Market Feedback and Additional Guidance on ISO 8100-32

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Abstract. ISO 8100 Part 32 is a new international standard published in 2020, addressing the planning and selection of passenger lifts for installation in offices, hotels, and residential buildings. The standard describes two methods to determine an appropriate lift installation: traffic calculation and simulation. Guidance is given on inputs to the analysis and how to review its results. A Technical Report is being prepared to support the application of the standard. In preparation for this work, a survey was undertaken to help understand the application of the standard and how the authors could best support its use. The survey results provide insights into how people engage with the standard and what additional guidance needs to be provided. This paper summarises the feedback and the scope of the additional guidance which will be included in the Technical Report.

1 INTRODUCTION

The ISO 8100-32:2020 standard, titled "Planning and Selection of Passenger Lifts to be Installed in Office, Hotel and Residential Buildings", was the culmination of seven years of work by ISO Working Group 6, Subgroup 5 to create an international standard on that topic under the aegis of the International Standards Organization [1]. The work started from ISO Technical Committee 178 resolution in 2013 to revise ISO 4190-6:1984 and extend its scope to buildings other than residential buildings [2]. Note that other planning and selection guides are developed in certain geographic regions, such as CIBSE Guide D from the Chartered Institution of Building Services Engineers [3].

The planning and selection of lifts has historically been a mix of art and science with varied practices that depend on training, experience, functional background, geographic region and building application. The process is typically partially based on industry-standard analysis methods but also interpreted by subjective factors. In light of a wide range of differing approaches, a primary objective of the 2020 standard was to define a core process in terms of inputs (e.g., data requirements) and outputs (e.g., reported metrics), to establish a common terminology, to specify a set of basic design criteria, and to endorse and briefly describe two industry-standard analysis methods. Recognizing the complexity of the subject matter and the difficulty in achieving consensus on more subjective guidance, the standard focused on the core analysis and terminology that would be applicable by those already skilled in the planning and selection process but also provided several simplified charts under a few scenarios for those less inclined to implement a detailed analysis method.

In 2022, the ISO working group proposed a new work item assigned to the same subgroup that created the original standard to supplement the standard with a separate Technical Report that provides additional guidance and discussion on some of the more complex topics. As a first step, the working group felt that Market Feedback from the user base on the standard was essential to make sure that the Technical Report addressed the most fruitful areas for guidance. Accordingly, the subgroup prepared a questionnaire and solicited feedback through a variety of associations, forums and publications intended to reach the main audience for the standard. The survey itself was made publicly available via a web-based survey tool from the end of November 2022 to the end of January 2023.

This article intends to describe: (1) the goal of the questionnaire, the survey design and how it was reviewed, advertised, and implemented; (2) the key findings from the survey; and (3) a conclusion on

the results and how they will impact the Technical Report. This feedback will inform the subgroup as it prepares the Technical Report expected to be published in 2025. Section 2 of this article discusses the survey methodology and design, sections 3-5 summarize the key results from the responses to the survey and section 6 discusses the conclusion of the Market Feedback.

2 METHODOLOGY

The survey questions, logic, and target distribution list were discussed and agreed upon by the working group responsible for ISO 8100-32. The survey was implemented using popular online survey software, which could easily be circulated electronically. The survey software provided some logic to ensure follow-up questions were only presented when relevant. It also used cookies to make it difficult for people to complete the survey more than once. No personal information was collected, avoiding General Data Protection Regulation (GDPR) issues.

The survey was sent to 21 organisations representing engineering societies, associations, the press, and standards bodies related to the international lift industry. The survey was open for three months from the end of November 2022 and received 427 responses. The questions asked are shown in Table 1.

