

2nd Symposium on Lift and Escalator Technologies

Standards, who needs them, who creates them and how are they created

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1.0 INTRODUCTION

For the professional engineer, standards can be a blessing and bane all in one, sometimes being seen as a useful guide to what is expected whilst at others seen as a block to innovation.

1.1 I have been in the lift industry since 1963 and spent half this time working in the field of standards development, firstly with Otis Ltd and then as Technical Director of the Lift and Escalator Industry Association. I was heavily involved with the development of many of the standards you will have heard of, such as, BSEN81 parts 1, 2, 3, 28, 58, 70, 71, 72, 73, 76, BS7255, EN13015, BS5655, BS5656, BS5588, ISO4190 - 1, 2, 3, 7, ISO14798 and many others. The process for creating standards is well defined but varies slightly with the type of standard or document being created.

1.2 British Standards are under the control of the British Standards Institution (BSI) and they have their own set of complex rules that have to be followed. The creation of European standards has another set of rules as does the creation of ISO standards.

Before we worry about writing a standard someone must determine if a standard is required. What subject is to be addressed and who should create it?

2.0 BSI STANDARDS

2.1 Participation in lift/ escalator work

At BSI, standards relating to lifts and escalators are under the control of a committee named MHE 4. This is a large committee with representatives from ACE Association for Consultancy and Engineering, BIS department for Business innovation and Skills, Chartered Institution for Environmental Health, Chartered Institution of Building Services Engineers, Department for Communities and Local Affairs, Health and Safety Executive, Institution of Engineering and Technology, Institution of Mechanical Engineers, Lift and Escalator Industry Association, London Underground, Safety Assessment Federation Ltd, Society of Operations Engineers, Unite Union and University of Northampton.

2.2 There are currently some 1350 committees within BSI with approximately 10,000 members all giving their time and expertise on a voluntary basis usually with the support of their employer. The amount of commitment varies depending on the work programme at any one time.

2.3 Frequency of meetings

Most committees only meet a couple of times each year but some members may also agree to represent BSI on other standards work in Europe or further afield.

BSI committees have to represent the interests of users, manufacturers, government departments and other bodies concerned with the work of the main committee MHE 4.

Some organisations will have representation almost automatically. As an example the government department of Business Innovation and Skill (BIS), The Health and Safety Executive (HSE) Lift and Escalator Association (LEIA) always have representation.

2.4 Where does work originate

Proposals for the creation of a standard can, in theory, come from almost any source but in practice, usually appear from one of the committee members such as LEIA, who through their work have realised some subject needs to be addressed or, it may be due to an accident or other reasons.

2.4.1 Is the work justified.

When a proposal is made it must first be determined if this is a subject that can be addressed by a British Standard (National standard) or if it will infringe on ISO or other standards such as those produced by the European Committee for Standardisation Committee (Comité Européen de Normalisation (CEN)).

2.4.2 Avoiding duplication of work

If the work is of European Interest, the case for a standard is put to CEN and if they agree on the need, CEN will take on the work. If CEN have no interest BSI will look to see if the need for a National standard on the subject exists. They will look to ensure the proposed standard is not just an item of interest to a single manufacturer but will be of genuine interest to consumers, industry etc. If the proposal is accepted MHE4 will appoint a convener to manage the work. Is it to be a full British Standard, Publicly Available Specification (PAS), Draft for Development (DD), Method, Guide, Vocabulary, Code of Practice (CP) or Classification? This needs to be agreed by MHE4 before work starts.

2.5 Publication types

2.5.1 A Publicly Available Specification (PAS) a document developed by British Standards but commissioned by an external organization such as LEIA.

2.5.2 DD means Draft for Development and is used when it is thought the subject would benefit from an extended period of consultation. A DD is usually published for 2 years during which comments are invited. At the end of the period it is determined if the document should be made into a full standard or possibly withdrawn.

2.5.3 Method is a document that gives a complete account of the way a particular activity is performed and may include information on tools and the degree of precision appropriate for the purpose.

2.5.4 Guides provide general information about a subject.

Codes of Practice (CP) provide recommendations for accepted good practice as followed by conscientious and competent practitioners.

