



Ministry of Housing,
Communities &
Local Government

Technical Review of Approved Document B of the Building Regulations

Analysis of responses to the Call for Evidence



© Crown copyright, 2019

Copyright in the typographical arrangement rests with the Crown.

You may re-use this information (not including logos) free of charge in any format or medium, under the terms of the Open Government Licence. To view this licence visit <http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

This document/publication is also available on our website at www.gov.uk/mhclg

If you have any enquiries regarding this document/publication, complete the form at <http://forms.communities.gov.uk/> or write to us at:

Ministry of Housing, Communities and Local Government
Fry Building
2 Marsham Street
London
SW1P 4DF
Telephone: 030 3444 0000

For all our latest news and updates follow us on Twitter: <https://twitter.com/mhclg>

September 2019

Contents

Introduction	9
The report	10
Number of respondents and number of responses submitted by issue	10
General	11
The mode of change	11
The status of ADB	11
Flexibility vs prescription	11
Ease of use	11
Systematic review	12
Scope	13
Inclusion of property protection	13
Legislative support of building regulation objectives	14
Purpose groups	15
Refining purpose groups	15
The use of risk profiling	16
Guidance allied to purpose groups	16
Specialised housing and care homes	17
Specific guidance and added protection	17
The balance between fire safety and living needs	18
Evacuation plans and management	18

Compartmentation	19
Overview	19
Allowable compartment sizes	19
Standards of enclosure	20
Penetrations and bypasses	20
Cavity barriers	20
Places of special fire hazard and ancillary accommodation	21
Roofs	21
Other B3 issues	21
Space separation	23
Alignment with modern fire scenarios	23
Consideration of different building geometries and risks other than relevant boundaries	24
Isolation from wildfires	24
Trigger heights and thresholds	25
Housing Trigger Points	25
11m (external firefighting and means of escape)	26
18m (provision of firefighting shafts in residential buildings)	26
18m (non-combustible walling in certain residential buildings)	26
10 storeys (alignment between ADB and HRRB)	26
30m (sprinkler provision in flats)	27
50m (wet risers)	27
Very tall buildings (a trigger point for extra guidance)	27
Single stair allowances	27
Graduation of structural fire resistance	27
15m (roofs)	27

Basement depths	28
Compartment size maxima	28
Other approaches	28
Means of escape from blocks of flats	29
The Stay Put strategy	29
Strengthening the strategy	29
Understanding and managing the strategy	30
Means of escape within flat units	30
Sprinkler protection	30
Travel distances in common areas	31
Balcony approach	31
Fires in common areas	31
Fire doors	31
Smoke control – principles	32
Smoke control – methods and issues	32
The allowance of single stairs	32
Single stairs – limitation and / or extra protection	32
Stair / entrance design	33
Basement connections	33
Lifts	33
Upgrading of existing buildings	33
Means of escape for disabled people	34
The needs and concerns of disabled and vulnerable people and the widening accommodation demographic	34
Standards of protection	35
Reliable evacuation and management plans	35

The principle of safe and dignified evacuation	35
Evacuation lifts.	35
Requirement B1 - other issues	36
Age Distribution	37
The changing demographic	37
Effects on means of escape	38
Smoke and toxicity	39
Support for limitation of toxicity	39
Research needs	40
Construction Features	40
Sprinklers and other fire suppression systems	41
Wider requirements for sprinkler protection	41
Integration of sprinkler design allowances	42
Guidance on sprinklers and other fire suppression systems	42
Water supplies	42
Access and facilities for fireservices	43
Review of current external access requirements	43
Reach and penetration into large floor areas	43
Internal firefighting in taller buildings	44
Design guidance allied to firefighting techniques	44
Fire mains	44
Ease of entrance into buildings	44
Water for firefighting	45

Requirement B5: access and facilities for the fire service - other issues	46
Basements	47
Review of risks	47
A risk graduated approach	47
Firefighting	48
Connection with basements	48
Construction technologies and design	49
Updating	49
Modern Methods of Construction (MMC)	50
Construction Details	51
Quality issues	51
Third party and other industry accreditation schemes	52
Guidance	52
Other	53
External walls and other B4 matters	53
Requirement B4 - other issues	54
Internal linings	55
Car parks	56
Fire tests	56
Cables	56
Services	57
Management Guidance	57
Refurbishments	57

Skills and training	57
Enforcement resources and systems	57
Definitions and rules of measurement	57
General - other issues	58
Glossary	59

Introduction

1. In December 2018 the Government announced plans for implementing the Hackitt review recommendations to ensure that people who live in residential high-rise buildings are safe and feel safe, now and in the future. The programme of work included a clear commitment to facilitate better understanding of what is required to ensure buildings are safe through clearer standards.
2. Critical to improving building safety is the application of building regulations fire safety guidance in Approved Document B (ADB). In the summer of 2018, a clarified version of ADB was published for consultation, followed, in July 2019 by publication of a final clarified ADB.
3. We are also moving forward with the full technical review of the fire safety aspects of building regulations. The Call for Evidence, seeking views to help set the agenda, terms of reference and programme for the technical review, closed on 15 March 2019 and 140 detailed responses were received, including representations from professional and trade bodies with large memberships. We are grateful to all those who contributed.
4. Today we are publishing a high-level summary of responses to the Call for Evidence, which illustrates the breadth and complexity of the fire safety agenda. We are publishing this summary now to keep this important subject at the forefront of our minds. The analysis of the responses received in the Call for Evidence was commissioned by MHCLG and prepared by PRP and the Adroit Economics Consortium. The following report presents the summary produced by that analysis.
5. The desire for change is clear from the responses to the Call for Evidence – but there is also recognition of the need for research to ensure that any changes represent expert consensus based on a robust evidence base. Necessarily, this work will take some years to complete.
6. However, the Government recognises that there are issues that should be addressed more quickly, and we are committed to taking action where the case is clear. As we plan for the long-term delivery of this review, we will prioritise those issues affecting high-rise residential buildings.
7. The Government today is separately launching a consultation on changes to fire safety regulations for new-build blocks of flats. In that consultation, we seek to commit to requiring sprinkler systems as standard in a wider range of new flats. We also want to look at how we can require better signs and evacuation alert systems to support effective firefighting.
8. The Government will work with industry and the Building Regulations Advisory Committee to consider the full range of technical areas raised in the Call for Evidence and determine a detailed plan for taking this review forward.

The report

A noticeable feature of the consultation exercise was the large degree of commonality of viewpoint from respondents on many of the issues. A clear consensus existed for many themes.

The consultation focused on technical matters but responses included considerable non-technical observation. Much of this was in the nature of preamble expounding the need for review of ADB. However, there was also a large body of comment on varied aspects that run in strong alliance with the ongoing use of ADB.

Intertwined with the mainstream commentary, were many suggestions for minor amendments (of wording for instance). These are too numerous for inclusion in this summary.

The consultation document broached topics that were not discrete and most of the responses cover issues that overlap between topics. Some cross referencing is noted in this report.

Number of respondents and number of responses submitted by issue

- A total of 140 individuals/organisations responded to the consultation, submitting a total of 1,342 separate responses.

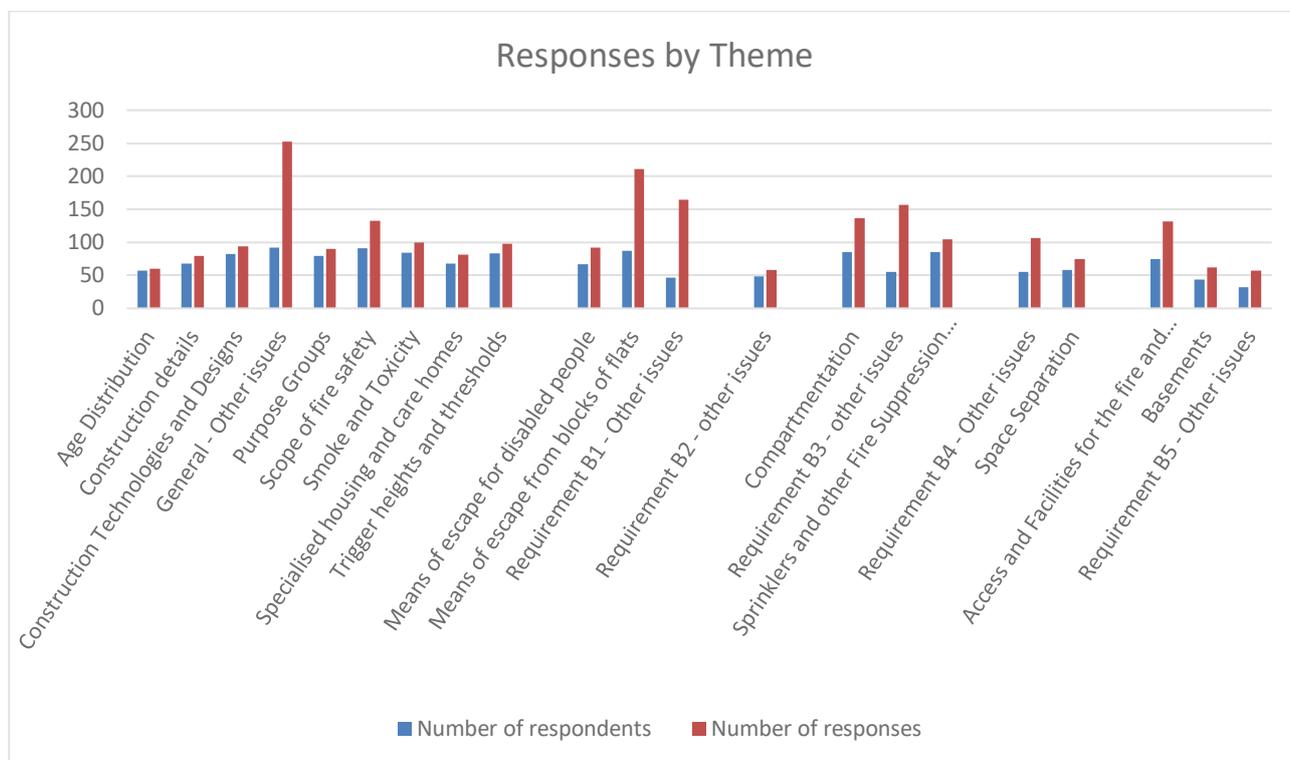


Figure 1: The number of respondents by type per theme and the number of responses by type of respondent per theme

General

The mode of change

Many respondents stressed the outstanding nature of the review and that therefore there is a desire for change. This was largely tempered by a realisation that there is a need for much research and that impacts, and the cost of change, could be large and need careful consideration. Accordingly, there were a number of suggestions for incremental amendment. Whatever pattern of change is to occur there was a perceived need for a clear published implementation programme.

The status of ADB

There were a few challenges of, and questions around, the status quo of ADB. At one extreme there was a view suggesting that ADB is unduly 'deregulatory' in that it allows too much freedom of choice to developers, contractors and designers. This viewpoint seeks total prescription.

However, there were a number of other comments that suggest that a correct understanding and use of ADB guidance in practice needs strengthening by including better introductory explanation and integrated aids in its use. This being intended to place its application into a competent framework and compliance trail, prevent misunderstandings of the guidance, reduce the amount of interpretation possible and avoid low standards due to misuse.

Flexibility vs prescription

The attributes of flexibility continue to be beneficial but there were a number of response threads that were not averse to, and some which actively encouraged, a more prescriptive approach being taken on certain matters. An example of this is the 'fabric first' concept of prescribing only non-combustible materials over a wide range of instances. It being postulated that this would safeguard on many fronts.

Ease of use

Respondents expressed a belief that the most efficient and consistent way of applying the safety benefits of ADB guidance is to make the content more readily understandable and easy to use and to target it more closely to particular building uses and typologies. Suggestions include the re-introduction of a core document (Manual), the placing of building specific guidance in individual sections (or documents), the introduction of flow charts to cover both the use of the guidance and attendant design, construction, inspection and verification processes.

It was felt that this will aid an inclusive understanding and safe application by users, whether experts or not, ADB being regarded as a public document available for use by all. There is however a contrary and isolated viewpoint, amongst some fire services, that ADB should only be used by experts.

Systematic review

There were many responses that called for a programme of frequent review of ADB and there were suggestions that a new format should be considered to enable ready updating and amendment.

Scope

A total of 91 individuals/organisations responded with regard to the scope of fire safety, submitting a total of 133 separate responses.

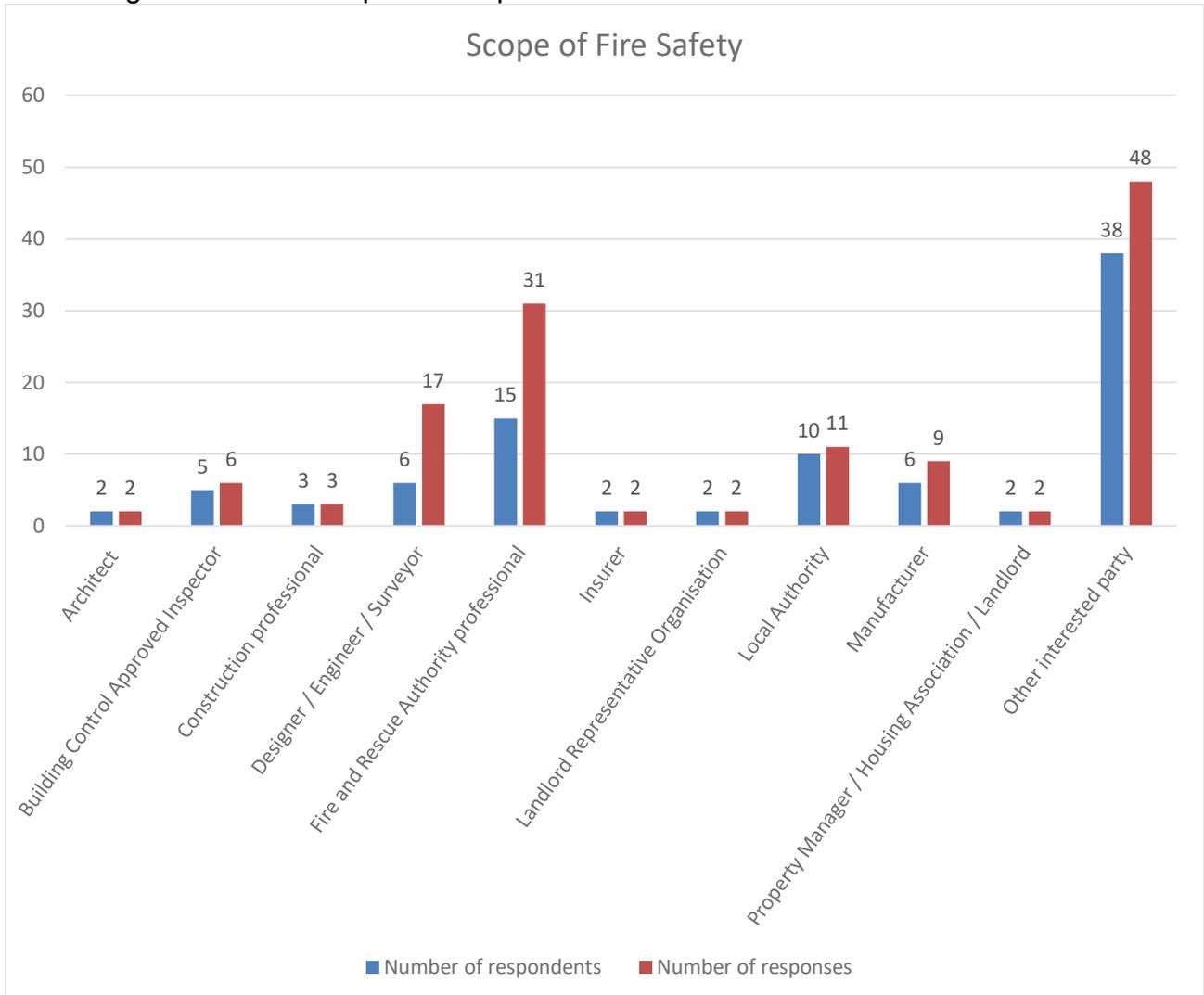


Figure 2: The number of respondents and the number of responses with regard to the scope of fire safety.

