4.11 Control switches

A cost estimate for control systems could not be found. It was therefore decided to neglect this component on the grounds that the cost would only be a small fraction of the overall total.

2.4.4.12 Construction costs

Some of the lift system components lead to a reduction in lettable floor space. This may be compensated by constructing the building with a larger footprint. The general construction costs of different building types are shown in Table 6. The data come from Spon's Guide, with costs given in 2013 prices. This data can be used to estimate the cost of increasing the overall building footprint in order to compensate for one or more additional lift shafts, lobbies, etc.

Table 6 - General construction cost, per m^2

Spon's Uniclass D3 Administrative and Commercial Building type	Construction cost (2013) per m^2	
	From	To
Civic offices, not air-con	£1,136	£1,453
Civic offices, with air-con	£1,374	£1,744
Office for letting (low-rise)	£1,136	£1,453
Office for occupation (low-rise)	£1,242	£1,559
Business park, functional, < 2,000 m^2	£835	£1,046
Business park, functional, > 2,000 m^2	£772	£962
Business park, medium quality, no air-con, < 2,000 m^2	£1,015	£1,268
Business park, medium quality, no air-con, > 2,000 m^2	£930	£1,163
Business park, medium quality, with air-con, < 2,000 m^2	£1,110	£1,401
Business park, medium quality, with air-con, > 2,000 m^2	£1,015	£1,268
Business park, good quality, natural vent, < 2,000 m^2	£1,015	£1,268
Business park, good quality, natural vent, > 2,000 m^2	£972	£1,216
Business park, high quality, with air-con, < 2,000 m^2	£1,242	£1,559
Business park, high quality, with air-con, > 2,000 m^2	£1,189	£1,506
Two-storey ancillary office	£877	£1,110
Range (min to max)	£772	£1,744

2.4.4.13 Management training

Regardless of the type of lift used for evacuation, there would be a requirement for someone to manage the process. That person, plus a deputy, would require training. It has been assumed that this would equate to one man-day per year (including refresher training) over the 25-year lifetime of the lift. The cost of this would mainly be due to the staff time of the persons involved. The principles behind the valuation of staff time are discussed in greater depth in the next section. As the staff involved would probably be of a more senior grade than those being trained to operate evacuation chairs, a higher charge rate of between £27 and £75 per man-hour has been used [23], i.e. £203 to £563 per man-day. The Present Value Whole Life Cost of this training over 25 years is calculated to be £6,400 ± £1,800, using a discount rate of 3.5%.

2.4.5 Estimating costs for different evacuation chairs

A number of manufacturers' websites [24, 25, 26] have been used to provide cost estimates for different types of evacuation chairs. This information is supplied to provide illustrative data, and does not represent endorsement of the products by BRE or by DCLG.

The range of prices (all inclusive of VAT) was as follows:

a) Evacuation transit chair requiring two to three people to assist one wheelchair user downstairs: price range £170 - £550 (a bariatric transit chair was £2,350)

b) Evacuation chair requiring one person to assist one wheelchair user downstairs: price range £580 - £2,035

c) Powered evacuation chair requiring one person to assist one wheelchair user either up or down stairs: price range £4,275 - £11,470.

The larger (and more expensive) powered evacuation chairs are capable of transporting a person while they remain in their own wheelchair. This has the advantage that the person retains mobility when they reach ground level.

The design life of all chairs has been assumed to be 10 years (this assumption is corroborated by a number of supplier's websites [27, 28]), thus new chairs are assumed to be purchased 10 and 20 years after the initial chair. The Present Value of the Whole Life Cost (for a 25-year period, the same as in the lift cost analysis) is 2.2 times the initial purchase cost.

A training course in the use of chairs, provided at an employers' workplace for four to six trainees, would typically cost between £500 and £1,000. Such a course would typically last a few hours (assumed to be three hours), after which the delegates would be sufficiently well-trained to be able to provide further training in-house. A one hour refresher training course is assumed to be required every year (or every 6 months in the case of powered evacuation chairs) [29].