2.5.5 Amendments (AMD) as the name implies are used to amend existing published documents.

2.5.6 Classifications provide designations and descriptions of different grades of a product.

2.5.7 Vocabulary documents provide definitions of terms used by a particular sector of industry.

2.6 Forming a work group

Having agreed on the type of document to be produced a proposed convener will be given a scope for the work and should not step outside the scope without the agreement of MHE4. BSI may offer

a secretary to support the organisation of the committee and a call for members will be sent out to MHE4 and other parties thought to have an interest. Who finally sits on the committee is usually a joint agreement between the WG convener and MHE4 with the MHE4 committee having the final say.

2.7 Work schedules and first meetings

BSI will set a schedule for the work and then the real work begins, usually starting with an initial meeting of members where they decide how often they need to meet, where to meet, who will provide the meeting room, if there is any research to be done and who will do it.

At meetings members are required to speak on behalf of those they are representing namely MHE4, SAFed, BIS or whoever, it's not always their employer, a point often forgotten.

2.8 Control of document format

As meetings progress draft text is produced in a BSI electronic template that assists committees in following format rules. Once the committee is satisfied with their work it is circulated to MHE4 members to gain their agreement to what has been produced.

2.9 Public enquiry stage.

When MHE4 agree, the document is sent out for a public enquiry, the period of which is normally 3 months. In theory anyone can purchase the enquiry document and comment, with comments being given on a BSI standardised comment template.

2.10 Handling comments from enquiry

At the end of the enquiry, all comments are gathered and the drafting committee that created the work must meet again and address the comments. This means they must consider each comment to determine if it's reasonable, editorial or of a technical nature. If a comment is accepted the committee has to revise the text of the draft document. If a comment is technical and sufficiently serious they will again revise the text extensively but this may drive the need for a second enquiry or they may reject the comment if justifiable. Whatever they do they must explain in the comment template so that interested parties can see why comments are accepted or rejected. Once this work has been completed the documents again returns to MHE4 to ensure they still agree with its content.

2.11 Final document

If MHE 4 do agree with the final proposed document it's then sent to BSI publishing that check formatting and text to ensure it follows the rule and then it's sent out for formal vote. Interested parties must either vote for the document to be published or explain why they are against its publication. Rejection must be supported by sound technical reasoning.

2.12 Use of risk assessments

The committee will often use a risk assessment based on ISO 14798 to determine if a particular requirements is essential. Some work will be based entirely on risk assessment especially where the proposed subject is very new to the industry and experience is limited. Members must also keep in mind the cost to society. We can all think of ways to make lifts safer but as serious accidents are few and far between, can the cost of some provisions be reasonably justified? The cost to industry must also be weighed against the improvement.

2.13 Official interpretation request

When complete, good standards should be unambiguous, easy to understand and not unnecessarily complex thus possibly impeding small businesses with limited resource. These things are not easy to achieve and as with many things the proof is in the eating. Good standards are used and bad ones

ignored by all however, as modern standard are performance based and do not precisely define technical detail therefore misinterpretation can occur. Where this is the case standard users can write to MHE4 requesting an official interpretation. Any correspondence relating to interpretations should reference the standard number, give its title, date and the clause number in question as well as an explanation of the problem with the particular clause or sentence.

MHE 4 will reply with an official interpretation relating to any standard they created or maintain. If the question relates to a standard outside their control such as one of the EN standards they will pass the request on to those that manage EN standards or may provide an unofficial view of the their own to assist those asking the question, official answers to EN questions can take many months to obtain.

2.14 Once a standard is published it has to be maintained. MHE4 has some 106 standards at this time so plenty for MHE4 members to do with updates due to changes in other standards, legislation, technical improvements, etc. To assist with all the work MHE4 has a number of sub-committees under its control as follows.

MHE/4/-/1 Advisory panel

MHE/4/2 Domestic lifts and stair lifts

MHE/4/-/5 Fire tests of lift landing doors

MHE/4/4 National work coordination and drafting

MHE/4/1 Safe working on lifts

MHE/4/3 Safe working on escalators

3.0 EN STANDARDS

3.1 Main lift committee

The production of EN standards by CEN (Comité Européen de Normalisation) is similar but not identical to BSI. The main lift committee is named Technical Committee 10. TC10 as it's normally known. It's responsible for the maintenance and production of all Lift and Escalator standards for Europe. It's a large committee made up primarily of National committee members from 27 EU member states. Each member state nominates someone to speak on behalf of its National standards committee. This was my roles for many years. I would attend TC10 meetings and speak on behalf of BSI MHE4. So to be a member you have to be nominated by your National committee who will frequently provide a brief to be followed in relation to some aspect of standards work of UK Interest.