Table 1 Survey questions

#	Question
Q1	In what country do you live?
Q2	For what regions do you work professionally?
Q3	What is your profession/job title?
Q4	What type of organization do you work for?
Q5	Have you used ISO 8100-32?
Q6	How often have you referred to or used ISO 8100-32?
Q7	For office buildings, how frequently do you use ISO 8100-32?
Q8	For hotel buildings, how frequently do you use ISO 8100-32?
Q9	For residential buildings, how frequently do you use ISO 8100-32?
Q10	How frequently do you use the calculation method from ISO 8100-32?
Q11	How frequently do you use the simulation method from ISO 8100-32?
Q12	Which parts of ISO 8100-32 have you used?
Q13	Are there any specific reasons why you have not used ISO 8100-32?
Q14	Which other guidance documents have you found useful for your work?
Q15	What additional guidance on ISO 8100-32 would you consider helpful?
Q16	Please specify in more detail where additional guidance should be provided.

The introduction to the survey explained that the first edition of ISO 8100-32 was published in 2020 and that it addressed the planning and selection of passenger lifts to be installed in offices, hotels, and residential buildings. The purpose of the survey was to assist the working group responsible for ISO 8100-32 in preparing a guidance document in the form of a Technical Report. Feedback on using the standard was invited so that this Technical Report could be provided.

For ease of analysis, most questions asked the respondent for a selection of one or more options, with an “other” option to capture unanticipated answers. Questions 7 to 11 used a scale of 1 (Never) to 5 (Always). Question 14 invited freeform text to help determine other guidance documents people find helpful.

The responses are summarized in the following sections. Responses to some of the questions are further categorized by responses to a background question such as Question 1 and Question 4. It is worth noticing that the sample size in some of the resulting categories is too small for statistical significance. For such categories, the data is included in the analysis, but further conclusions are not made.

3 BACKGROUND OF THE RESPONDENTS

As the survey was distributed to organisations around the world, it is not surprising to find responses from 68 countries in total including every geographical region of the globe. 75% of the respondents were living in European and Asian countries where there are relatively large lift markets. The United Kingdom and Australia dominate as the respondents’ country of residence with more than 15% of the respondents living in those. Table 2 lists the top-ten countries in which the respondents were living along with the number of respondents in each according to the responses to Question 1. One respondent did not reveal their country of residence.

Table 2 Top-ten countries in which the respondents live

Country	Respondents	Country	Respondents
United Kingdom	67	United States	16
Australia	65	Poland	12
Switzerland	23	Hong Kong	12
China	18	Spain	11
Germany	18	India	10
Unknown	1	Other (58)	174

By combining responses to Questions 1 and 2, the geographical region in which the respondents were living can be tabulated with the region for which they were professionally working. Table 3 relates the respondents living in each region to the regions they worked for. Since Question 2 allowed multiple choices, the total number of respondents working for different regions exceeds the number of respondents living in that particular region. Generally, more than 95% of the respondents worked for the same region as they were living. Oceania makes an exception to this rule as only 84% of the respondents living in the region also worked for the region. The European respondents stand out from the others since a significant portion of them, circa 15%, also work in each of the other regions.

Table 3 The regions in which the respondents live and for which they work

Region of living	Respondents living in the region	Respondents working for a region				
		Africa	Americas	Asia	Europe	Oceania
Africa	6	6		1	1	
Americas	36	1	35	2	4	1
Asia	103	5	3	99	11	4
Europe	212	25	35	39	206	27
Oceania	69		2	15	5	58
Total[1]	426	37	75	156	227	90

Table 4 explores the relationship between the responses to Questions 3 and 4, i.e., the role in which a respondent was working and the type of organisation for which they were working. More than half of the respondents, 231 in total, worked for lift suppliers. Significant numbers of them worked in engineering and sales roles. Lift consultancies and engineering firms were the only other types of organizations, from which a significant number of responses originated. The low number of responses from architectural firms and construction companies may result from two reasons: either the survey distribution channels did not have many representatives from such organisations or ISO 8100-32 was not known well enough to raise interest to respond to the survey.