Inclusion of property protection

A large majority supported the principle of this inclusion across the board. This was on the following grounds:

- Protection of the nation’s built asset
- Helping to ensure business, employment and profit continuity
- Avoiding housing disruption and the decanting of residents
- Ensuring the continuity of social and public services, particularly health and education
- Sustainability/Climate Change considerations

- Prevention of pollution
- Avoiding remediation costs
- Prevention of unmanageable building fires

Within the range of these responses there was acknowledgement that an initial prime focus might be for housing and public buildings.

A very small number of respondents were against the concept. This was on the grounds that it is a matter that adequately sits within the power of building clients and their insurers. On this aspect it is noteworthy that respondents from the insurance industry favoured inclusion.

Amongst the support, some concerns were expressed regarding a possible difficulty in establishing and targeting appropriate standards to achieve the long-term benefit, that there might be a perceived over reliance on sprinklers and that certain building materials and techniques might become disadvantaged.

Legislative support of building regulation objectives

The consultation responses showed wide concern that other legislation is not sufficiently robust in respect of reliably securing water supplies for both firefighting and sprinkler protection. Both of which would be important components of property protection strategies, but which are also already vitally important for current Building Regulations and Building Safety initiatives/objectives. Most fire services and some other construction organisations expressed this concern.

Purpose groups

A total of 79 individuals/organisations responded with regard to purpose groups, submitting a total of 90 separate responses.

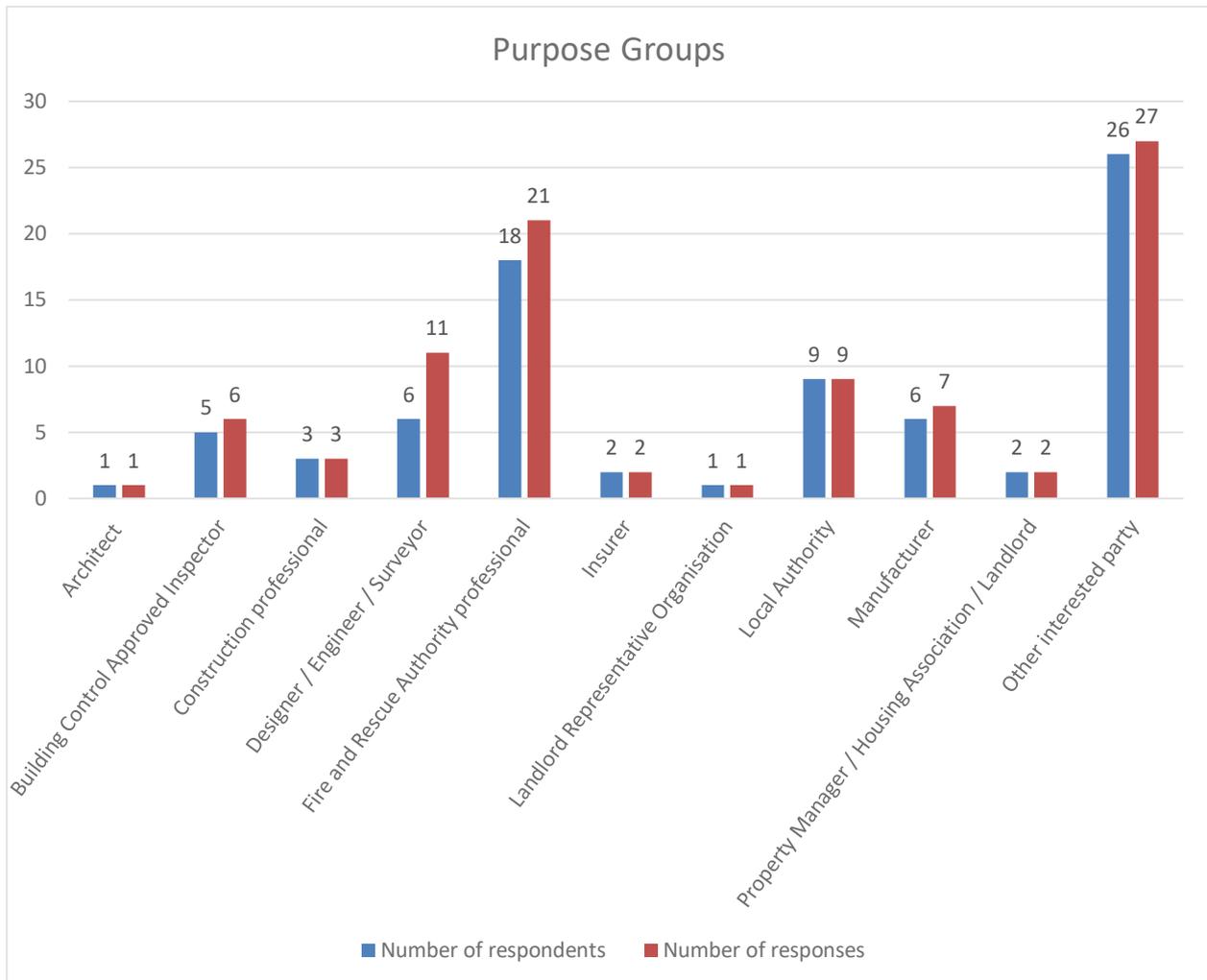


Figure 3: The number of respondents and the number of responses with regard to focus groups

Refining purpose groups

There was support for retaining purpose groups (PG) within their current overall form and mode of use, but all were of the opinion that there is benefit to be gained from them being refined in to units that are much more closely defined around the buildings particular use and risk features. Numerous examples were quoted that illustrate that some of the existing groupings are too wide, e.g. PG 5 (Assembly) and PG 7 (Storage and other non-residential). Respondents suggested that this was seen as creating a lack of focus on the particular use that may be contained within a too broad a grouping.

The use of risk profiling

Only a small number of respondents favoured a whole scale adoption of the BS9999 approach. Others were concerned that such a move might become over complicated without any real improvement being created. It was also noted that the BS9999 system is incomplete in that it neither accommodates the features embodied in residential building standards or provides a method tailored for disabled and vulnerable people.

However, there were various suggestions that a modified form of risk profiling could help support mainstream purpose groups by providing a graduated ranking within some of the wider PG (i.e. more refined than the current 'higher' or 'normal 'hazard rating).

Guidance allied to purpose groups

There was a very strong call for ADB guidance to be specifically sectionalised in support of respective PG or groupings of like PG. It was noted that the current standalone Institutional PG 2A has a complex definition but then has no, or next to none, guidance in the body of ADB.

A large number of respondents seek more extensive guidance for mixed use buildings.

Specialised housing and care homes

A total of 68 individuals/organisations responded on specialised housing and care homes, submitting a total of 81 separate responses.

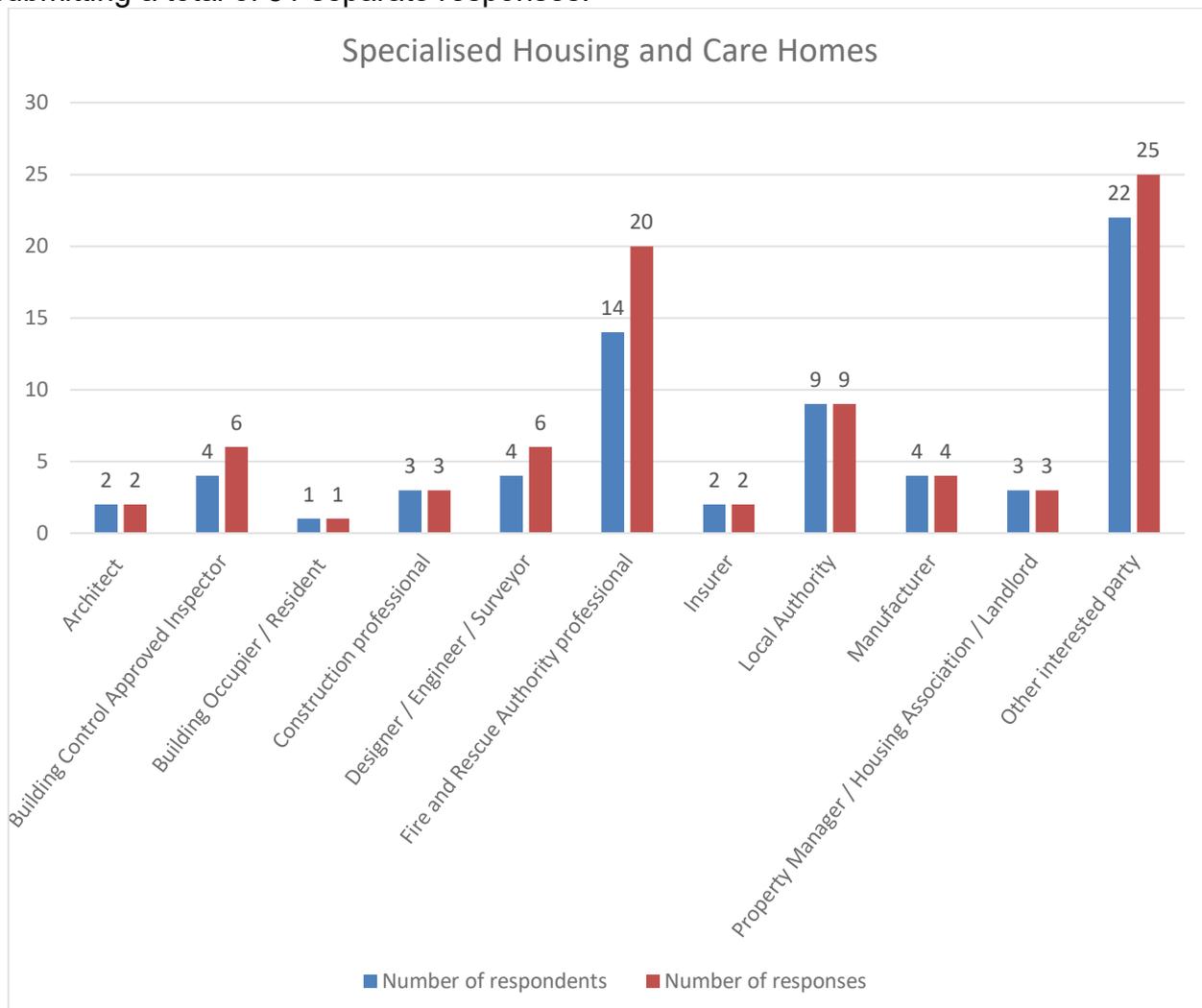


Figure 4: The number of respondents and the number of responses to the issues of specialised housing and care homes

This topic attracted a collective merge of commentary also spanning into trigger points, means of escape for disabled people and age distribution.

Specific guidance and added protection

Replies were in favour of review and for more and better specific guidance being included for these categories. Accompanying this was a consensus that this means added levels of protection, the foremost of which being the suggestion that all such premises should be required to have sprinkler protection and also that the combustibles ban should apply regardless of height. However, little else was articulated as to what actual standards are desirable. There were a number of mentions that there is guidance in BS9991, but this is seen as duly protective but also constraining on amenable living layouts.

The balance between fire safety and living needs

Within the replies there was recognition that carefully set holistic standards are required but the overall response leaves a void to be filled by further and full review.

There were only a few responses regarding the concept of extended lifetime living in houses apart from some mentions of PPP (Personal Protection Plans) in a general sense.

Evacuation plans and management

For this accommodation group, and most others, a large number of replies believe that ADB should include guidance that references appropriate management/ evacuation plans that give a clear steer across the interface between building design standards and the fire safety needs of the building in use.

Compartmentation

A total of 85 individuals/organisations responded to the issue of compartmentation, submitting a total of 136 separate responses.

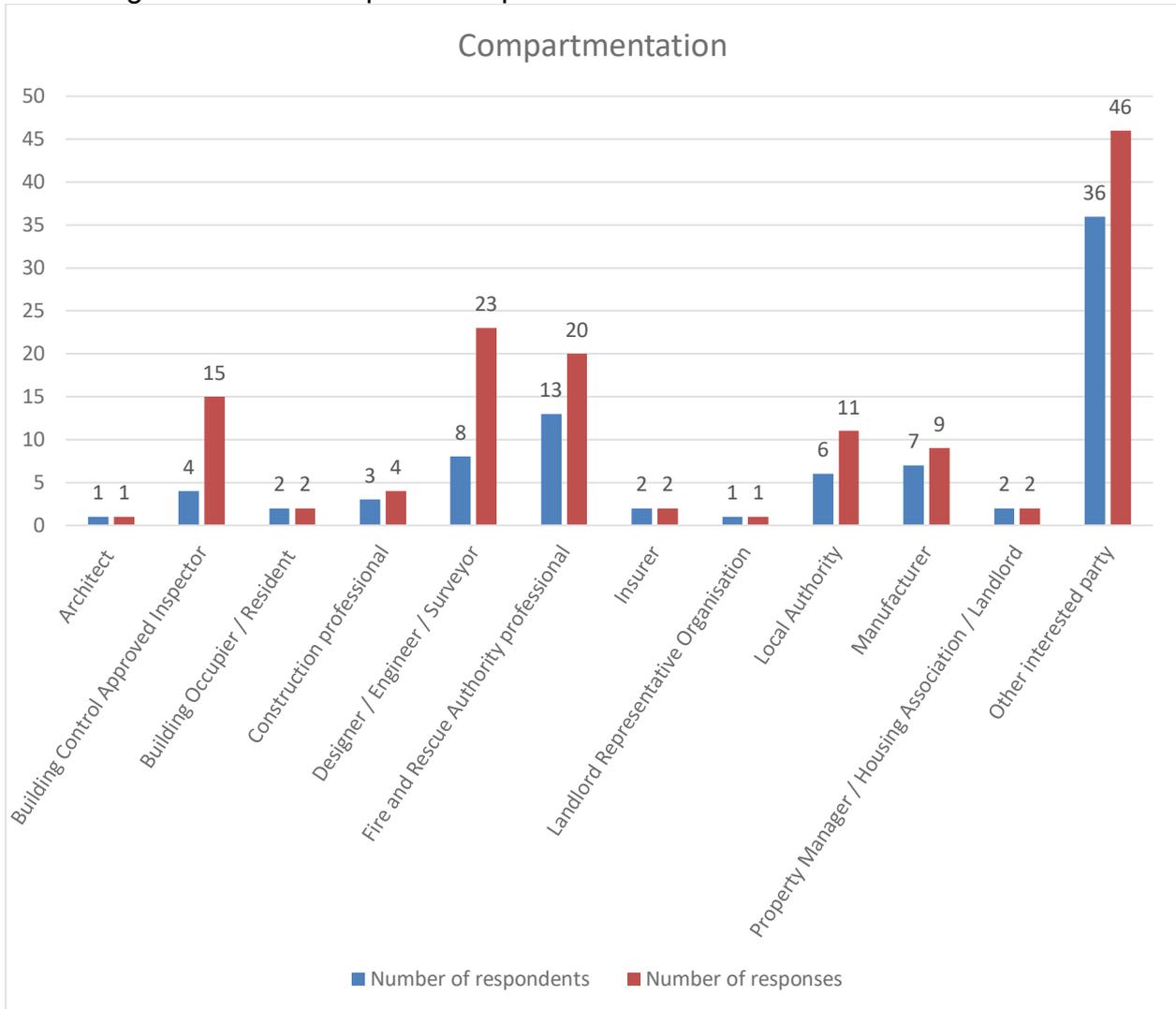


Figure 5: The number of respondents and the number of responses to the issue of compartmentation

Overview

There was generalised support for a review to ensure that compartment parameters are in alignment with modern day fire loads and uses. This included the response that any outcome rules and methods of assessment from a review should be kept in simple terms.