Other parties with a position at TC10 include inspection organizations such as TUV, Dutch Lift Institute as well as a CEN Consultant.

3. 2 Proposed new work

Proposals for new standards or the need for revision of a standard comes to CEN TC10 from many directions. It may be suggested by a National committee, may be mandated by the European Commission to support the introduction of a new directive related to lifts or, from CEN itself who inform the committee that some particular document is out of date and needs updating or withdrawal.

As with BSI work proposals they have to be justified by a business plan showing there is a real need and assuming there is a need and support within TC10 to do the work, TC 10 will look to find a convener from within its members.

3.3 TC10 structure

The current structure of CEN/TC10 is as shown below and new work may fit well into the existing structure where a convener already exists or a new work group may be formed.

Table 1 CEN/TC 10 - Structure

Secretariat	Chairperson	Secretary
AFNOR	Mr E.Gharibaa	Mrs E.Contival

SC/WG	Title
CEN/TC 10/WG 8	Stairlifts and vertical platforms for the disabled
CEN/TC 10/WG 6	Fire fighting lifts
CEN/TC 10/WG 10	Improvement of safety of existing lifts
CEN/TC 10/WG 9	Inclined lifts
CEN/TC 10/WG 1	Lifts and service lifts
CEN/TC 10/SC 1	Building hoists
CEN/TC 10/WG 4	Data logging and remote control
CEN/TC 10/WG 2	Escalators and moving walks

3.4 Work groups or Work teams

TC10 can decide if the work is to be performed by a working group (WG) ad-hoc group, work team (WT) etc but only a WG is in full control of its work. Depending on the subject, the decision related to WT or WG etc will depend amongst other things on the type of document to be produced.

3.5 Publication options

As with BSI, CEN have various publication possibilities to pick from as follows.

3.5.1 European Norm (EN) a European standard that is not harmonized but must be adopted by member states who are obliged to withdraw conflicting National standards.

3.5.2 European Draft standard (pr EN) these are similar to BSI draft for development. When first sent to enquiry the enquiry document will carry the prEN title.

3.5.3 Ratified text is the official text sent by CEN to National bodies for publication.

3.5.4 European pre standard (ENV) Similar to a draft for development (DD) by BSI. Usually used where technology is still changing. It's not necessary for National conflicting standards to be withdrawn

3.5.5 Technical report (TR) document containing informative material but not suitable as a standard.

3.5.6 Guide usually contain material related to standardization principles and practice
Technical specification (TS) often used where a draft standard has failed to gain enough support to allow it to be ratified.

3.5.7 Harmonised EN standard. An EN standard drafted in support of one or more directive introduced to remove barriers to trade. Identifiable from other EN standards by its Z Annex at the rear of the document. The annex will explain the directive it supports. It must also be referenced in the Official Journal (OJ) of the European Union.

3.5.8 When required, National committees may ask for an official interpretation of a clause to TC10 for the standards under their control. Note, this is a request from a National committee so if you need an official interpretation of text, you should write to BSI MHE4 who will either answer your question or submit it to CENTC10 for reply. Official interpretations are published on a regular basis in BS CEN/TS 81-11.

3.6 Enquiry voting

Voting and format rules vary depending on what is to be published. A full standard must be precise in its wording and is subject to national voting where as some other documents need only TC10 approval before publication. The choice of publication type can also affect the availability of funding for participants.

3.7 Funding of participants. BSI participants to Work Groups are usually eligible for some financial support but this is not the case for Work Team delegate or ad-hoc delegates. TC10 will provide the convener with a scope of work and it's not for the convener to stray or change the scope without TC10 approval.

3.8 Mandated work

As previously stated, some work will be mandated by the European Commission in support of a European Directive. As an example when the Lift Directive was introduced the commission mandated CEN to produce a harmonised standard to support it and EN81 parts 1 and 2:1998 were created. In this situation the commission also appoints a CEN consultant who is responsible for keeping a watchful eye on the standard as it's developed. The consultant checks the document against the directive it supports to ensure that if it's followed compliant products will fully satisfy the legal requirements of the directive.

3.9 Avoiding duplication of work

CEN will notify National committees when new work is proposed to see if it will be of interest to them and remind them that if they are already working on the subject they will have to stop work.

3.10 Creating a work group or team

For work to start a call for delegates will be made to National committees and as the work is European, meetings will be conducted either in Paris at the head quarters of AFOR who publish the standards or, in another European country as agreed by the WG members at their first meeting. At the first meeting plans are usually agreed on the best way to proceed in order to meet the time table for work issued by the CEN secretary.