Table 4 The role and type of organization of the respondents

Type of organization	The role of the respondents						Total
	Architect	Consultant	Engineer	R & D	Sales	Other	
Architectural firm	1	4					5
Construction		1	6	1	5	2	15
Engineering		15	26	2	1		44
Government		2	1			3	6
Lift consultancy		56	9			2	67
Lift supplier		7	101	14	88	21	231
Regulatory org.		1	6			2	9
Other			11	2		13	26
Total	1	86	160	19	94	43	403

4 THE USE OF ISO 8100-32

"Yes" responses to Question 5 of the survey guided the respondents to more detailed questions about their use in Questions 6 to 12. By choosing "No", a respondent was allowed to continue directly from Question 13. In total, 214 respondents (50% of them) had used the standard, 170 respondents (40% of them) confirmed having not used the standard, and 43 (10%) had skipped the question. Table 5 summarizes the number of respondents for each choice of Question 5. Since Question 5 allowed

[1] Table 3 data does not the respondent who did not reveal his/her country of residence. As a results, the total number of respondents is 426 instead of 427.

multiple choices for a respondent, the shown values add up to higher values than the simple Yes/No categorisation. Of those who had not used ISO 8100-32, 44% were not aware of it while 34% did not have access to a copy of it. On the other hand, 34% of the respondents had a copy of it but either had not read it or just not used it.

Table 5 The number of respondents categorised by the use of ISO 8100-32

Used or not	Response	Respondents
No	I was not aware of it	74
	I do not have access to a copy	58
	I have access to a copy but have not read it	12
	I have read it but have not used it	46
Yes	I have referred to it in a specification of a lift installation	141
	I have applied it to the planning and selection of lifts for a project	165
	I have used it for another purpose	36

The remaining analysis in this section concentrates on the 214 users of ISO 8100-32. Those using the standard for its intended use based on Question 6 responses were further categorized by the type of organisation for which they work as shown in Table 6. Generally, 77% of the users had applied it to planning and selection while 66% had referred to it in a specification. This pattern repeats across the different types of organisations, where sample size allows meaningful conclusions, i.e., in the cases of engineering firms, lift consultancies and lift suppliers.

Table 6 The uses of ISO 8100-32 categorised by the type of organization

Type of organization	Used ISO 8100-32	Referred to ISO 8100-32 in a specification	Applied ISO 8100-32 to the planning and selection of lifts
Architectural firm	3	2	1
Construction	9	9	8
Engineering	18	11	14
Government	1		
Lift consultancy	27	18	21
Lift supplier	144	96	113
Regulatory org.	3	1	
Other	9	4	7
Total	214	141	164

Question 6 concerned the frequency of using ISO 8100-32 and allowed a respondent a single choice from daily to annual use. Table 7 explores the responses categorised according to the type of organization, where four respondents working for a lift supplier had skipped this question. Here, a frequent user is defined as using the standard either daily or weekly. Accordingly, 37% of all users had used the standard frequently. A slightly greater percentage, 40%, of the users working for lift suppliers were frequent users. The number of frequent users in lift consultancies and engineering

firms was too low for a reliable conclusion, although the portion of frequent users in such organisations ranged from 26% to 33%.

Table 7 Frequency of using ISO 8100-32 per the type of organisation

Type of organization	Daily	Weekly	Monthly	Annually	Total
Architectural firm		2	1		3
Construction	1	2	6		9
Engineering	1	5	6	6	18
Government			1		1
Lift consultancy	1	6	16	4	27
Lift supplier	8	49	59	24	140
Regulatory org.			1	2	3
Other	3		5	1	9
Total	14	64	95	37	210

Questions 7 to 9 asked about the frequency of using ISO 8100-32, for example, when a respondent is working on an office building. The respondents were given a range of choices from one to five, where a value of one corresponds to never and five corresponds to always. In comparison to Question 6, which charted the frequency of use in time, Questions 7 to 9 consider the frequency of using the standard for a particular purpose. In the following, a respondent is interpreted as a frequent user if they responded either "four" or "five" as the frequency. Figure 1 shows the number of frequent users categorised by the type of organisation for different building types along with their percentage shares. According to the figure, frequent use of ISO 8100-32 is independent of the building type. On the other hand, more than 80% of the users working for a lift supplier use the standard frequently while 40-50% of the users working for lift consultancies and engineering firms belong to the frequent users.