Allowable compartment sizes

Embodied in these responses was concern that large compartment areas and volumes (mainly in Storage and Industrial buildings) had reached a point that was already

exceeding an ability to manage fires within such buildings. There is strong support for additional features being required to limit the risks from these buildings. A component of this was that there should be recommendations for more extensive provision of sprinkler protection.

Standards of enclosure

A number of respondents questioned whether the fire resistance of compartment walls in flats should be more than 60 minutes when the fire resistance of the structure is required to be of a higher rating.

There were views that where buildings are required to have non-combustible external walling then perhaps compartmentation and structure should carry a similar requirement.

Penetrations and bypasses

There were concerns expressed over construction quality with particular emphasis as to how this can undermine compartmentation. There were many requests and suggestions for more and clearer guidance and the use of accredited schemes to help improvements into place.

Service risers in blocks of flats were seen as a modern-day risk that warrants research and strengthened guidance.

Numerous comments mentioned gaps in guidance or matters that may be deserving of widened attention. These include: curtain walling spanning compartment lines; openings in external walls in close proximity to compartment structure; enclosed balconies; etc. The matter of external fires bypassing compartments is included at 18.1.

Cavity barriers

Many comments were made regarding issues around cavity barriers. This is a matter that overarches most of the topics, but it will be summarised here:

- Methods should be put in place to give better quality control of installation
- A clear regime of dedicated test standards/procedures should be formulated for cavity barriers including open state barriers
- ADB should include absolutely clear guidance on the positioning and required standard of barriers
- It should be determined where 30-minute barriers are acceptable or where higher performing barriers might be necessary
- Regulation 7 should consider the design life of cavity barriers in comparison to the wall structure they are housed within.

Places of special fire hazard and ancillary accommodation

A number of replies expressed concern that the guidance is out of date and does not capture the pattern of modern installations and forms of ancillary accommodation. These would include plant rooms, water pump rooms, gas meter rooms, cycle stores, concierge spaces, PV inverters, batteries, cleaners' cupboards, mobility scooters, etc. Where the latter's potential risk to means of escape arrangements was expressed as being of concern.

Roofs

Similarly, comments were received stating that the guidance on roofing in respect of compartmentation fails to reflect modern construction and materials which typically utilise considerable thicknesses of combustible insulation.

Other B3 issues

A total of 55 individuals/organisations responded to Requirement B3 - Other Issues, submitting a total of 157 separate responses.

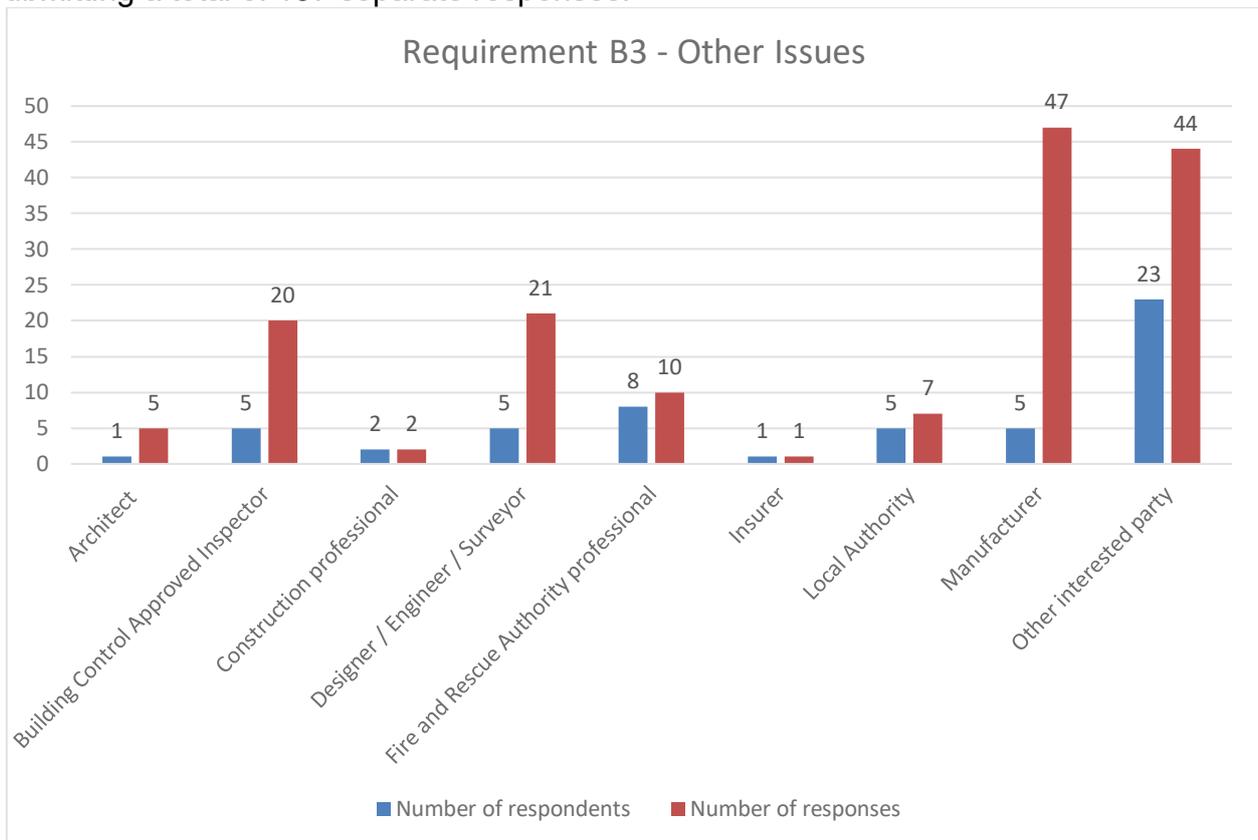


Figure 6: The number of respondents and the number of responses to Requirement B3 - Other Issues.

Mezzanines – Some comments were made to the effect that the allowances for mezzanines should be reviewed considering some contemporary large and multi floor mezzanine structures are outstripping the intent of the allowance and that they should be considered fully as floors.

Car parks – Summarised separately in this report under section headed 'Other'.

Combustibility – There were a small number of responses that called for a widened requirement for the use of non-combustible materials in the construction of structural frameworks, floors, compartmenting structure and linings.

Space separation

A total of 58 individuals/organisations responded to the issue of space separation, submitting a total of 75 separate responses.

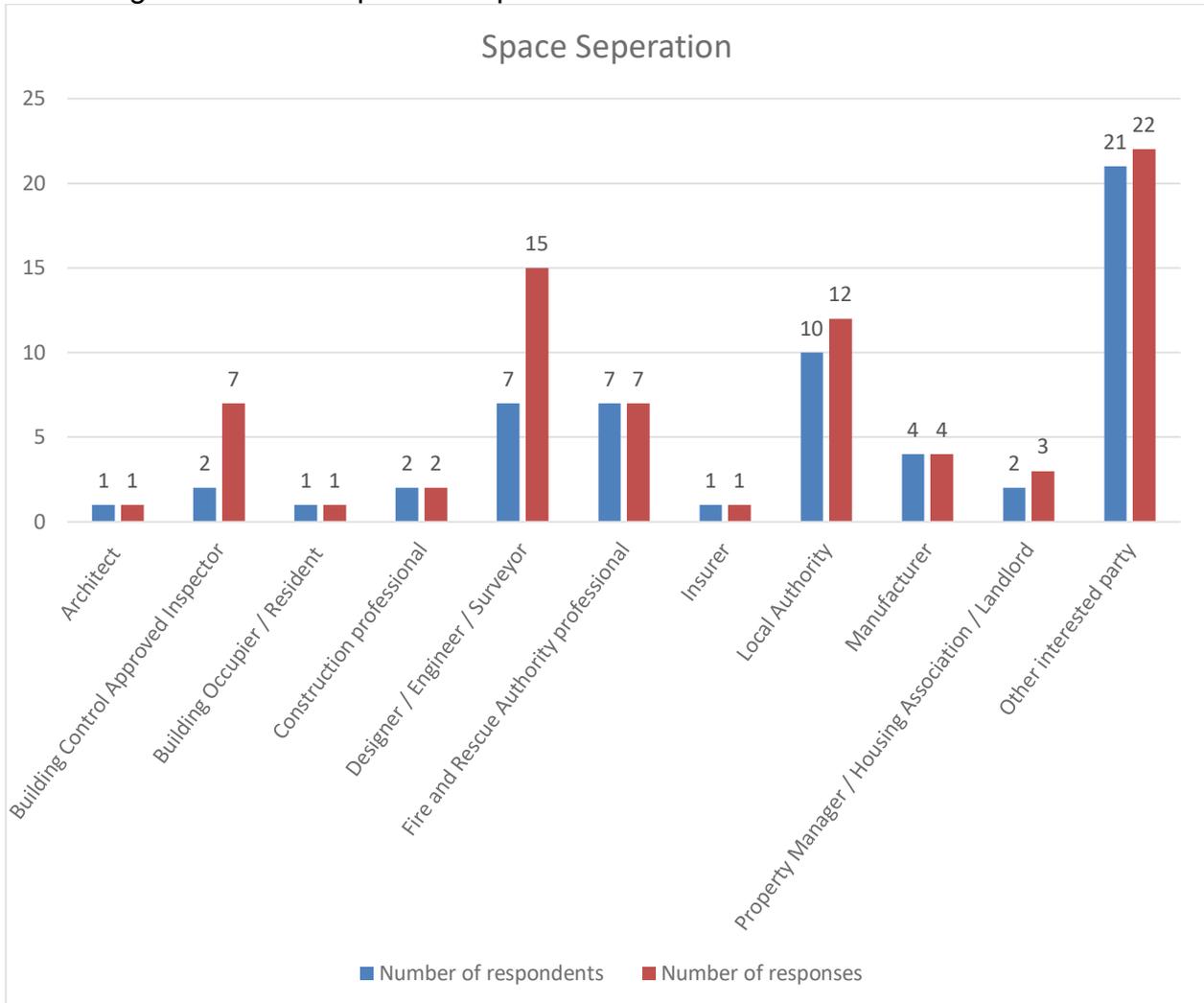


Figure 7: The number of respondents and the number of responses to the issue of space separation.

This topic has connectivity with Compartmentation and B4 External Walls.

Alignment with modern fire scenarios

There was wide support for review and necessary updating in conjunction with modern fire patterns together with the trend for larger, denser and taller buildings in close proximity. A few submissions discussed the scientific basis and there were some concerns that the validity of the doubling allowance for sprinkler protection should be re-evaluated. There were mixed opinions as to whether simple UPA (Unprotected Areas) rules can be maintained across the board or whether the use of engineered assessment is more appropriate in complex cases.

There is also concern that UPA can sometimes be misused to allow the downgrading of fire protective inner linings to external walls.

Consideration of different building geometries and risks other than relevant boundaries

A number of replies were concerned that the rules are seen as being couched in respect of traditional building forms and that modern dense urban designs present different formats of shape and height. Also, there is growing concern at the theoretical risk of conflagration within a single building configuration irrespective of 'relevant or notional boundaries'; for instance, across podiums and other gaps, at internal building angles, across varying roof heights, etc.

Isolation from wildfires

A single submission was received regarding the possible growing need to protect rural and urban fringe developments from wild fire.

Trigger heights and thresholds

A total of 83 individuals/organisations responded to the issues of trigger heights and thresholds, submitting a total of 98 separate responses.

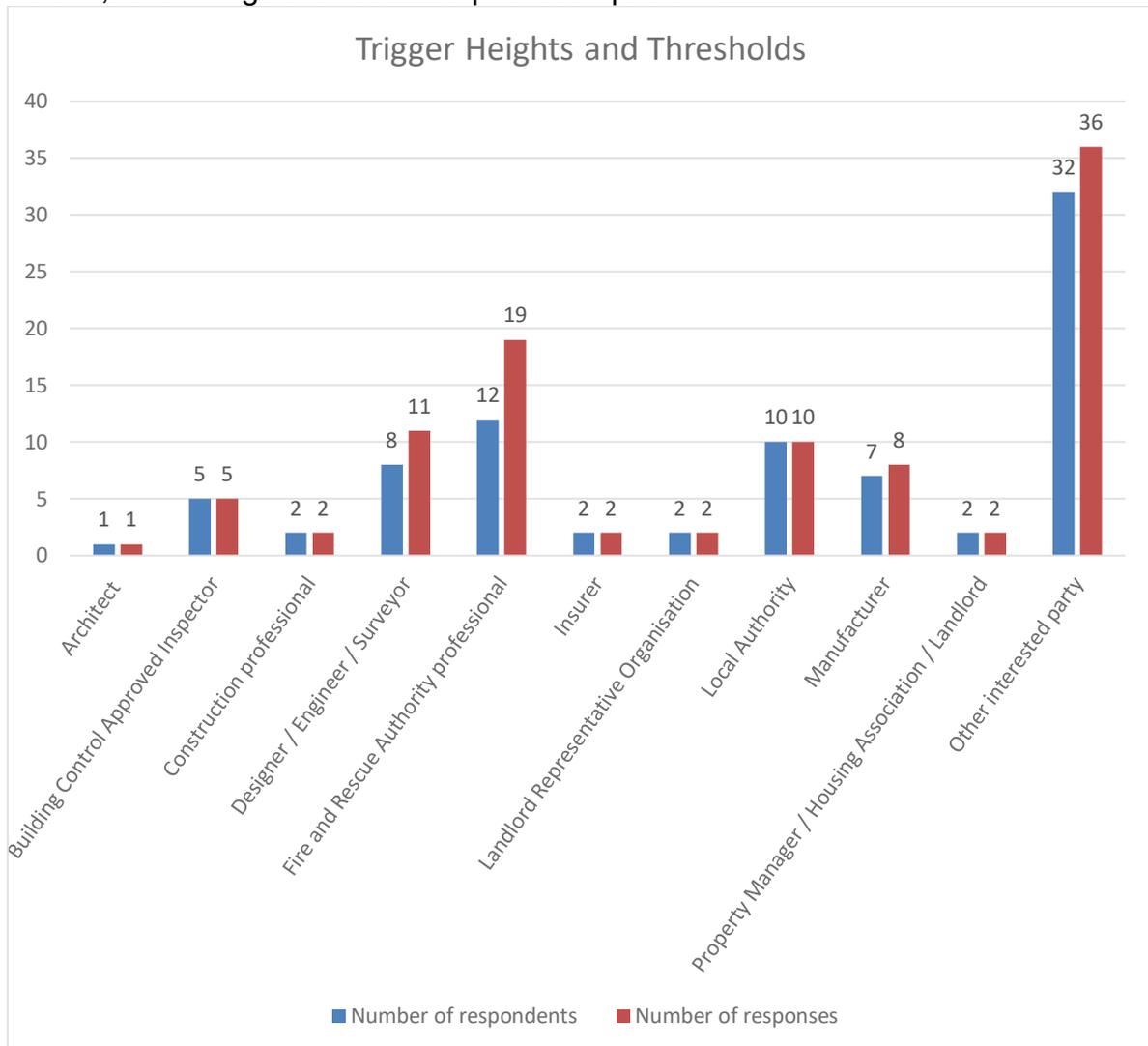


Figure 8: The number of respondents and the number of responses to the issues of trigger heights and thresholds

This topic acted as a catalyst for comments that span across and impact on most other topics as well.

Housing Trigger Points

A few observations were made about housing trigger points, and these concurred that these trigger points are sound.

11m (external firefighting and means of escape)

There was wide recognition of 11m being the accepted limit of traditional external firefighting techniques and a therefore a natural break between that and total reliance on internal firefighting and rescue. As such, responses broadly suggest there is acceptance of it being a limit for the 'small single stair' allowances for flats and the single stair limit for other buildings. Reasons were given that the wider firefighting capabilities, the natural limit of travel distances incurred in lower buildings and the lower likely building population all supported 11m as a valid height threshold.

Additionally, there were suggestions that 11m could be a potential trigger point for many other safeguards. These included sprinkler protection, non-combustible walling and firefighting shafts. This is in recognition of some voluntary protocols and viewpoints that have developed post Grenfell and that look for strengthened protection above current ADB guidance. However, responses did include variance of opinion as to what might be seen as an appropriate package of extra protection and trigger points for any higher standards of safeguard.