The time spent by delegates attending the initial and refresher training courses also represents a cost associated with the provision of chairs. Advice from DCLG [30] was to follow the approach of valuing time that was adopted in a recent Regulatory Impact Assessment [23]. That document stated:

"The EC Harris database has been previously used as a source of evidence on the cost for workers in the construction industry. This reflects the value by the market of a professional including wage, on costs and other business costs to the organisation and is the rate a firm would charge someone else per hour of an individual's time. This approach is widely used in the construction industry. However, more generally in impact assessments the Annual Survey of Hours and Earnings (ASHE) forms the basis to estimate the cost of someone's time (plus an additional estimate of 30% for additional overheads such as pension contributions and national insurance contributions).

We (DCLG) believe that neither approach is entirely satisfactory – the former potentially overestimates the cost of labour (not least because an individual will not be able to charge 100% of their time out at this charge out rate) and the latter undervalues the opportunity cost of being engaged in non-productive familiarisation (ie the lost income when someone is employed in non-income generating work). We have therefore assumed an hourly rate half way between the EC Harris industry estimate and the ASHE plus 30% approach. This method has been used in previous impact assessments and is consistently used to estimate the value of time savings throughout this impact assessment."

In the year to April 2013, according to the Annual Survey of Hours and Earnings (ASHE), the average annual wage of full-time workers in the UK was £27,000 [31]. Assuming full-time employment equates to 220 working days of 7.5 hours each per year, the cost per man hour for delegates to attend a course would on average be £16. With the addition of a 30% overhead the hourly cost rises to £21.

The EC Harris database referred to above only relates to the charge-out rates of construction professionals, and would not necessarily reflect the situation of a generic non-residential building. However, where the RIA document quotes specific hourly rates, it was noted that the EC Harris values were generally 3 times higher than the "ASHE+30%" values. Hence, if the salary-related cost was £21 per hour (above), the charge out rate would be £64 (both values rounded to nearest £1). The mid-point hourly rate is therefore £42.50.

If it is assumed that an evacuation transit chair requires a total of six people to be trained (to allow sufficient cover for absences), and the other chairs require three operators to be trained at any one time, the initial training costs are £765 and £382, respectively, in addition to the cost of the course. . The whole life costs of the refresher training would be £4,093 for evacuation transit and powered evacuation chairs, and £2,046 for non-powered evacuation chairs.

Maintenance costs for chairs (other than replacement at the end of the 10-year design lifetime) have not been included. Such costs have been assumed to be small.

2.4.6 Results of cost analysis

The results of the cost analysis for lifts are presented in Table 7. The uncertainty is quoted as ± one standard deviation.

Table 7 - Costs of lift installations in different example buildings

Building example	Fire-fighting lift	Evacuation lift	"Beneficial" lift	Normal lift + lobby
Building 1 (2 storeys above ground)	£151k ± £7k £265k ± £7k	£138k± £7k £251k ± £7k	£76k ± £6k	£90k ± £6k
Building 2 (5 storeys above ground)	£191k ± £10k £304k ± £10k	£169k ± £10k £284k ± £10k	£86k ± £6k	£122k ± £9k
Building 3 (2 below, 3 above ground)	£207k ± £12k £322k ± £12k	£169k ± £10k £284k ± £10k	£86k ± £6k	£122k ± £9k

For the fire-fighting and evacuation lifts, sensitivity analysis has examined the effect of variation in the cost of providing a backup power supply. The two values shown in each cell of the table represent the lower and upper bounds of the range.

The costs of evacuation chairs over a 25-year period are calculated to be as follows:

a) Evacuation transit chair requiring two to three people to assist one wheelchair user downstairs: Present Value Whole Life Cost = £6,410 ± £1,477.

b) Evacuation chair requiring one person to assist one wheelchair user downstairs: Present Value Whole Life Cost = £5,014 ± £811.

c) Powered evacuation chair requiring one person to assist one wheelchair user either up or down stairs: Present Value Whole Life Cost = £20,221 ± £5,652.