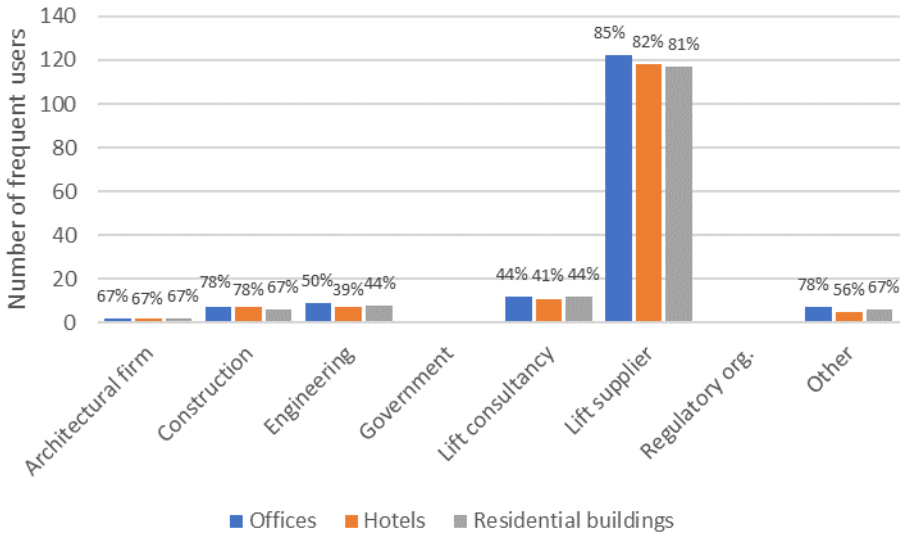

Figure 1 Frequent users of ISO 8100-32 for offices, hotels, and residential buildings

Questions 10 and 11 asked about the frequency of using the calculation method and the simulation method, respectively, in the range from one to five. Figure 2 depicts the number of frequent users categorised by the type of organisation. The difference in using the different methods is the clearest for the users working for lift suppliers, where 85% of the users frequently use the simulation method but less than 10% use the calculation method. The responses from lift consultancies and engineering firms resembled each other as about 50% of the frequent users had used the simulation method but about 30% the calculation method. Nevertheless, the results show that the simulation method defined in ISO 8100-32 is used significantly more often than the defined calculation method.

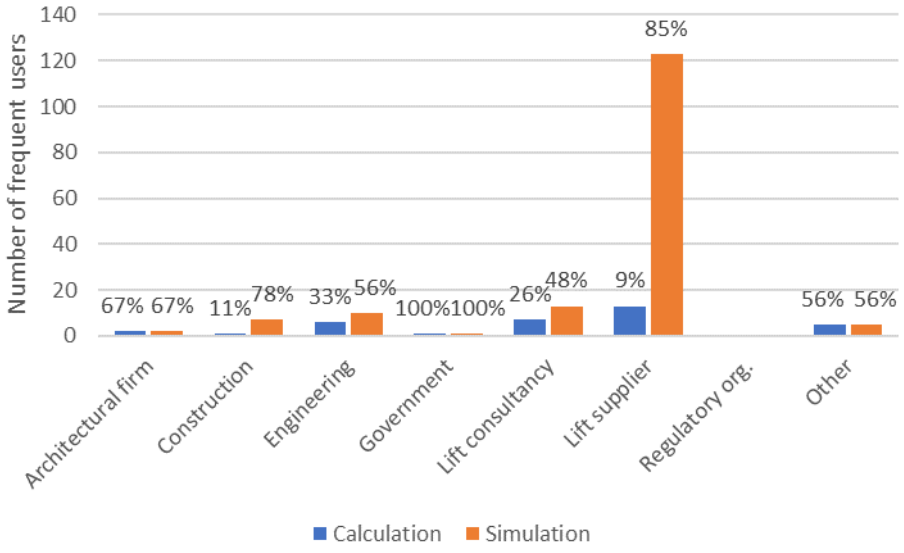

Figure 2 Frequent users of ISO 8100-32 for the calculation and the simulation method