18m (provision of firefighting shafts in residential buildings)

This requirement was accepted if the basis of firefighting need is correctly pitched at 18m. However, there were a large number of comments, from fire services and others, suggesting that the 18m guidance should be reviewed, but without any suggestions as to what the standard should be.

A number of commentators noted that there is an indeterminate zone from 11m to 18m at present.

18m (non-combustible walling in certain residential buildings)

Large numbers of respondents are of the opinion that this should be reviewed further and extended to a lower trigger point, possibly 11m, for a wider range of buildings but to apply across all heights of buildings occupied by vulnerable people.

10 storeys (alignment between ADB and HRRB)

There were concerns expressed over variation in the rules of measurement and the different confusing approaches embodied in current ADB and elsewhere. Correlation to an agreed singular and sensible form of approach was requested. The particular mismatch between 'Building a Safer Future' reports and ADB was also quoted as an illustration of uncertainty of approach across the legislative framework.

30m (sprinkler provision in flats)

A large majority considered this requirement to be set too high to achieve the desired level of safeguard and that it should be reduced. Opinions varied as to whether this should be down to 11m or 18m.

50m (wet risers)

There were a number of respondents who questioned whether dry risers were reliably efficient up to 50m and that a review should be conducted to ascertain if wet risers should be called for at a lower height.

Very tall buildings (a trigger point for extra guidance)

A significant number of respondents suggested that it is not suitable for ADB guidance to be applicable without a height limitation. These commentators recommended the introduction of special guidance for very tall buildings with the probability that it should apply over 50m.

Single stair allowances

There was no adverse comment against the continuation of the 18m limit for other buildings.

However, a very large number of respondents raised numerous points of debate regarding single stairs in residential buildings over 11m.

Graduation of structural fire resistance

Apart from many questions on car parks, these were generally seen as acceptable.

15m (roofs)

A few comments were received to the effect that this trigger point is unclear as to what risk it relates to and that it needed review together with the whole matter of fire risks from modern roof forms.

Basement depths

Various comments were expressed that it was not understood as to the derivation of the 3m and 10m depths and that accordingly they should form part of the wider review of basements.

Compartment size maxima

Numerous comments were received to the effect that they considered the allowance for floor area and volume of single storey PG 7 buildings was too large. These all link with matters raised under Compartmentation.

Other approaches

A few respondents expressed a view that instead of arbitrary height triggers a holistic risk assessment process should be used to set the required standard of provisions.

Means of escape from blocks of flats

A total of 87 individuals/organisations responded to the issue of means of escape from blocks of flats, submitting a total of 211 separate responses.

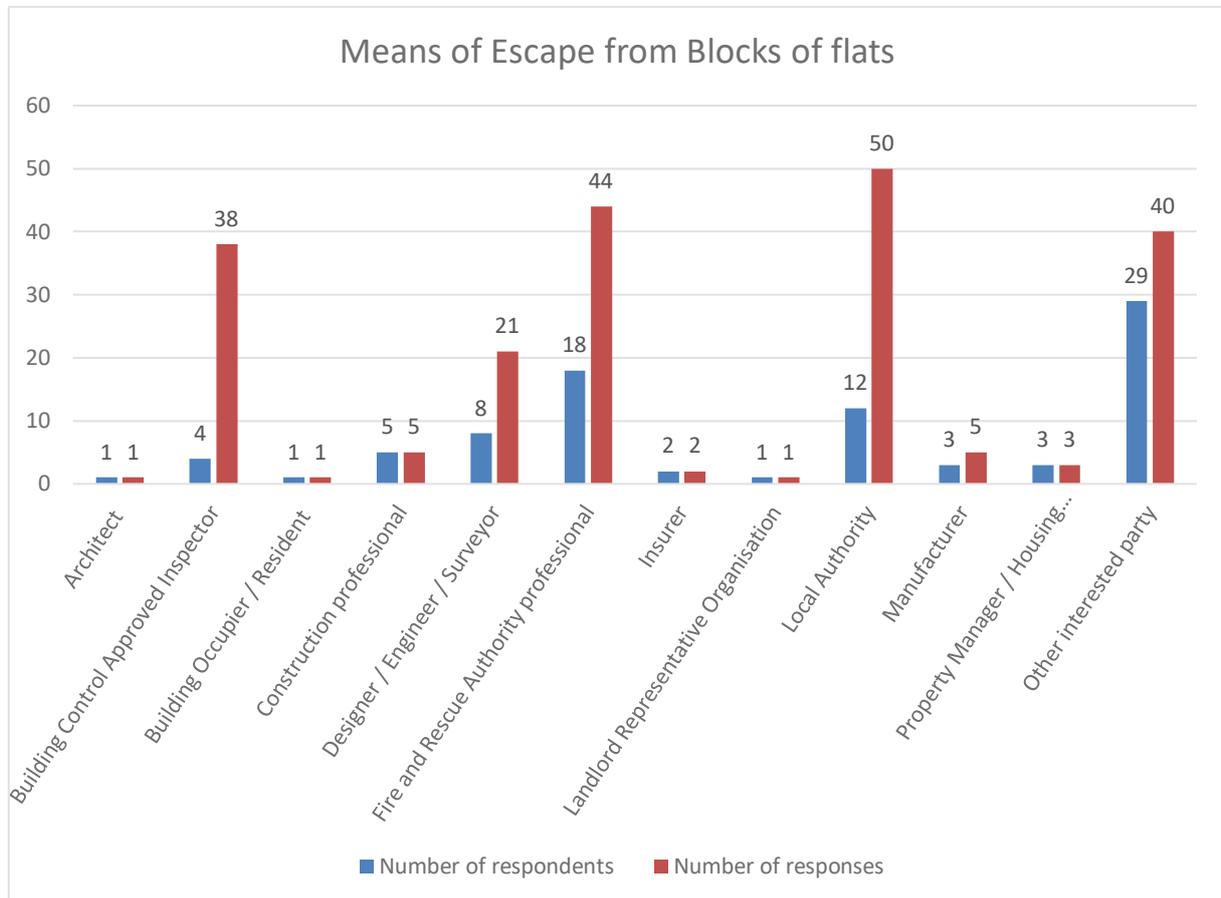


Figure 9: The number of respondents and the number of responses to the issue of means of escape from blocks of flats.

The Stay Put strategy

A large number of responses were received on this subject with the majority concurring that 'stay put' was an appropriate strategy for flats. Some comments indicate that it is believed that alternative strategies were used internationally but these did not mention what they were.

Strengthening the strategy

The majority of respondents believed that the strategy should be strengthened. Measures suggested included the provision of a wider building alarm system, possibly zoned, that

could be activated by the fire service to give warning to residents. Also widely mentioned were enhanced levels of protection to escape routes and wider sprinkler protection.

Understanding and managing the strategy

Numerous mentions were made as to how the safety success of the strategy depends on its application in practice. There is need of promotion of understanding across building designers, residents, building management and emergency services. ADB is seen as being a major vehicle in setting the strategy robustly into place via building design standards and also by incorporating a regulatory focal point of firm and absolute management guidance.

It was noted that this would further strengthen the need for the “Golden Thread” of data throughout the process to better inform the building management.

Means of escape within flat units

The general tenor of responses seemed to indicate an overall satisfaction with this guidance, but the following points were raised as being in need of review:

- Extra open plan allowances to be incorporated in ADB
- Concern regarding over long total internal travel distances
- Resolution of an allowable position of cooking facilities in relation to escape paths in open plan units
- Comments related to the use of FD20 doors within flats
- Concern was expressed over the widening disparity between ADB guidance for alarm systems and that in BS 5839-6

Sprinkler protection

There was wide support for the provision of sprinkler protection to be lowered from a 30m trigger point, although opinions varied as to what might be the most appropriate height. Sprinklers were seen as being of multi-benefit in providing personal protection of individuals, limiting fire spread and hence protecting means of escape layouts and structural fire safety. Respondents suggested it could also help to avoid undue housing disruption due to fire damage.

Travel distances in common areas

Apart from a few questions over the derivation of distances there were no issues raised over the basic limits.

However, there were a number of linked issues mentioned such as the inclusion of extended travel distances where sprinkler protection is provided; the question as to what might be suitable for disabled residents; and the provision of added levels of protection to escape routes and any attendant adjustments of allowable distances.

Balcony approach

A number of replies called for the inclusion of the specific BS 9991 guidance to be directly embodied in ADB.

Fires in common areas

A few respondents commented on the fact that ADB strategies are predicated on the assumption that a fire will be in a flat. These respondents reported that there are a rising number of fires occurring in common areas and a review of guidance relating to common areas was therefore suggested.

Fire doors

A large number of responses were received regarding fire doors ranging from generalised to very detailed. Comments covered the following themes:

- Misapplied testing regimes
- Confusion over testing
- Allowances for engineered assessment of tests
- Poor quality of installation
- The benefits of accredited product testing
- The benefits of accredited installers schemes
- Marking and verification of fire doors
- A need for better smoke seal performance
- The potential for specifying a higher fire door rating to achieve enhanced layers of protection

- Are existing ADB ratings always best targeted to the particular position/risk?

Smoke control – principles

A number of responses questioned some fundamental aspects of ADB guidance, which can be broadly categorised as follows:

- i) ADB has allowed systems of smoke control to be based on a fire on a single floor; this becomes ineffective if a fire impinges across several floors;
- ii) there is no stated performance level of smoke venting
- iii) whilst ADB does not preclude any necessary design solution the current one size fits all approach is out of step with the needs of many building formats.

Smoke control – methods and issues

In addition to 9.10 a spread of other matters were raised:

- Construction, maintenance and testing of smoke shafts and dampers
- The potentiality of wider use of pressurisation
- The continuing status of bespoke architectural AOV (Automatically Opening Vents) being impinged by CPR (Construction Product Regulations) requirements
- Various methods of measuring free area
- Clear incorporation of the 30m rule
- Implications from the joint use of smoke ventilation systems as daily ventilation systems

The allowance of single stairs

A large number of comments were received in respect of this issue, many expressed the concern over the continuation of this allowance and called for review if not an outright ban.

Single stairs – limitation and / or extra protection

There was a consensus that single stairs were acceptable within the present 11m classification. Above that height numerous viewpoints were brought forward as to an exclusion above 11m or 18m or allowance within limits that might be set from a matrix of risk considerations including:

- The number of flats and the attendant population
- Height

- Sprinkler protection
- Extra protection such as increased fire resistance of enclosing structure to escape routes and stairs, additional lobby protection to stairs, pressurisation of stairs, etc.

The need for review of this subject was seen as vital.

Stair / entrance design

A significant number of comments were submitted highlighting the need for stair and entrance spaces to be sufficiently dimensioned so as to allow for concurrent evacuation and firefighting operations.

Basement connections

A number of respondents commented that many blocks of flats have single stairs which for modern amenity/social reasons need to connect with basements. This is precluded by ADB but design solutions are usually approved on the basis of providing fire door separation of the flight downwards and the provision of smoke ventilated lobbies at basement level. It was suggested that this be reviewed and included in ADB.

Lifts

There was considerable support for the proposal that the use of lifts for means of escape be further explored.

Upgrading of existing buildings

A few respondents suggested that legislation should be changed to enable Building Regulations to be retrospectively applied to existing buildings to allow for mandatory upgrading of certain vital, but within a defined limited range, safety improvements.

Means of escape for disabled people

A total of 67 individuals/organisations responded to the issue of means of escape for disabled people, submitting a total of 92 separate responses.

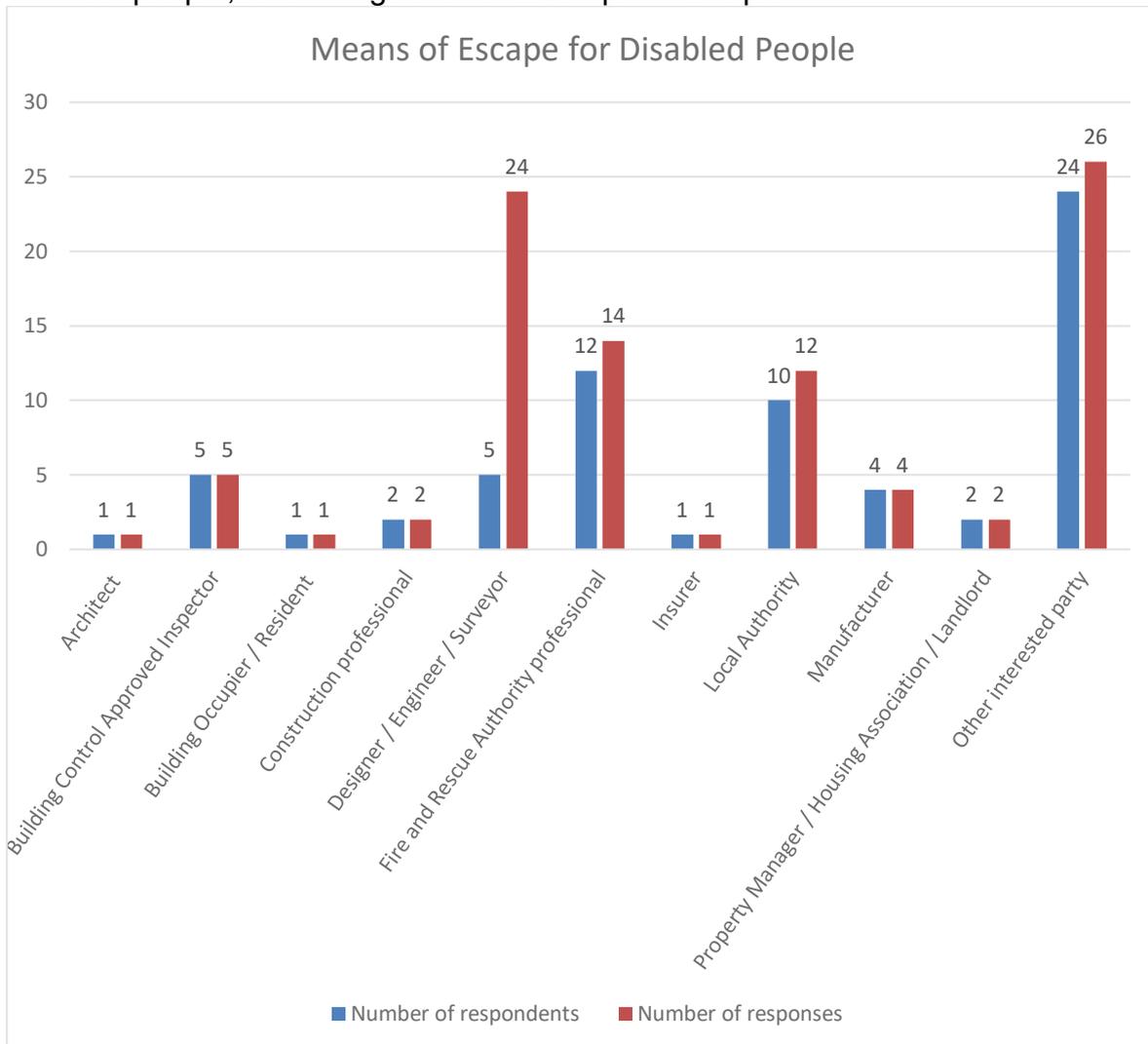


Figure 10: The number of respondents and the number of responses to the issue of means of escape for disabled people

Many comments were contiguous with Specialised Housing, Means of Escape generally, and Age Distribution.

The needs and concerns of disabled and vulnerable people and the widening accommodation demographic

Alongside general support for the principle of developing integrated safety provisions there were a few concerns from disabled support groups. This included the results of a survey that showed that disabled people are placed in a position whereby they have no confidence in the escape provisions available to them.

Standards of protection

Apart from strengthened means of escape arrangements there were viewpoints that advocate the provision of sprinklers for all housing for vulnerable people.