The uncertainty is quoted as ± one standard deviation.

The costs presented above for lifts and evacuation chairs do not include the on-going costs for maintenance and should be considered as advisory and for information purposes only. These costs have been developed against a theoretical exemplar of a building rather than an actual building. The costs for the lift requirements have been developed against a theoretical stair within the building; the stair has no specified width, nor a specified configuration. The theoretical building only incorporates floor slabs, of unknown size, and does not include any additional features such as additional lifts and stair cores, degrees of compartmentation and fire separation or connecting voids such as atria. This theoretical approach has been considered in an attempt to remove as many building configuration influences as possible to ensure that the cost analysis is not considered as being biased.

Therefore, the costs that have been presented in this report are to provide a guide for the various options that could be implemented within a building to address the various evacuation requirements for disabled building users.

2.4.7 Conclusions of cost analysis

The cost analysis has produced a table of estimated costs to enable cost comparisons to be made to inform decisions on the provision of different evacuation solutions (different types of lifts or evacuation mobility aids) for new construction commercial buildings for three different building heights. These costs include appropriate capital and, where applicable, on-going training costs.

It is beyond the scope of this work to comment on the suitability, or otherwise, of evacuation solutions for specific situations.

3 Conclusions

The conclusions for this work stream are as follows:

- In the opinion of users, information provided in current guidance, AD B, is considered to be sufficient to provide minimum guidance to meet the Building Regulations. However, there is a general consensus that additional supporting information on the objectives behind the provision of disabled egress facilities and equipment would be considered beneficial to designers and users.
- Different guidance documents provide varying dimensions etc. for access and egress provisions within buildings. Designers and building users should make themselves aware of these differences and ensure that any building work undertaken satisfies all the relevant requirements of the Building Regulations.
- Based on the survey of sizes of wheelchairs and other mobility aids, the recommendations for the number and dimensions of disabled refuges in AD B would appear to be suitable for the majority of wheelchairs and building configurations.

- In the opinion of stakeholders, building designers (and design teams) do not generally fully consider the management implications of their design proposals for end users.
- In the opinion of stakeholders, Regulation 38 is not always fully complied with; Thereby, strategic fire safety design information is not readily available for building and facilities managers.

The cost analysis has produced a table of estimated costs to enable cost comparisons to be made to inform decisions on the provision of different evacuation solutions (different types of lifts or evacuation mobility aids) for new construction commercial buildings for three different building heights. These costs include appropriate capital and training costs. On-going maintenance costs have not been included.

4 Acknowledgements

The authors, James Lavender, Jeremy Fraser-Mitchell, David Charters and Corinne Williams, would particularly like to acknowledge the valuable contribution provided by members of Satellite Steering Group C and the overall Project Steering Group.

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Appendix A – Summary of the Research

Building Regulations Division, Department for Communities and Local Government (DCLG) commissioned BRE to carry out a project titled “Compartment sizes, resistance to fire and fire safety”. The main aim of this project is to produce robust evidence and data based on research, experimental fire testing, computer modelling and laboratory testing, where necessary, on a number of linked work streams in relation to fire safety and associated provisions in Schedule 1 of Part B of the Building Regulations 2010.

This Final work stream report describes the findings of the research for Work stream 7 – Means of escape for disabled people. The principal aim of this work stream was to produce robust evidence and data to explore whether the guidance in Approved Document B (AD B) for means of escape for disabled people is sufficient to promote and support safe evacuation (unassisted where necessary) and is fit-for-purpose, along with the levels of compliance that are currently achieved to fully understand the implications. This work stream also explored and examined alternative options other than detailed in AD B, based principally on available built in solutions (including their costs and risks) that could facilitate and aid means of escape.