Question 12 allowed a respondent to choose from all the top-level clauses of ISO 8100-32 that they had used. Figure 3 depicts the number of users having used each clause along with a percentage of all users. Clause 8, which sets requirements for the simulation method, is clearly the most referred to part of the standard as almost 80% of the users had used it. The other parts of the standard attracted less than 30% of the users. However, of those, "Terms and definitions", "Reporting", as well as Annexes A, B, and C attracted more than 25% of the users.

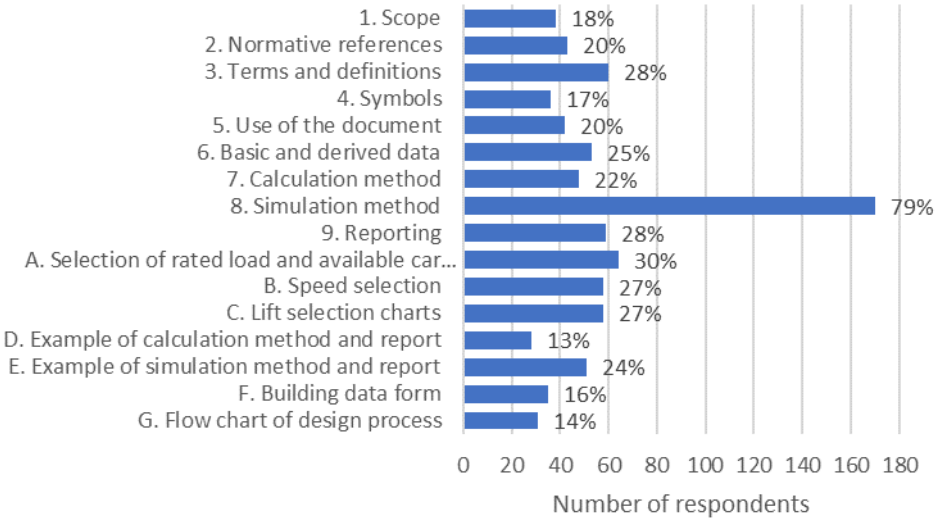

Figure 3 The use of the top-level clauses of ISO 8100-32

5 THE NEED FOR ADDITIONAL GUIDANCE

Questions 13 to 16 aimed at gathering a further understanding of why the respondents had not used the standard and what kind of guidance need they had. These results were assumed to give concrete ideas about topics that could be covered in the new Technical Report under preparation. First, Table 8 summarizes responses to Question 13 about reasons for not using ISO 8100-32. More than half of the respondents indicated that there are no specific reasons not to use the standard. However, 35 respondents either did not know of or were not confident of how to use the standard, so could benefit from the additional guidance.

Table 8 The reasons for not using ISO 8100-32

Any reason not to use?	Response	Respondents
No	There are no reasons for not using ISO 8100-32	235
Yes	I do not know how to use it	15
	I am not confident how to use it	20
	I prefer other design procedures	27
	I am required to use other design procedures	25
	Other	48

Freeform responses to Question 13 along with the option “Other” gave additional yet hard-to-summarise feedback, although some recurring reasons could be identified:

1) some respondents or their customers were not aware of the standard;
2) some respondents’ work did not include planning and selection of lifts;
3) some respondents did not have access to the standard;
4) some respondents prefer other methodologies and/or guidance documents.

In Question 14, respondents were asked to list other guidance documents that they have been using. As the responses were given as freeform text, they contained a wide variety of document references. Table 9 summarizes the number of respondents based on the guidance documents that they used.

Internationally known CIBSE, BCO, and PCA guidelines provide guidance within the scope of ISO 8100-32 and are, therefore, the most relevant other guidance documents for this survey [3,4,5]. CIBSE Guide D was the most referred to document as 62 (15%) of the respondents named it. The users of CIBSE Guide D split interestingly into different kinds of organisations: 28 of them (45%) worked for a lift consultancy, 14 (23%) for a lift supplier and 9 (15%) for an engineering firm. On the other hand, about half of those having used CIBSE Guide D had not used ISO 8100-32 while another half of them had used ISO 8100-32.