Reliable evacuation and management plans

Alongside strengthened physical building standards, numerous responses called for ADB to set out comprehensive guidance on the inter-relationship of building standards for design with management in use. Many responses questioned the use of places of refuge and the need for evacuation lifts.

The principle of safe and dignified evacuation

A few responses mentioned that measures should include this principle, which looks for provisions that can ensure disabled people can evacuate with safety, security and in a manner that is easy to undertake.

Evacuation lifts.

A significant number of replies suggested that the potentiality of incorporating wider use of evacuation lifts should be explored. Many of these appear to be suggested due to a lack of confidence in places of refuge and that these were often misinterpreted and were thought to be open to incorrect use by building management. Evacuation Lifts were seen as supporting the principles mentioned above.

Requirement B1 - other issues

A total of 47 individuals/organisations responded to Requirement B1- Other Issues, submitting a total of 164 separate responses.

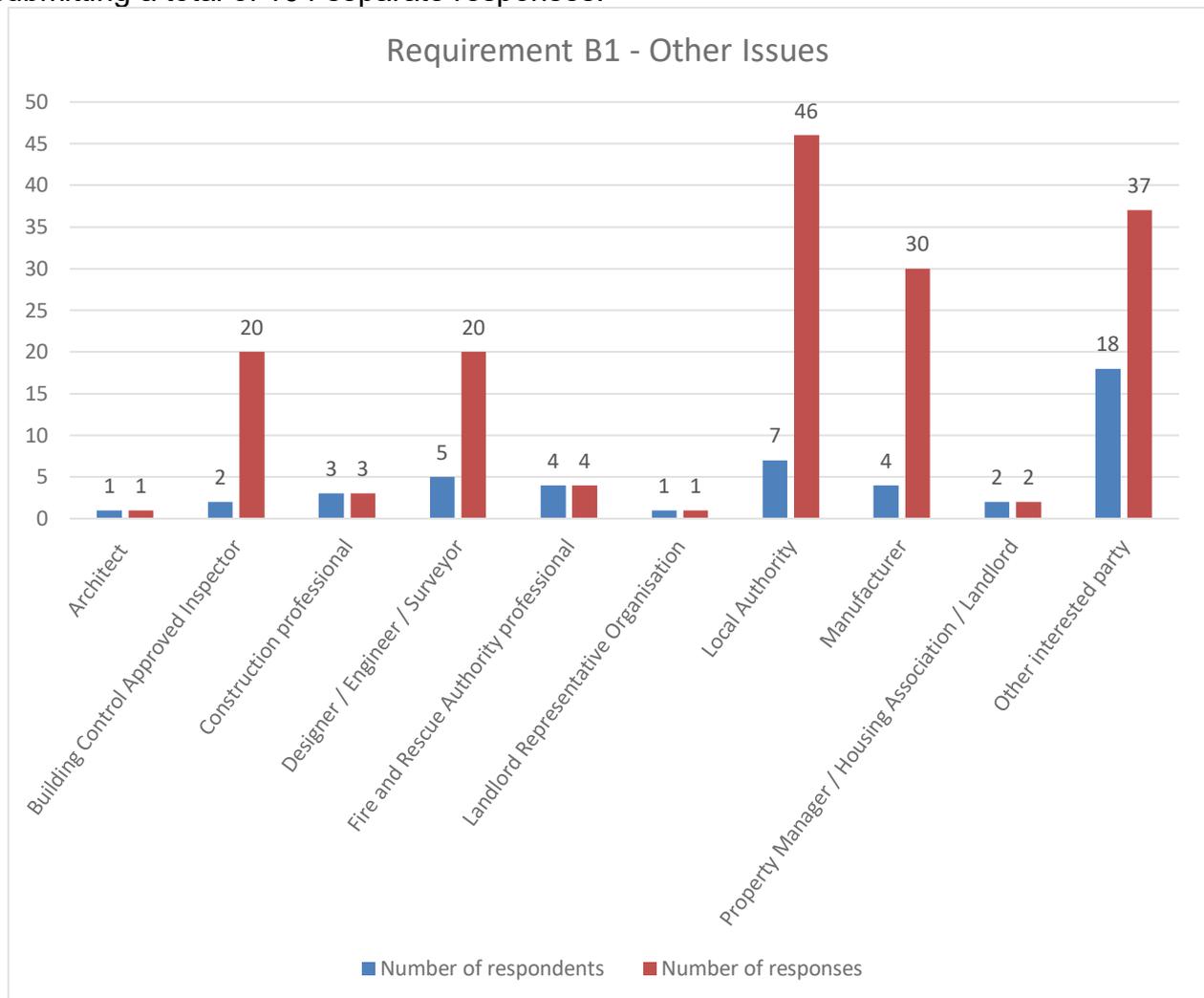


Figure 11: The number of respondents and the number of responses to Requirement B1- Other Issues.

Age Distribution

A total of 57 individuals/organisations responded to the issue of age distribution, submitting a total of 60 separate responses.

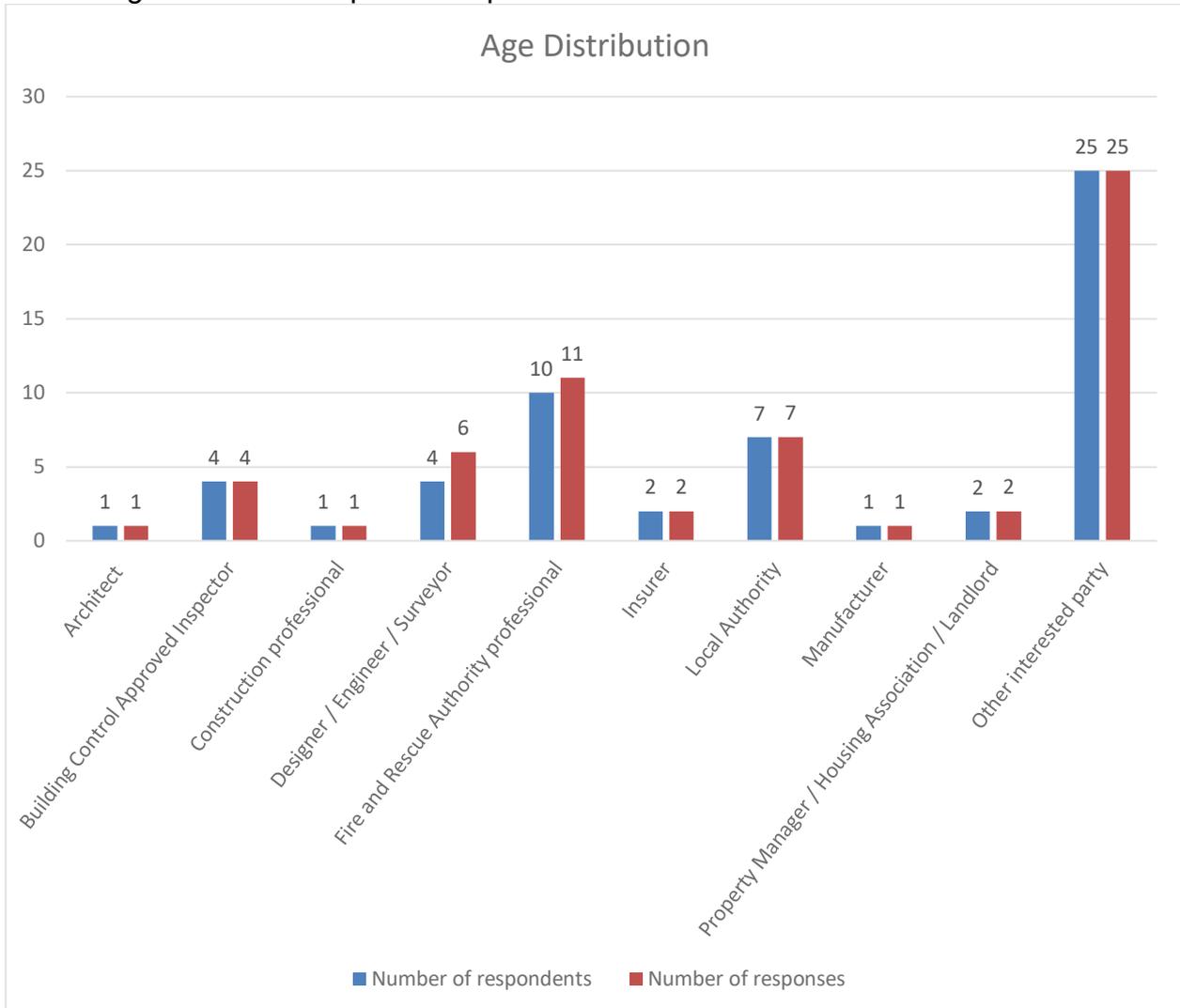


Figure 12: the number of respondents and the number of responses to the issue of age distribution.

The changing demographic

It was widely acknowledged that the UK's demographic is changing and that inclusive policies towards housing and employment are also contributing to a new pattern. Replies indicated that there was support for building standards being suitably amended to accommodate the changing environment.

Effects on means of escape

Respondents primarily saw this as effecting means of escape and their comments in response were combined under those topic headings. In general, it was accepted that it is no longer appropriate to simply assume blocks of flats can all be considered in a past general needs category or the provision of a basic refuge in other buildings will cover the real safety needs of occupants.

Smoke and toxicity

A total of 84 individuals/organisations responded to the issue of smoke and toxicity, submitting a total of 100 separate responses.

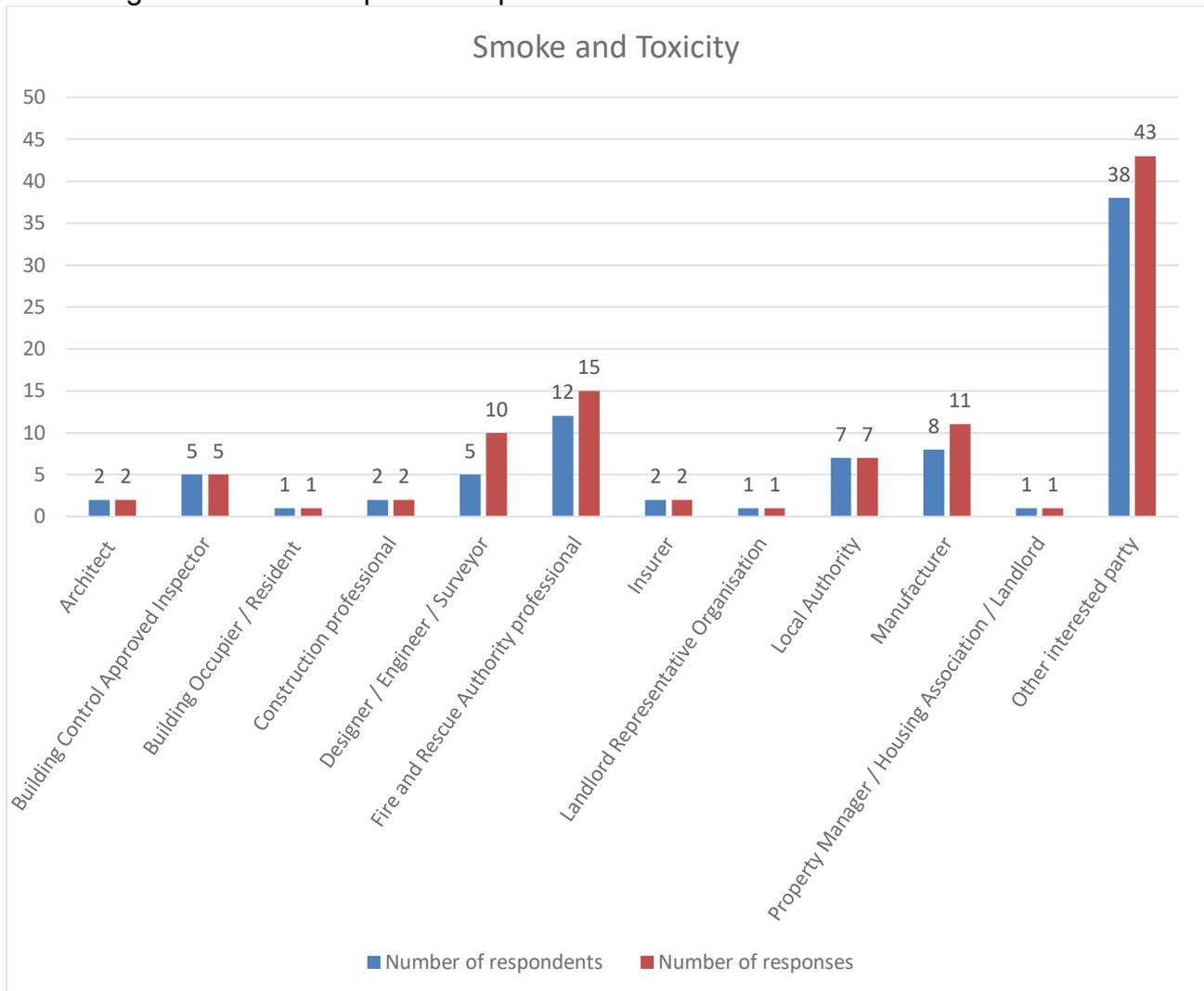


Figure 13: The number of respondents and the number of responses to the issue of smoke and toxicity

Support for limitation of toxicity

There was wide support for the principle of controlling against undue toxicity. The evidence of national statistics on fire deaths was quoted as compelling evidence. However, virtually all respondents expressed a lack of knowledge of the subject and therefore an inability to comment further. Only a very few more detailed comments were submitted.

Research needs

From 12.1 the responses all led to a stated need for further research. A few responses did indicate that there would be a possible difficulty in establishing a meaningful control mechanism between the natural toxicity present in all smoke, that produced by building materials and that emanating from building contents.

Construction Features

Numerous comments were made around the subject as to how toxic smoke spread could be limited by improvements and wider use of smoke sealing, dampers, smoke exhaust systems and measures to prevent re-entry.

Sprinklers and other fire suppression systems

A total of 85 individuals/organisations responded with regard to sprinklers and fire suppression systems, submitting a total of 105 separate responses.