The conclusions of this work stream are as follows:

- In the opinion of users, information provided in current guidance, AD B, is considered to be sufficient to provide minimum guidance to meet the Building Regulations. However, there is a general consensus that additional supporting information on the functional objectives behind the provision of disabled egress facilities and equipment would be considered beneficial to designers and users.
- Different guidance documents provide varying dimensions etc. for access and egress provisions within buildings. Designers and building users should make themselves aware of these differences and ensure that any building work undertaken satisfies all the relevant requirements of the Building Regulations.
- Based on the survey of sizes of wheelchairs and other mobility aids, the recommendations for the number and dimensions of disabled refuges in AD B would appear to be suitable for the majority of wheelchairs and building configurations.
- In the opinion of stakeholders, building designers (and design teams) do not generally fully consider the management implications of their design proposals for end users.
- In the opinion of stakeholders, Regulation 38 is not always fully complied with; Thereby, strategic fire safety design information is not readily available for building and facilities managers.
- The cost analysis has produced a table of estimated costs to enable cost comparisons to be made to inform decisions on the provision of different evacuation solutions (different types of lifts or evacuation mobility aids) for newly-constructed commercial buildings for three different building heights. These costs include appropriate capital and, where applicable, on-going maintenance and training costs.

Appendix B - Questionnaire

DCLG Project Compartment sizes, resistance to fire and fire safety

Work stream 7 – Means of escape for disabled people

Satellite Steering Group C Questionnaire

The following series of questions is designed to assist the research being undertaken in work stream 7 of the above project. Where identified, please provide ‘yes’ or ‘no’ answers together with brief summation of any relevant additional evidenced-based or anecdotal information in support of your answer. Where a ‘yes’ or ‘no’ answer is not required please provide the additional information. It is understood that some questions may not be directly relevant to your discipline, therefore please answer the questions that are appropriate to you.

Please can you provide your contact details below.

Although this is not required, it will enable us to contact you to further discuss your response, should the need arise.

Name:		Organisation:	
Telephone:		E-mail:	

Q1	When considering means of escape for disabled people which guidance do you primarily follow?			
Q2	Do you consult any other guidance for the design of means of escape provisions for disabled people?			
Q3	Do you consider the overall approach for disabled means of escape to be correct for buildings in AD B purpose group/s:	1a? (Flats)	Yes / No	
		2 – 7? (Other non-domestic buildings, e.g. offices, shops, warehouses)	Yes / No	
Q4	Is the guidance provided in AD B for disabled means of escape sufficient for AD B purpose group/s:	1a? (Flats)	Yes / No	
		2 – 7? (Other non-domestic buildings e.g. offices, shops, warehouses)	Yes / No	
Q5	Is there sufficient supportive information associated with the design of facilities for means of escape for disabled people within AD B?		Yes / No	
Q6	Do you consider that the same provisions should be provided for downward vertical escape (from buildings above ground floor) as upward vertical escape (from basements)?		Yes / No	

Q7	When designing means of escape for disabled people have you always been able to follow the guidance of AD B?	Yes / No	
	If 'No' what alternative solution did you implement to comply with the Building Regulations?		
Q8	In occupied buildings has sufficient fire safety design information been provided relating to the facilities for means of escape for disabled people to enable robust fire safety management of the building?	Yes / No	
Q9	Within existing buildings, where provided, are the means of escape provisions for disabled people suitable and sufficient for the building population?	Yes / No	
Q10	When undertaking fire drills do you fully test/ utilise all the facilities for means of escape for disabled people?	Yes/ No	
Q11	Through the development of a Personal Emergency Evacuation Plan (PEEP) have you had to provide additional physical provisions to support the means of escape for the disabled person?	Yes/ No	
Q12	Have you been involved in an Emergency Evacuation of a building where the means of escape for disabled people were used?	Yes/ No	
	If 'Yes' were the provisions suitable or sufficient?	Yes/ No	