3.11 Standard templates

As with BSI, a CEN template for the document type will be provided for the committee to use so as to assist them in following the rules for CEN publications. The standard has to be written so that compliance can be ensured by manufacturers and other interested parties. As an example, you should not use phrase such as, *the access shall be safe* it's not acceptable as everyone will have an opinion on what make safe access. Instead you have to define what safe mean in terms of step height, lighting levels, hand holds etc or whatever is agreed makes an access safe.

3.12 Language of meetings

Meetings and drafting is normally conducted in English with publications of final text in English, French and German, the three official language of the EU.

3.13 Ratified text

Ratified text (agreed final text for publication) is always in English and if differences are discovered the correct wording can be ascertained from the ratified text Difference between the English, French and German version are not unusual to find.

3.14 First public enquiry

Once a draft document has been completed to the satisfaction of the WG and CEN consultant, it's circulated to TC10 members to see if they would agree with it and if accepted by TC10 it's sent to public enquiry at the level of National committees such at MHE4.

3.15 Length of enquiry

The length of the enquiry is typically 3 or 6 months with comments from National committees being made on a CEN comments template. National committees will be asked to indicate if they would support such a standard or not. If not they must explain the technical reason why not. A typical reply from a National committee could be, Yes, we would support such a standard subject to our official comments being addressed or No, we would not support this as its in directly conflict with National legislation and in our view could create a barrier to free trade etc. Comments are returned to the WG that performed the work and like BSI the comments must be addressed by the committee with a written explanation of why any particular comment is accepted or rejected.

3.16 Formal vote stage

The revised document is usually again returned to TC10 to ask if they are satisfied and agree to the document being sent for formal vote. If TC10 agree the document is sent out for formal vote again to National committees who can only vote No on technical grounds. The voting is weighted for each member state with Germany, France, Italy and UK holding the largest vote. Voting rules vary depending on document type and what is described here assumes an EN standards is being produced not a Technical Specification (TS where a vote is not essential).

4.0 ISO STANDARDS

4.1 ISO 178 structure

Once again the structure of ISO is not greatly different than CEN or BSI.

The main committee for lifts and Escalators being ISO178. This large committee has representative from many countries in the world such as China, Japan, Australia, France, German, Korea, Norway, Sweden, Russia, Denmark, Italy etc. Those attending represent mainly large manufacturers and lift examination bodies with occasional visits from government representatives.

4.2 Selection of delegates and funding

Delegates attend in their own right as experts in their field and normally carry the cost with the help of their company. They may receive some limited funding from their National committee who will also have a say in who attends. The costs involved for travel and accommodation can be considerable with no or a small donation from BSI so it's usually only large companies that can afford to participate.

ISO TC178 has a number of Work Groups , see Table 2.

Table 2. ISO 178 Work Groups

Subcommittee/Working Group	Title
TC 178/WG 2	Guide rails The convener can be reached through the secretariat
TC 178/WG 4	Safety requirements and risk assessment The convener can be reached through the secretariat
TC 178/WG 5	Escalators and passenger conveyors -- Safety standards comparison The convener can be reached through the secretariat
TC 178/WG 6	Lift installation fire related issues The convener can be reached through the secretariat
TC 178/WG 8	Electrical requirements The convener can be reached through the secretariat
TC 178/WG 9	Measurement of lift quality The convener can be reached through the secretariat
TC 178/WG 10	Energy efficiency The convener can be reached through the secretariat

4.3 Subject addressed by ISO/TC178

The ISO/TC178 documents published and maintained are mainly to do with Electromagnetic Compatibility, Energy Efficiency, Lift sizes load and speed, Global essential safety requirements for lift, provisions for accessible lift for disabled persons, requirements for disabled evacuation using lifts, fire testing for lift doors, Escalators and moving walks

4.4 Avoiding duplications of work

Whenever possible so as to avoid duplication of work, documents are drafted with the hope or sometimes agreement they will eventually be published as a European standard and not just an ISO standard. This requires considerable effort by participant and a considerable amount of compromise to make one document fit everyone's wishes and fit ISO and CEN rules.

4.5 Source of work

Work is normally generated by members (manufacturers) who see a need for some standardization. Proposed work is studied to try and ensure it is worthwhile and is likely to be supported by members. If ISO/TC178 agree to start new work they again select a convener from ISO/TC178 with the individual's prior agreements and then send out a call for delegates. Often the work will fit into other work underway in which case, it will be passed to the convener currently managing similar work.