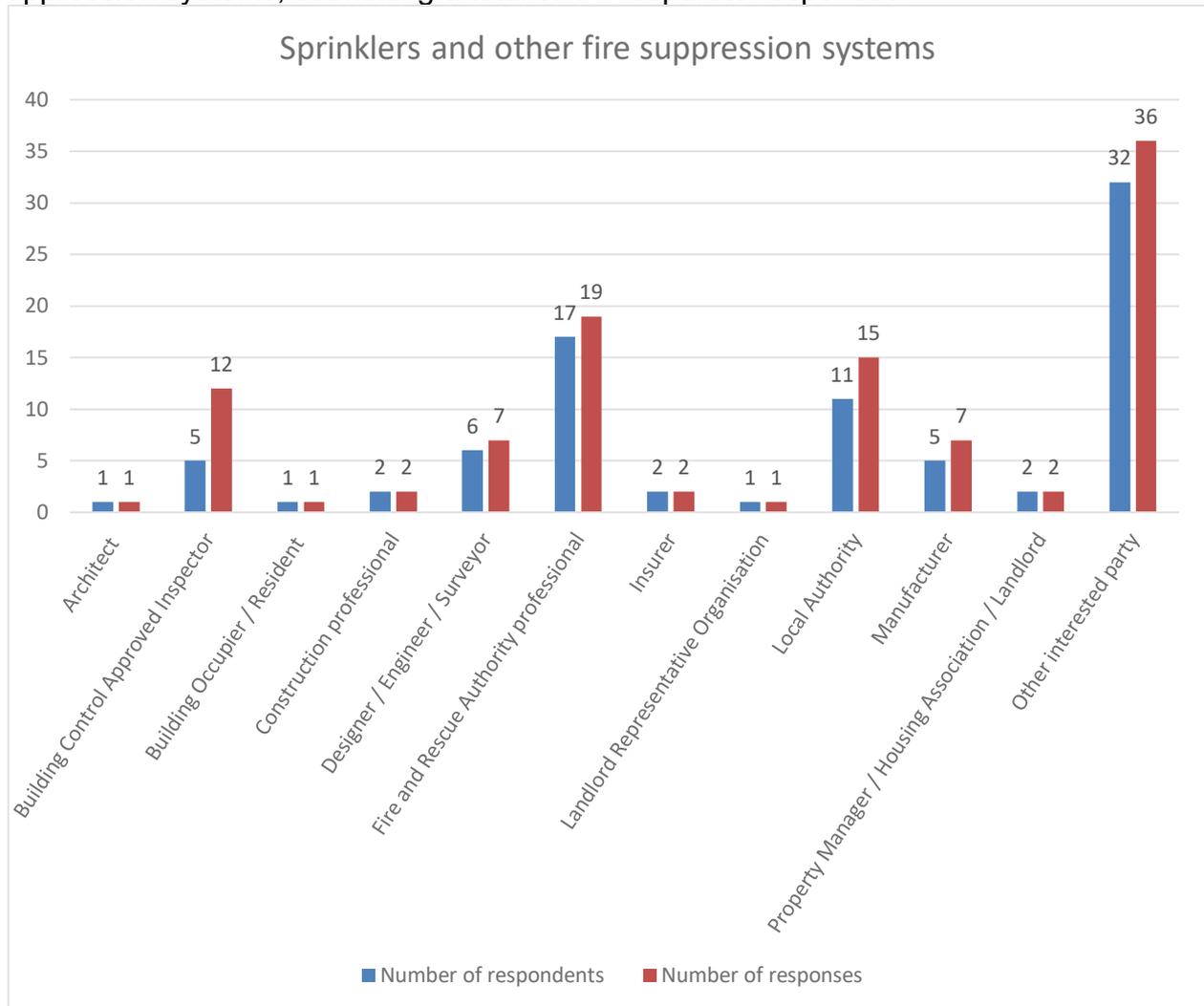


Figure 14: The number of respondents and the number of responses with regard to sprinklers and fire suppression systems.

Wider requirements for sprinkler protection

Large numbers of respondents called for wider requirements for sprinkler protection, these embraced the following targets:

- A lower trigger point in blocks of flats (possibly at 11m or 18m)
- Similar for other residential buildings (such as Student Accommodation)
- All housing for vulnerable, disabled or old people

- All housing (as per Wales)
- Basements
- Certain car parks
- Large PG7 buildings

Integration of sprinkler design allowances

Numerous respondents noted that there is an extensive matrix of design allowances, granted upon sprinkler protection, scattered across ADB and other design codes. Request was made for the integration of all of these into ADB (where appropriate).

Guidance on sprinklers and other fire suppression systems

There was a fairly wide call for ADB to include guidance on various systems.

Water supplies

A number of concerns were expressed on the barriers to efficient sprinkler system design and installation being presented by difficulties over water supplies and Water Company requirements.

Access and facilities for fire services

A total of 75 individuals/organisations responded on access and facilities for the fire and rescue service, submitting a total of 132 separate responses.

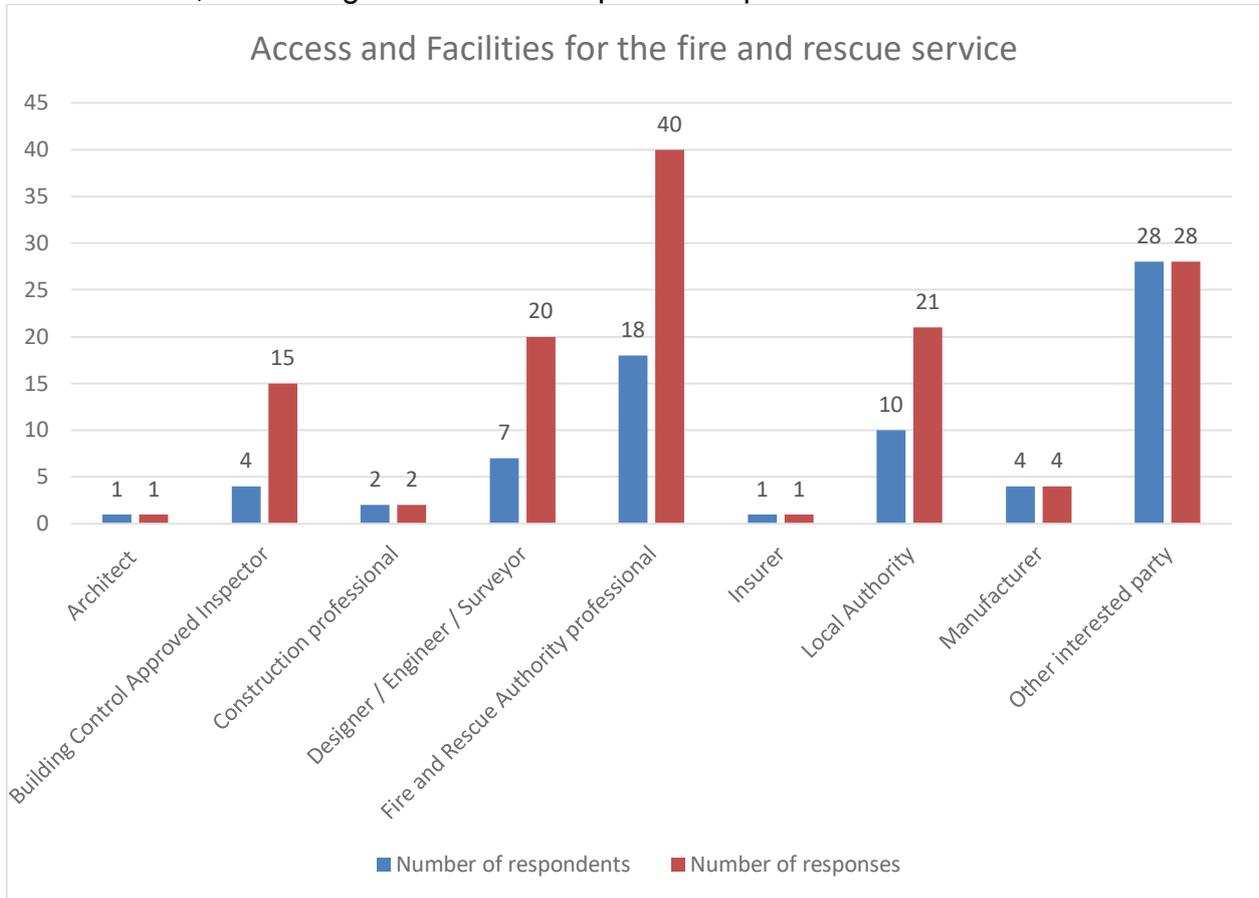


Figure 15: The number of respondents and the number of responses on access and facilities for the fire and rescue service

Review of current external access requirements

There was large support for this to be reviewed and updated as found necessary.

Reach and penetration into large floor areas

A number of respondents were concerned about fires in very large volume buildings and the ability to conduct any form of effective firefighting. A few responses raised the question as to whether any form of internal protective barriers could help firefighting techniques.

Internal firefighting in taller buildings

A large number of replies, from Fire Services and others, considered that there should be a review. The 18m trigger point for firefighting shafts in residential buildings was given emphasis for review but no evidence was given, apart from noting the 11m disparity. It was also requested that any review should encompass all aspects of firefighters needs such as:

- Ease of access to building information and control panels
- Ready and simple operation of ventilation and other installations
- Demarcation of stairs
- Numbering of floor levels
- Aids to communication
- Dimensional requirements for stairs, lobbies, entrances

Design guidance allied to firefighting techniques

A significant number of respondents felt that ADB guidance should be more clearly illustrative of the mode of firefighting with definition of bridge head positions, landing valve connection, hose layouts, lengths and reach of hoses, etc.

Fire mains

A significant number of respondents sought similar improvement regarding guidance on the provision and position of fire mains, access to inlet valves, fire service approach, etc. In both of these cases ADB already has guidance but it was felt necessary to make it clearer to avoid design misunderstandings.

There were a considerable number of requests for a review to be undertaken of the effective limit of dry risers and as to whether the 50m trigger point for wet risers needs adjustment.

Ease of entrance into buildings

Some comments were made concerning the ease of fire service entrance into buildings and the possible constraints that security systems may present. This raised the question as to whether more guidance is needed, or if reliance could be placed on the fire service's forcible entry techniques.

There was also concern over falling debris from above onto the entry point that may hinder entry for the fire service and exit by occupants.

Water for firefighting

A large number of concerns were expressed, by all fire service respondents and others, regarding growing problems in the supply of sufficient water for firefighting. This matter also has connection with similar problems effecting sprinkler installation. The concerns can be distilled into the following points:

- Legislation that inhibits ease of provision and operational use
- Design of water mains infrastructure that does not always accommodate for hydrant installation
- Lack of clear ADB guidance concerning hydrant provision and location
- Alternative **provisions for rural conversions, etc. where there are no mains**

Requirement B5: access and facilities for the fire service - other issues

A total of 32 individuals/organisations responded to this issue, submitting a total of 57 separate responses.

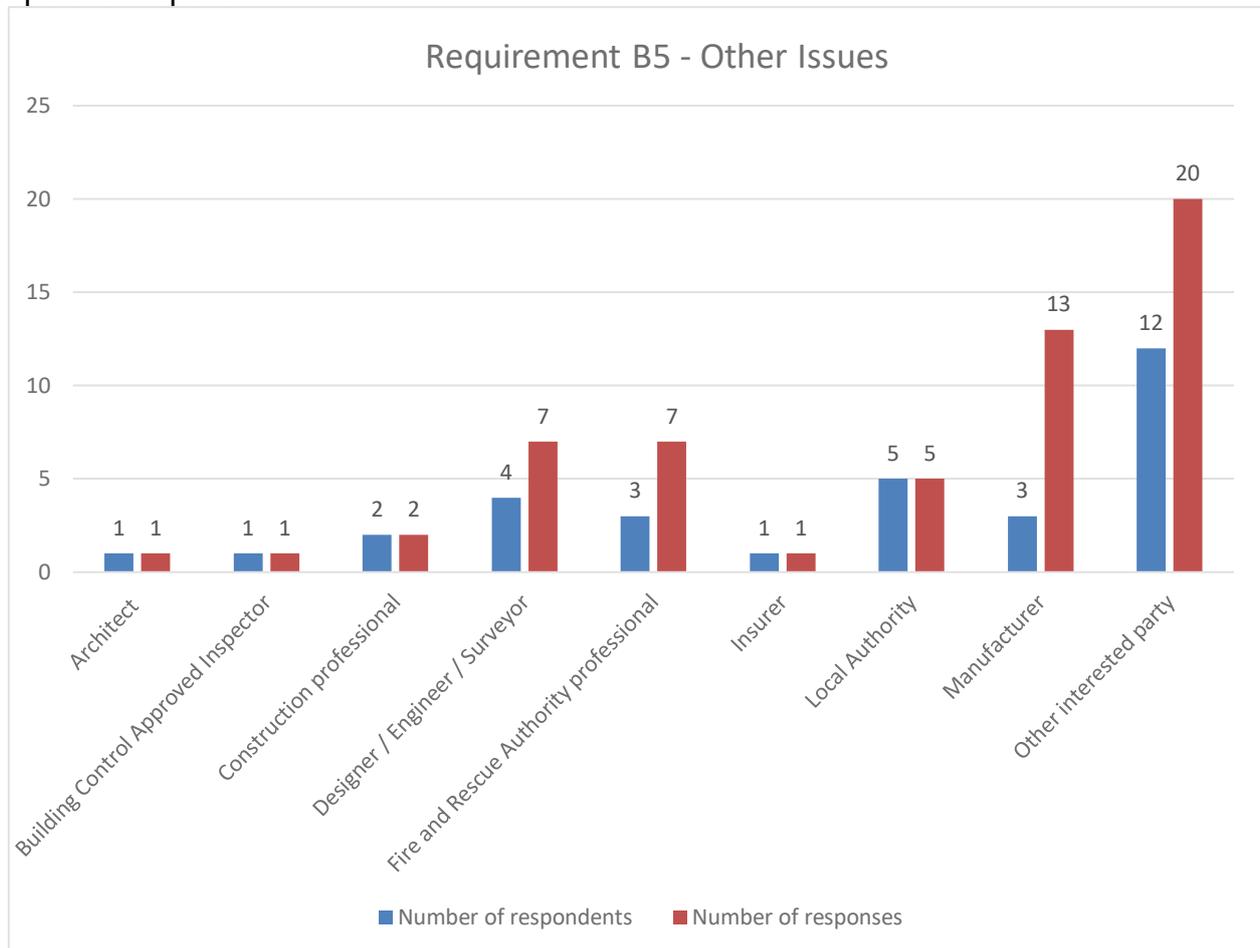


Figure 16: The number of respondents and the number of responses to Requirement B5: Access and facilities for the fire service - Other issues.

Basements

A total of 44 individuals/organisations responded to the issue of basements, submitting a total of 62 separate responses.

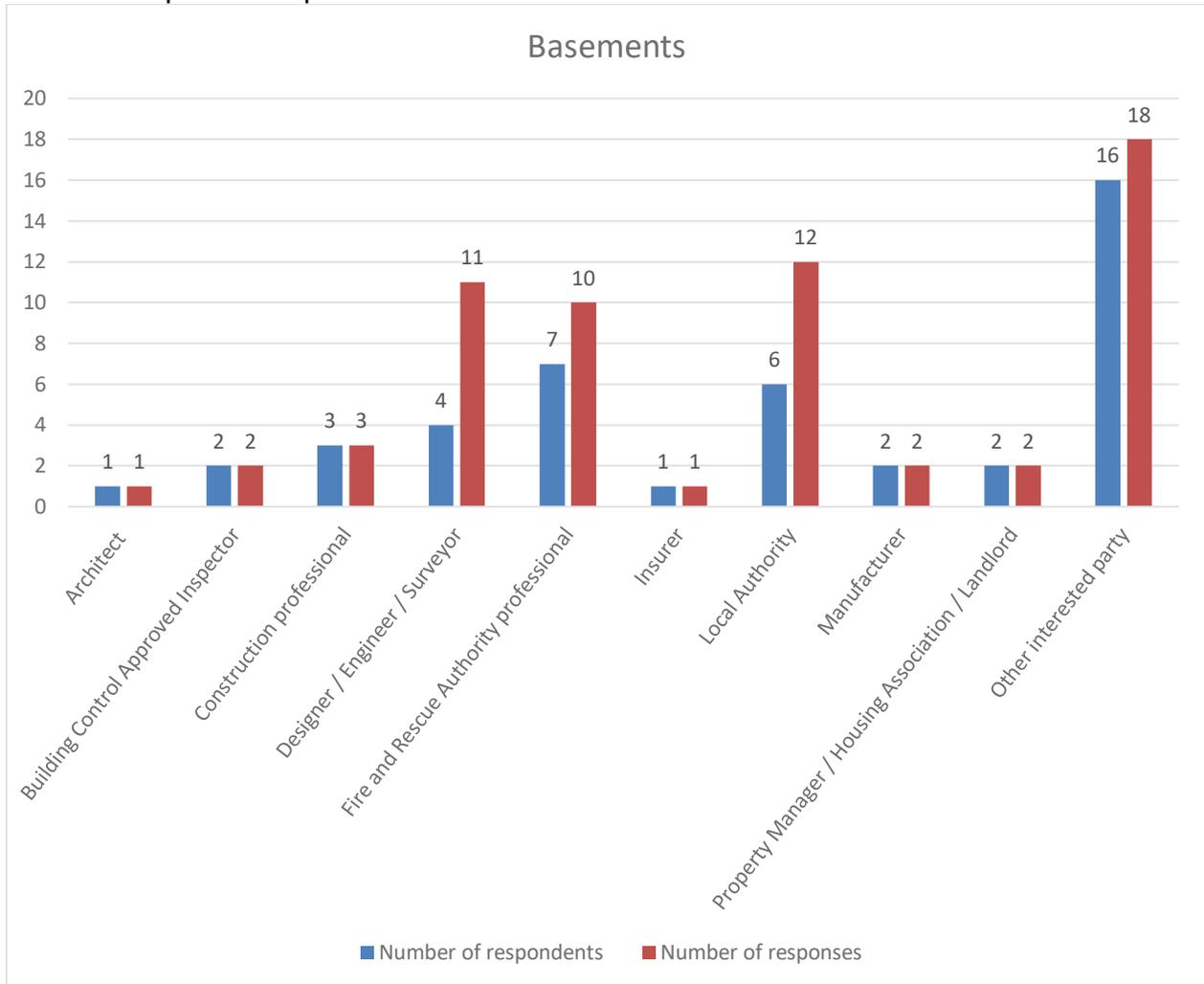


Figure 17: The number of respondents and the number of responses to the issue of basements.