BCO and PCA guidelines were mentioned by more than 10 respondents, however, this represents less than 5% of the respondents. The respondents also mentioned other local codes and guidelines as well as their own or proprietary documents. Some of the responses also listed other standards.

Table 9 Other guidance documents the respondents had used

Type of organization	CIBSE Guide D	BCO	PCA	Other local codes and guidelines	Own or proprietary
Architectural firm	2				1
Construction					
Engineering	9	4	5	1	2
Government	1				1
Lift consultancy	28	11	2	9	1
Lift supplier	14	1	8	12	8
Regulatory org.				2	
Other	8	2		5	1
Total	62	18	15	29	14

The last part of the survey concentrated on collecting needs for additional guidance on ISO 8100-32. Figure 4 shows the percentage of respondents needing guidance on a specific part of the standard based on Question 15. The simulation method specified in Clause 8 was ticked by more than 30% of the respondents while more than 25% would need more guidance on lift selection charts in Annex C. The respondents were given an additional choice, which was not directly linked to any particular parts of the standard. More than 25% of the respondents indicated their need for additional examples in applying the standard.

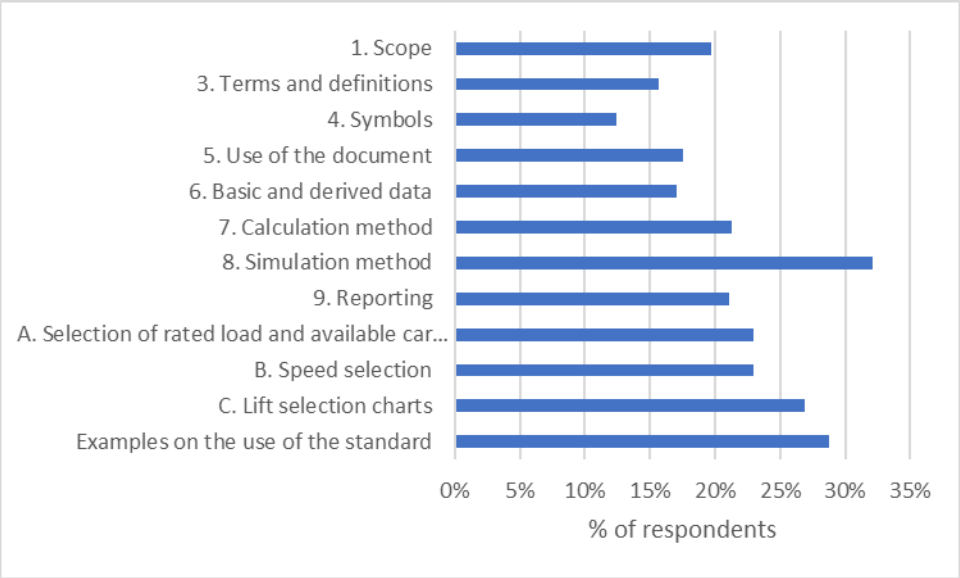

Figure 4 Percentage of respondents needing additional guidance in different parts of ISO 8100-32

Quite naturally, the high-level responses to Question 15 only indicate parts of the standard that are challenging for its users to understand and can direct the efforts to create additional guidance. However, they cannot tell what guidance is actually needed. Therefore, the purpose of Question 16 was to collect more detailed descriptions, specifically what kind of guidance could benefit the users of the standard. In total, there were more than 100 non-empty responses to this question. Some of them meant “no comments” expressed in one way or another. Some of them gave a rather vague idea

of what kind of guidance is really needed. Some of them indicated change proposals to the standard, which is not in the scope of the Technical Report under preparation.