4.6 Frequency of meetings

Work is performed by work groups and meetings usually take place twice each year with some intermediate video conferences to move things on.

Draft documents are produced in an ISO template that establishes the format of the document. AFNOR may provide a secretary to support work groups or a National standards maker may agree to provide the secretariat.

4.7 Controlling work progress

Rules will automatically set the time table for the work and meetings will be held anywhere in the world that the working group members agree to.

ISO/TC 178 will set the scope of work for the working group who will report progress to them through the secretariat. Once a draft document is completed it will be put to the ISO/TC 178 committee, to gain their agreement. If they agree the document is published in an ISO format for the document in question.

4.8 ISO document types

4.8.1 Internationally agreed standard.

4.8.2 Technical Specification (TS) often used where a draft standard has failed to gain enough support to allow it to be ratified.

4.8.3 Technical Report (TR) document containing informative material but not suitable as standard.

4.8.4 DIS a Draft International Standard during its comment stage.

4.8.5 FDIS Final document resulting from a DIS with comment included and distributed for final voting.

4.8.6 Technical Corrigenda document used to correct errors in a standard.

Appendix A

Example of ISO25743 development

A.1 After the disaster of 9/11 there was much debate across the globe regarding how such buildings should be designed and the role the lift could play, if any during an evacuation. Some people in the twin towers had escaped using lifts whilst others had died, trapped in lifts.

A.2 At the time, I was convener of ISO/TCWG6 a working group with responsibilities for lift fire related issues, see Table 2 and flow chart below. Reading various publications, some by lift specialist and others by fire experts, it became clear to me that no one was really thinking through all the issues that the use of lifts would bring.

A.3 We discussed the idea of making a study into the use of lifts with my ISO working group, after lots of debate it was finally decided that as we would know more about lift capabilities than anyone else. We should study what lifts could contribute, if anything. We decided to suggest to ISO/TC178 that this was some work we should undertake that would be of use to many in years to come. After more debate with ISO/TC178 they finally agreed that we could and should at least make the study.

A.4 WG6 proposed a scope of work and with some modification the following was agreed by ISO/TC178 *Produce a Technical Report investigating and highlighting the main risks associated with using lifts for the evacuation of persons in various types of Emergencies in high rise building*

A.5. As the committee WG6 already existed we did not need to establish the convener and members, we commenced with the work. ISO set the time frame and work began. This posed a new problem, where to start?

A.6 We decided again after considerable debate that we should chart everything that could go on in a major building emergency. This resulted in a chart that identified where issues of some kind existed. Some of the issues were clearly lift issues whilst many of them related to how the building was designed and beyond the control of lift designers. As an example, if lifts were to be used in a fire we could make the lift do anything when a fire signal was sent to it. Nevertheless we don't design or provide the fire detection system for the building or determine where fire detectors will be, other than these tasks.

A.7 We decided that the report should point out the issues others must consider and give proposals with regards to what the lift could do if some provision was made by others.

A.8 The significance of some risks we identified was argued, with some WG6 members thinking they were serious risks whilst others considered them minor. We used the ISO14798 risk assessment methodology to settle many of these arguments, a great tool for this purpose.

A.9 As work progressed, we identified failings in our original scope and returned to ISO/TC178 to request change to the scope see flow chart 1 below, this happening more than once.

After much work and many meetings in places such as USA, Australia, Canada, France, UK etc, we had a draft document. The chart had gone through much iteration and identified over 40 issues resulting in 26 drafts of the TR.

A.10 The document was sent to ISO/TC178 who made a few comments and WG6 made corresponding amendments. With the amendments made the document was sent to other ISO/TCs who would have an interest. Again a few comments came back and amendments made before the document was sent out for official comment. 50 plus comments came back and these were addressed in following meetings before the document was finally agreed for publication as a Technical Report by ISO/TC178. Being a TR a final public vote was not required. It was finally published in 2010 having started in 2002.
So what has been done after all this, Is the report used?

A.11 Yes, USA has been using it in studies undertaken for high buildings and in addition other countries with similar building issues have been interested in the work.

WG6 is using it to try and develop a standard for lifts that could be used during a fire if the right building design provisions are made, so we wait to see what happens next.

Flow chart 1. Production of ISO/TR25743