Review of risks

There was large agreement for review to be undertaken in view of the acknowledged development of modern risk patterns and the advancement of larger and deeper basements. Commentary was also made on a perceived lack of a centralised point of guidance for basements, with the knowledge seen as being spread across many sources.

A risk graduated approach

Commentators reported on the scope of basement scenarios from those of little or no risk up to the large and intense basements presenting new risk factors that can be advanced in

an evolving modern world. It was also noted that there is a wide range of safeguarding solutions being applied at present but that there is a desirable potential for ADB to unify these and codify them into one source.

Firefighting

A number of respondents commented that firefighting needs for basements should be reviewed. The 10m firefighting shaft trigger point was felt insufficient to offer good access to many other basements above that depth. Smoke clearance provisions were often seen as inadequate or cumbersome of operation.

Connection with basements

A number of comments noted a perceived tension between ADB guidance that precludes connections between basements and accommodation over and current, socially driven, design practice that finds routes of allowing this subject to various safeguards. Review and the integration of a suitable standard in ADB was suggested for uptake.

Construction technologies and design

A total of 82 individuals/organisations responded on construction technologies and design, submitting a total of 94 separate responses.

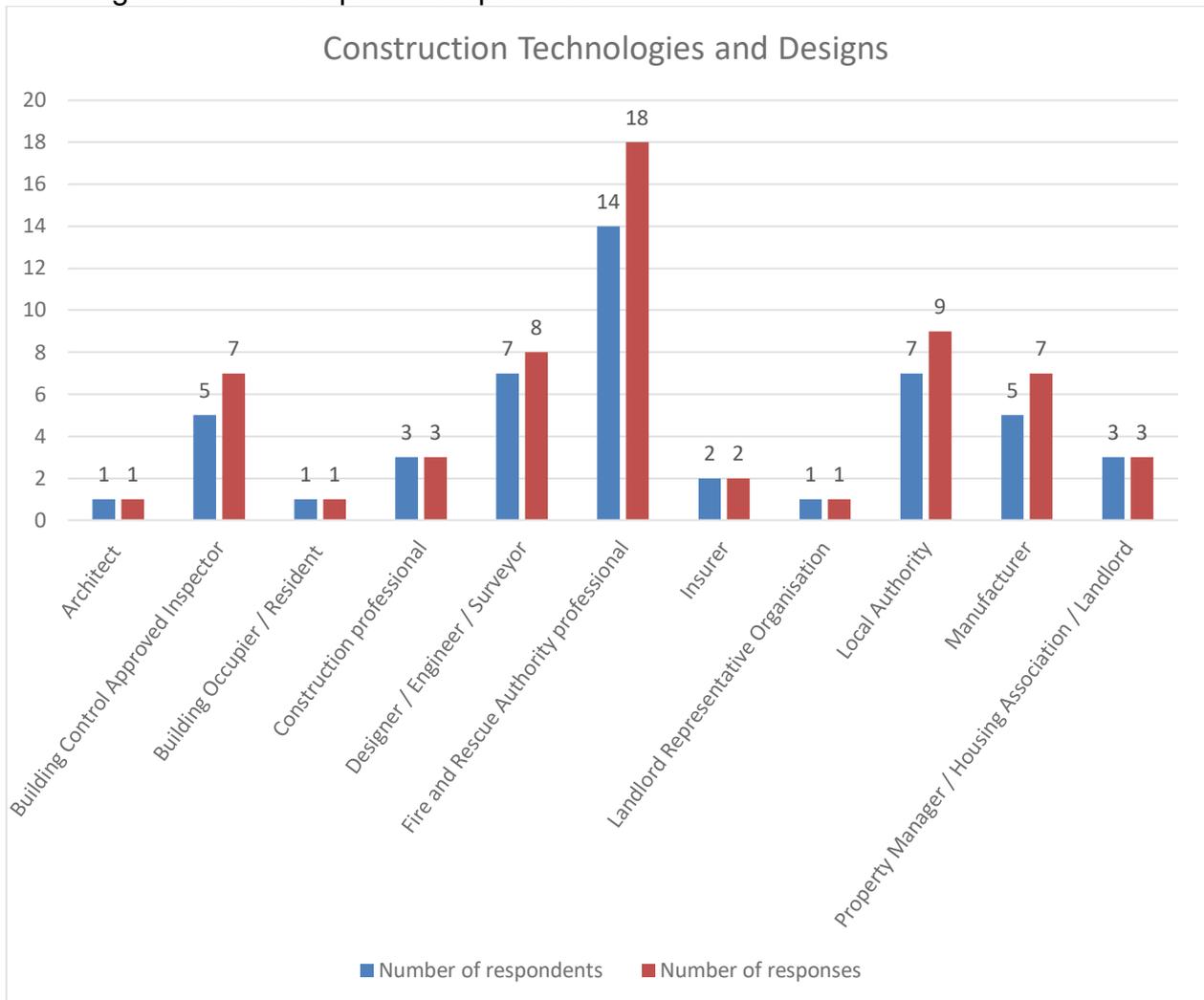


Figure 18: The number of respondents and the number of responses on construction technologies and design.

Updating

There was wide spread support from respondents seeking the updating of ADB guidance to reflect modern day forms of construction and risks. At the same time there was also recognition of the need to continue to also embrace traditional construction.

Modern Methods of Construction (MMC)

There were a significant number of respondents who stated that ADB does not give a sufficient focus to the varied nature of MMC and the risks presented. Gaps between units, jointing, combustible frameworks, premature collapse of panel systems, the encapsulation of flammable materials amongst others were quoted as being of concern. Respondents generally seem to support innovation, but concerns were expressed that testing regimes and verification applied to MMC may be leaving uncertainty as to whether ADB objectives are sufficiently safeguarded.

Construction Details

A total of 68 individuals/organisations responded with regard to construction details, submitting a total of 79 separate responses.

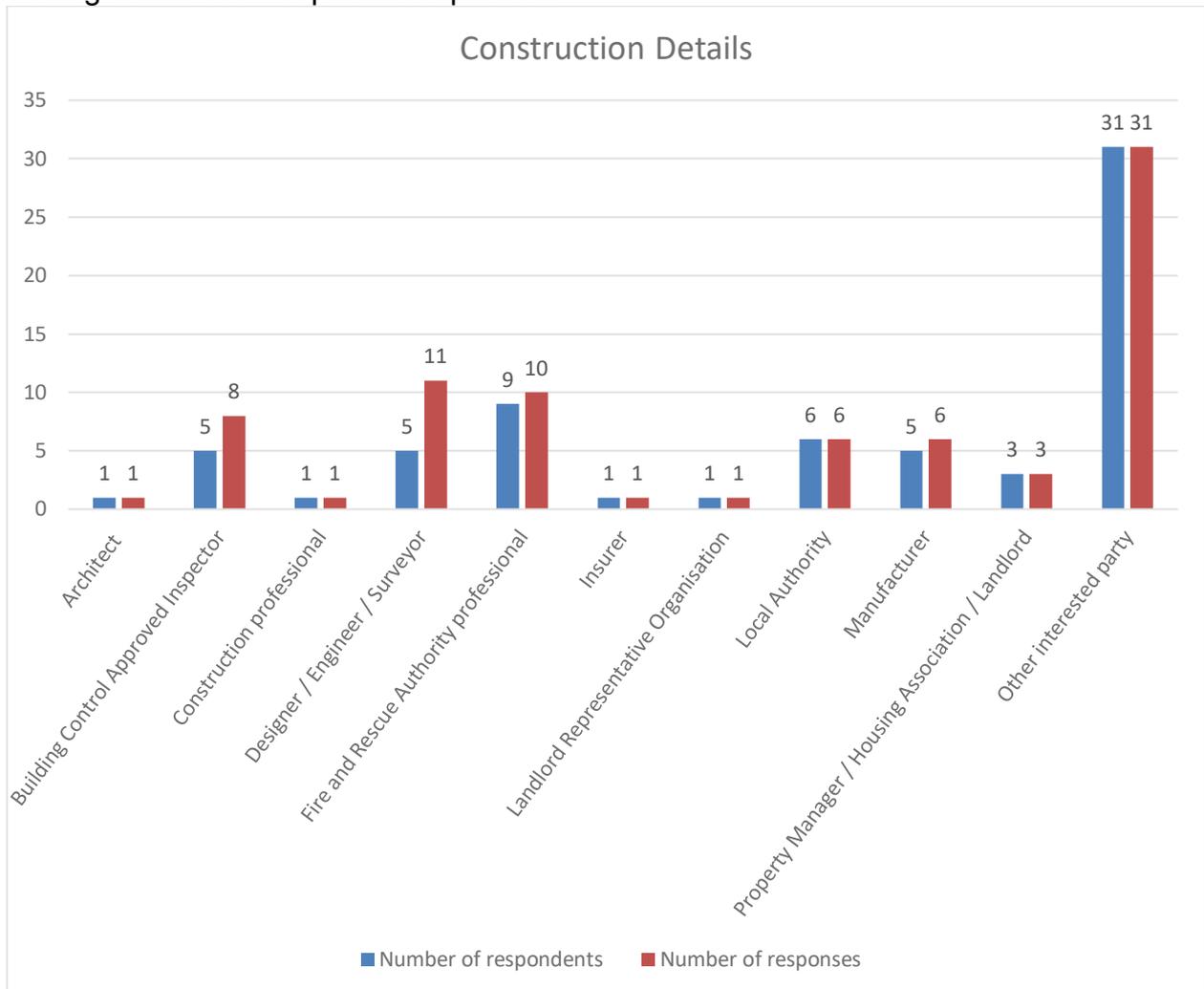


Figure 19: The number of respondents and the number of responses with regard to construction details

Quality issues

A large number of respondents expressed concern over construction quality defects and the manner in which they can undermine fire safety. This included the following common faults:

- Missing and/or incorrectly fitting cavity barriers
- Inadequate fire stopping
- Poorly fitted fire doors and gaps around frames
- The incomplete fire lining of protected shafts

- Lack of or poor fire stopping across and around party walls and other compartment lines
- Installation faults and inadequate commissioning of fire safety installations (such as fire alarms, smoke vents, etc.)
- Substitution of specifications with downgraded materials

Third party and other industry accreditation schemes

Many comments were made as to how such schemes could help raise and secure proper standards in support of ADB both in the round as well as pointing up a significant number of schemes covering specific aspects.

Third Party, accredited industry specific and perhaps something in the nature of Robust Details were all suggested as being beneficial towards securing reliable installation, approval, testing and commissioning, and certification.

Guidance

Most respondents called for more, better and clearer guidance and there are many suggestions, and offers from industry, to how this could be serviced. ADB was seen as the focal point and it was expected to contain comprehensive mainstream guidance but there was wide acknowledgment of a place for an authorised 'library' of supporting guidance from both national and industry standards. Comments also indicated that this would need to be managed within an overarching ADB system with 'rules' of targeting appropriate subject areas, authorisation and review.

Other

External walls and other B4 matters

Non-combustibility – A large number of comments were of the opinion that the recent combustibles ban should be extended to apply to a lower level across a wider range of building use and that for Specialised Housing, Care and Hospitals it should apply to all heights of building.

Fire Resistance of non-loadbearing external walling – Some comments were received that current perceived ambiguity could be clarified and that such walling that is not 'window UPA' could have a designated fire resisting standard, for example on blocks of flats and taller buildings.

Curtain Walling - Whilst ADB requirements cover curtain walling systems there was a noticeable number of comments on the perceived lack of specific ADB guidance on this walling method.

Façade Fires – There were many responses that do not see over reliance on the combustibles ban as the only necessary measure. Suggestions included the need for a more realistic facade testing regime, the limitation of openings, sacrificial floors in tall buildings, and/or the provision of fire resisting bands of external storey construction (including glazing) at intervals up a tall facade.

External Fire Sources – A few comments were made to the effect that ADB strategies do not provide sufficient attention to external fire sources along with those on common areas mentioned elsewhere.

Requirement B4 - other issues

A total of 55 individuals/organisations responded to Requirements B4 - other issues, submitting a total of 106 separate responses.

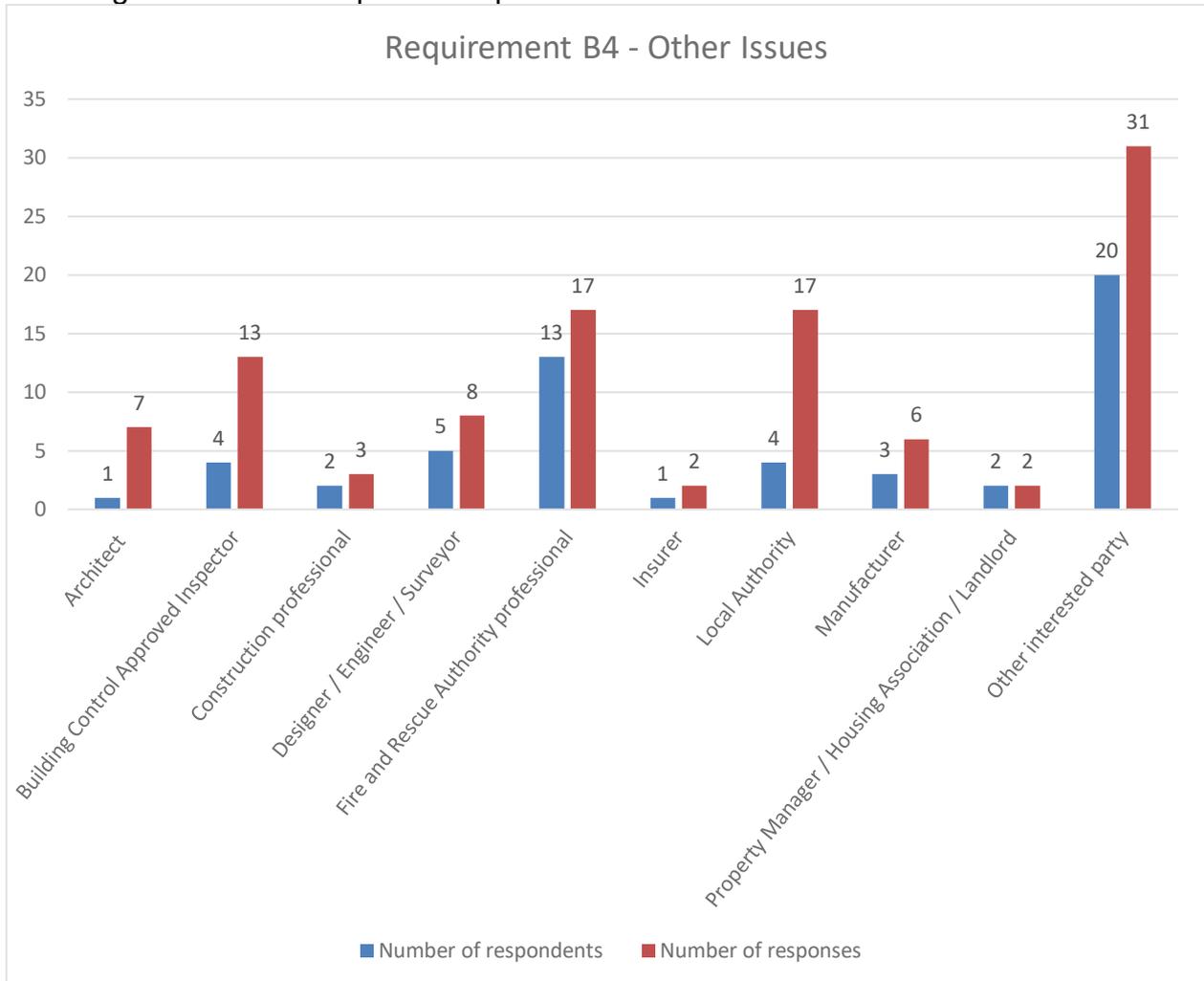


Figure 20: The number of respondents and the number of responses to Requirements B4 - Other Issues

Internal linings

Requirement B2: Internal Fire Spread (linings)

A total of 48 individuals/organisations responded to Requirement B2: Internal fire spread (linings), submitting a total of 58 separate responses.