About 20% of the comments were related to the application of ISO 8100-32 in general: how or when should it be used, how to use it for the replacement/modernisation of lifts in existing buildings, or what are its legal requirements. These needs could be covered by describing in more detail how lift planning and selection integrates with the building design process. Some comments asked for an explanation of how ISO 8100-32 is related to other guidance documents, e.g., CIBSE Guide D, and how to establish their equivalence. Guidance on design criteria and other parameter values for building types or lift uses other than in the scope of the standard, e.g., hospitals and goods lifts were requested in about 10% of the comments. However, the analysis methods of the standard require well-established data definitions and design criteria for each type of building within its scope. In addition, many comments were related to the data, such as building occupancy and typical lift performance parameters. About 10% of the comments further confirm the observation related to Question 15 that additional practical examples showing the use of the standard in steps would help in understanding it and how to apply it in practice.

Two respondents raised detailed questions about the value of lunch traffic required handling capacity in ISO 8100-32 design criteria for offices. The value is assumed to accommodate standard designs. In other words, peak passenger demands in a typical office building are not expected to exceed the required handling capacity defined for the full population, i.e., with no allowance for absenteeism or stair usage.

Generally, peak demands during lunch traffic have been found to be higher than during morning uppeak traffic although also the contrary occurs [6,7]. As well, lunch traffic demands higher than ISO 8100-32 required handling capacity were observed especially in buildings with one (major) tenant and in certain geographic areas. Thus, in addition to internationally accepted minimum values, lift planning and selection should carefully consider local conditions and the targeted use of the building.

To allow more future-proof and flexible designs, higher handling capacity than given in ISO 8100-32 can be required as implied by a note:

> "Other values [than the ones shown in Table 3 of ISO 8100-32] can be used provided they are documented with reasons. The values given can change depending on national and cultural norms, building usage, etc."

For example, CIBSE Guide D requires a higher handling capacity for lunch traffic than ISO 8100-32.

It is also worth noticing that the ISO 8100-32 simulation method requires consideration of passenger demands higher than the required handling capacity. The method does not impose any strict limits for passenger service quality under higher demands but helps in understanding the sensitivity of a lift installation to such demands.

6 CONCLUSION

ISO 8100-32 has now been public since June 2020. The survey organized by ISO/TC 178/WG 6/SG 5 aimed at collecting market feedback on the standard and needs for additional guidance. The survey invitation was sent to 21 organisations and attracted 427 responses from around the world. More than half of the respondents worked for lift suppliers while significant proportions worked for lift consultancies and engineering firms. Approximately half of the respondents had used the standard, of whom about 80% had used the simulation method as specified in Clause 8. In open questions, the respondents also indicated other guidance documents that they had used as well as details of what kind of guidance should be provided.

The responses to the survey indicate clear needs for additional guidance and raise items that could be considered for adding to the scope in the next periodic review of the standard. The additional guidance, to be given in the form of a Technical Report, should, to say the least, encourage those who do not know or are not confident about how to use the standard to start using it. SG 5 is currently drafting the Technical Report, tentatively titled "Guidance on ISO 8100-32:2020 – Planning and selection of passenger lifts to be installed in office, hotel and residential buildings". All comments and feedback are being considered as part of the drafting process.

The group is targeting to submit the first complete draft for WG 6 review later this year and expects the Technical Report to be published at the latest in 2025.

Initially, the scope of the Technical Report has been defined as follows:

> "This Technical Report consists of clarifications and additional examples of selected topics pertaining to the planning and selection of passenger lifts as covered by the ISO 8100-32:2020 standard as well as giving further explanations and background information on why specific items are out of the scope of the standard. This document also responds to feedback received from the market."

While being a high-level description of the work in progress, it readily contains elements that the survey revealed, such as clarifications, examples, and background information. The Technical Report will *not* become another book on lift traffic planning but is intended to gather key information in a concise form and cite other guidance documents and books for further information. Since the simulation method is the most frequently used part of the standard and probably the least known for industry practitioners, it may deserve more additional guidance than the other parts of the standard.

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BIOGRAPHICAL DETAILS

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