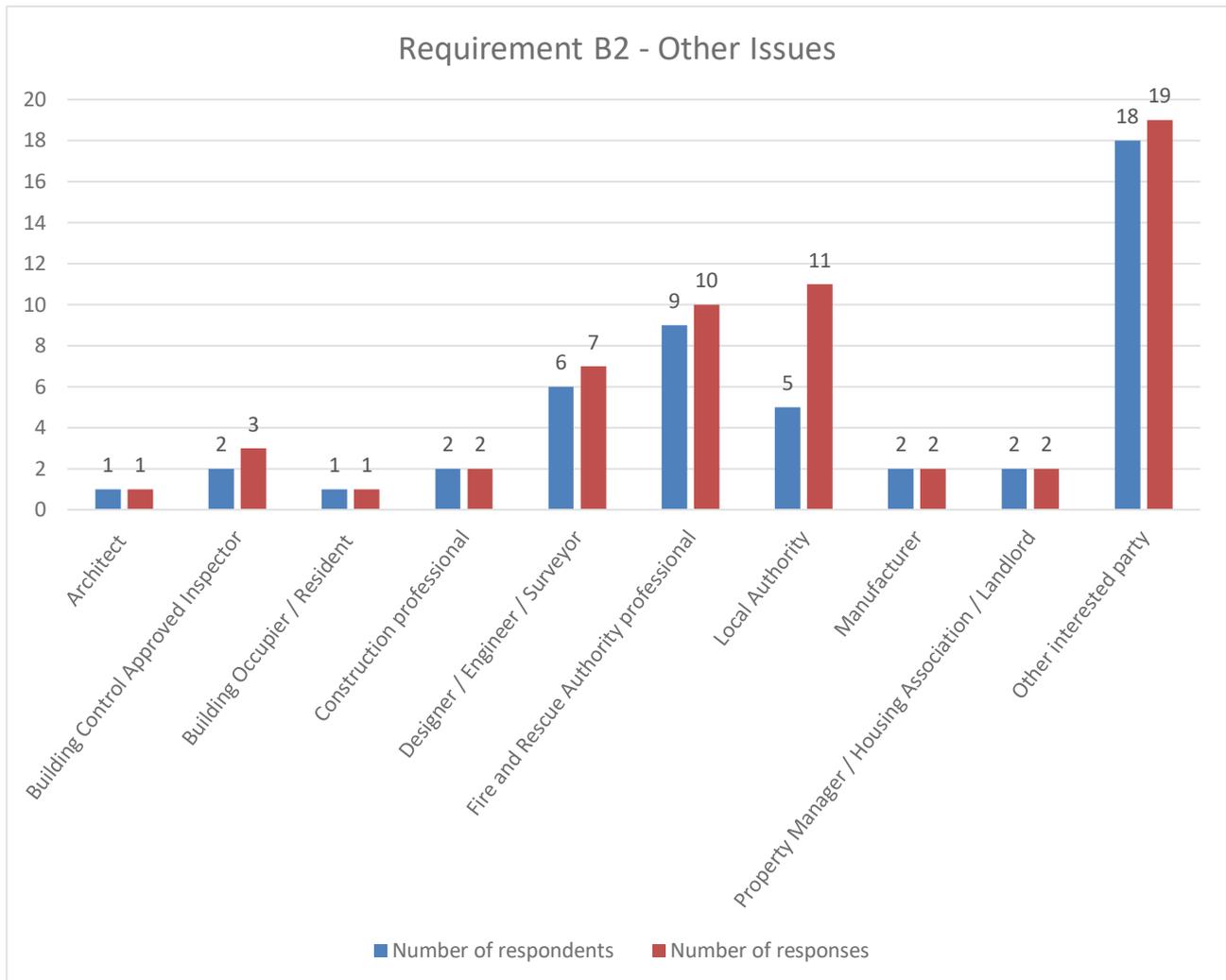


Figure 21: The number of respondents and the number of responses to Requirement B2: Internal fire spread (linings).

A few commentators raised the following matters:

- Class B may not be a sufficient standard for critical means of escape routes and entrances/exits.
- Concerns were expressed over the paucity of many surface linings over flammable sub strata
- The attributes of structural linings are often negated by other fittings placed on wall and ceiling surfaces.

Car parks

There was wide support for a review of standards for car parks whether basement, otherwise enclosed, semi open or open. The nature of the Liverpool fire, some basement incidents and the changing nature of vehicles were all seen as in need of review.

Fire tests

A large number of responses commented in this regard ranging from normal professionals to test experts. There was an evident sense of confusion, concern and call for clarity.

Many points of detail were made but in summary the following broad aspects are noted:

- A general difficulty in understanding test procedures
- Lack of guidance on testing regimes and purpose
- Belief that BS 476 was more closely aligned to purpose and contained more guidance
- Difficulty in interpreting test outputs
- Undue gap between some test regimes and practical building reality
- Lack of specific tests for some important components
- Test reporting is too constrained and does not comment on extraneous features
- Dealing with 476 legacy test reports
- 'Gaming' of testing in order to achieve a desired result
- Apparent variation of test results
- Misrepresentation of test outputs
- 'Vague' certification
- Marketing skew
- A general lack of confidence

Cables

A few responses considered that the inclusion of controls on cabling would be beneficial. Some useful guidance was submitted in this regard.

Services

Apart from cables there were a number of responses that call for a review and updating of ADB guidance on services which is felt to have become outdated. Electrical faults remain a major fire source and buildings now contain a wide range of PV associated fittings, such as inverters and batteries, communications installations, heat exchange units, etc. Also, guidance on gas installations is seen as being incomplete.

Management Guidance

A large number of respondents, across many topics, requested that a full suite of management guidance in support of fire safety needs be either included in ADB or clearly cross referenced to other sources and for it to be legally included in the compliance trail.

Refurbishments

Some respondents requested the inclusion of guidance to set a sound approach to refurbishments and the application of material alterations and the 'not worse than' rule. Striking a balance between avoiding demands for disproportionate upgrade but not constraining against beneficial improvements was seen as advisable. In this respect there were also some comments that suggested that certain vital safety features might benefit from being subject to new retrospective regulatory demand.

Skills and training

Many respondents made the observation that any improved ADB guidance, and linked initiatives need supporting by a programme of insuring the requisite skills are in place.

Enforcement resources and systems

Similarly, a small number commented that enforcement resources should not be either numerically depleted or diffused by weakness in the control system.

Definitions and rules of measurement

There was a strong call for a complete review of these, which are considered confusing at present.

General - other issues

A total of 92 individuals/organisations responded to General - other issues, submitting a total of 252 separate responses.

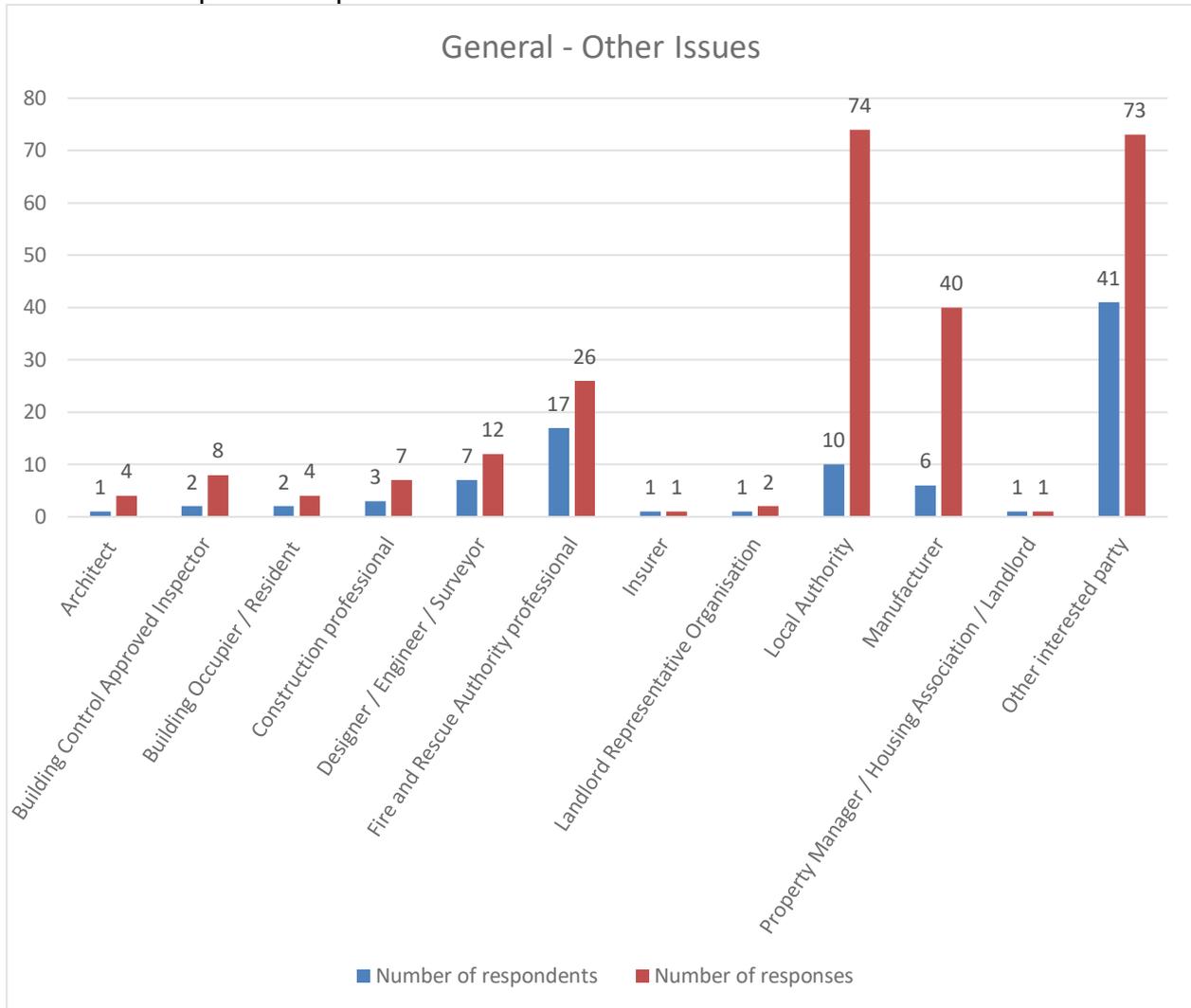


Figure 22: The number of respondents and the number of responses to General - Other Issues.

Glossary

AOV (Automatic Opening Vent) – A window, door, damper or similar that automatically opens, to allow smoke to discharge to external air or an internal smoke shaft, upon activation by a smoke detection system.

Cavity Barrier – A product or construction used to restrict the movement of smoke or flame in a void.

Combustibles Ban – November 2018 Amendment of the Building Regulations that requires external walls of certain residential buildings with a storey 18m or more above ground to be built only of A1 or A2-s1, d0 materials.

Common Areas - Corridors, lobbies, staircases and other parts of blocks of flats used by occupants of more than one flat for access, egress and amenity.

Compartment – A part of a building enclosed by fire resisting walls and floors to a designated degree so as to confine any fire within that compartment and to prevent fire spread throughout the whole of the building.

Dry Riser – Internal pipe work to convey water for firefighting purposes vertically to landing valves within a building. Charged from external inlet valves that fire service pump appliances connect with.

Fire Doors - A door which, with its frame and furniture and when closed, can restrict the passage of fire and smoke to a specified level of performance.

Fire Fighting Shafts – Highly protected vertical core enclosure to facilitate internal firefighting. Contains firefighting stair and lobbies together with a firefighting lift.

Fire Hydrant – Valve and outlet connection on water mains dedicated to fire service use to supply water for firefighting in a neighbourhood.

Fire Mains – Generic term for a system of water supply pipework within a building for firefighting purposes. Includes dry and wet risers.

Fire Resistance - The properties of construction or a component to withstand fire for a stated period of time and to performance requirements as required and designated under relevant fire test standards.

Fire Stopping - Sealing applied to fill gaps around penetrations of fire resisting structure so as to prevent the passage of fire and smoke.

HRRB (High Rise Residential Building) – A residential building of 10 storeys or more as defined in the Hackitt Report 'Building a Safer Future'.

Life Safety – Fire precautionary measures imposed by Building Regulations to ensure that persons in and around buildings are given warning of fire and that appropriate means of escape and structural fire protection can ensure their safe and ready escape. Also includes for facilities for fire service intervention in order that accepted modes of operation can be undertaken.

MMC (Modern Methods of Construction) – Describes a number of construction processes which involve off-site manufacture or assembly. The process includes new buildings, retrofitting, repair and extension of existing buildings.

Non-Combustible – Materials or products that will not, or not significantly, contribute to a fire. Designated by an A1 rating when tested and classified under BS EN 13501-1 or declared as such by EC listing.

PPP (Personal Protection Plan) – Person centred measures that help protect vulnerable, or other people that may need extra consideration, to continue to live safely in their homes.

Pressurisation – Method wherein staircase enclosures and other vital escape routes and fire fighting zones are protected against smoke infiltration by applying a positive pressure.

Property Protection – Approaches that provide for an agreed level of greater fire precautionary and protection measures, over and above that which is intrinsically provided by Building Regulation life safety measures, in order to safeguard buildings, contents and use against damage, loss and disruption.

Purpose Group – A system of classifying buildings according to their general use and the risks presented. These are set out in Approved Document B and form the basis of graduated guidance according to the buildings group.

Residential Care Home – Institutional accommodation for people who may have difficulty in living independently, with meals, personal and medical care provided by staff.

Smoke Control – Methods whereby smoke from a fire is channelled and/or exhausted away from escape routes in order to maintain reasonable tenability for persons to escape.

Smoke Shaft – Internal vertical fire resisting shaft, in the nature of a chimney, into which smoke from a fire floor is vented. Can operate by either natural or mechanical ventilation according to design.

Specialised Housing – Housing on an independent living basis but which provides for managed care and support to varying levels. (e.g. 'sheltered', 'extra care', etc.)

Sprinkler Protection – Buildings provided with AWFSS (Automatic water fire suppression systems) to control or extinguish fire. Can be sprinkler systems to BS EN 9251 or BS EN 12845 as appropriate or alternatively water mist systems to BS 8458.

Stay Put Strategy – Evacuation strategy adopted for blocks of flats that are highly fire compartmented. Allows for the immediate warning and escape of the residents of a fire affected flat. The occupants of other flats are protected and can 'stay put' unless the fire spreads from the original fire flat in which case they can escape via protected routes under their own volition or if directed by the fire service.

Travel Distance – The distance to be travelled by a person from any point in the accommodation to a designated safe point, e.g. to an entrance door where considering internal flat layouts, from a flat entrance door to a protected lobby or stair enclosure or a final exit.

UPA (Unprotected Area) – Windows, doors or other non-fire-resistant areas of external walls from which fire can break out of, and radiate heat from. These form the factors which determines the distance of isolation that is required to prevent against conflagration.

Wet Risers – Internal water supply pipework installed in a building for firefighting purposes and permanently charged with water from pressurised tanks.