Developments on the Standardisation for Fire Safety within ISO

G COX
Fire Research Station
Garston, Watford WD2 7JR, UK

Abstract

This short paper describes work currently underway within ISO on standardisation in the field of fire safety. It describes the initiatives underway within the ISO/TC92 'Fire Safety' Committee to establish a strategy for the next ten years and beyond which acknowledges the increasing trend towards performance based regulation and the use of Fire Safety Engineering to achieve cost effective safe design.

It is written from the perspective of the chairman of TC92 for whom changes to both title and scope of the Committee have necessitated a strategic review for the way forward. It explains the background to these changes and attempts to explain some of the procedures involved in ISO standardisation, as understood by the author with a research rather than a standardisation background.

Introduction

ISO, the International Organisation for Standardisation, is a non-governmental organisation that was established in 1947. It was created following a conference in London of national standardising organisations drawn from 25 countries shortly after the end of the Second World War. The history of the development of ISO has been described in a book prepared recently for its 50th anniversary [1]. The scope of ISO covers standardisation in all fields except electrical and electronic engineering which are the responsibility of the International Electrotechnical Committee (IEC). Indeed IEC was the pioneer in the international standards field being established as early as 1906. The current membership of ISO comprises 120 standards bodies, one for each country. These include 86 member bodies, 25 corresponding members and 9 subscriber members. ISO's work results in international agreements that are published as International Standards.

Its mission is to:

'Promote the development of standardisation and related activities in the world with a view to facilitating the international exchange of goods and services, and to developing co-operation in the spheres in intellectual, scientific, technological and economic activity.'

Contrary to popular belief ISO is not an acronym for the 'International Standards Organisation' but instead is derived from the Greek 'isos,' meaning 'equal' as in 'iso-therm' or 'iso-bar' etc.

The technical work is carried out through technical committees (TC's) which are established by the Technical Management Board (TMB). TC's establish their own subcommittees (SC's) and working

groups (WG's) to undertake the work. Each TC and SC has a secretariat assigned to a member bod. eg DIN, AFNOR, ANSI, JISC (see Glossary of abbreviations at the end of the paper). The technica staff are thus supported by 'professionals' versed in the procedures of standardisation and th drafting of documents. Chairmen of TC's and SC's are nominated by the relevant secretariat ar appointed by the TMB or TC respectively. Chairmen are required to act in a purely internationa capacity 'divesting themselves of a national point of view' [2]. Because of the importance of th final documents particularly for regulatory purposes, the procedures have of necessity to t comparatively formal compared to the much more 'relaxed' atmosphere that is experienced in, sa. scientific conferences.

ISO is a voluntary body though bodies such as IEC, IMO and WTO rely on ISO to contribute their own standards. For fire safety, national regulatory bodies - even in the European Union preserve the right to set the levels of safety as a national prerogative. An important aspect standardisation within Europe is that CEN standards are mandatory within the member states of tr Union, irrespective of whether an individual member state voted against them. In a situation whe the existing national and new CEN standard conflict then it is the national standard which must t withdrawn.

ISO and CEN have a co-operative agreement to ensure that work programmes are complementa and that wherever possible European standards are based on international documents. This wa formally agreed between the two bodies in 1991 and is known as the Vienna agreement.

The Fire Committees

There are over 200 Technical Committees, ranging from TC 1 'Screw Threads' through TC 17 'Quality Management and Quality Assurance,' responsible for the ISO 9000 series of Standard: There are two Committees devoted solely to fire, TC 21 'Equipment for Fire Protection and Fi Fighting' and TC 92 'Fire Safety,' although there are many others which have within them a fir interest. Some examples include TC 61 'Plastics,' TC 136 'Furniture,' TC 38 'Textiles,' and TC 'Ships and Marine Technology'. The published scopes [3] for the two main Committees are a follows:

for TC 92:

Standardisation of the methods of assessing:

fire hazard and fire risk to life and to property;
the contribution of design, materials, building materials, products and components to fir safety
and methods of mitigating the fire hazards and fire risks by determining the performance ar behaviour of these materials, products and components, as well as of buildings and structure:
Excluded: materials and equipment already covered by other technical committees;
fields covered by other ISO and IEC committees.

and for TC 21:

Standardisation in the field of all fire protection and fire fighting apparatus and equipmer

including extinguishing media as well as the personal equipment of the fire fighter, and related work on terminology, classification and symbols.
Approval of advisory documents relating to the general principles and application of equipment and apparatus for fire protection and fire fighting.

Excluded: protective clothing dealt with by ISO/TC 94

Currently TC 92 is served by four sub-committees, each with its own Working Group structure:

SC1 Reaction to Fire (Chair: B Sundstrom, Secretariat: BSI)
WG2 Ignitability tests
WG3 Spread of flame tests
WG5 Rate of heat release tests
WG7 Large and intermediate scale tests
WG8 Application of test results for predicting fire performance of building products

SC2 Fire Resistance (Chair: D Priest, Secretariat: ANSI)
WG1 General requirements
WG2 Calculation methods
WG3 Fire resistance tests for doors, shutters and glazed elements
WG4 Ventilation ducts and fire dampers
WG5 External exposure of roofs
WG6 Sealed penetrations of fire resistant separating elements

SC3 Toxic Hazards in Fire (Chair: H Roux, Secretariat: ANSI)
WG1 Fire model
WG2 Fire chemistry
WG4 Preparation of guidance documents
WG5 Prediction of toxic effects of fire effluents

SC4 Fire Safety Engineering (Chair: W Becker, Secretariat: DIN)
WG1 Application of fire safety performance concepts to design objectives
WG2 Fire development and smoke movement
WG3 Fire spread beyond the room of origin
WG4 Detection, activation and suppression
WG5 Life safety

In addition to formal liaisons with other ISO committees, TC92 has formal liaison with IEC/TC20 'Electrical Cables' and TC89 'Fire Hazard Testing' as well as, amongst others, CIB W14, IMO and the SFPE.

The TC 21 Committee has seven subcommittees devoted to equipment and extinguishing media:

SC 2 Manually transportable fire extinguishers
SC 3 Fire detection and alarm systems
SC 5 Fixed fire extinguishing systems
SC 6 Extinguishing media for fire fighting
SC 8 Gaseous media fire extinguishing systems

SC 9 Carbon dioxide extinguishing systems
SC10 Foam extinguishing systems

Like TC92 it also has its own Working Groups

WG 1 Advisory panel
WG 2 Symbols for fire fighting vehicles

The Chairmen and Secretariats for both TC 21 and TC 92 are currently provided by the UK (BSI). Sir Reginald Doyle is the Chairman of TC21 and the author of this paper is Chairman of TC92.

The paper is written from the TC 92 perspective, where strong pressures for change have developed and have been recognised by the TMB, but it does have a broader relevance as will be apparent below.

ISO TC92 - A brief history

Technical Committee 92 held its first meeting in London in 1961. Its title then was 'Fire Tests on Building Materials and Structures' and this remained unaltered except for an addition of the term 'Components' to the title in 1977. However the big change occurred following the resolutions of the 15th plenary meeting in 1992. After various proposals and discussions, the Technical Management Board of ISO endorsed, in May 1995, a significant broadening of the Committee's scope under a new agreed title of 'Fire Safety.' The previous emphasis on Testing is replaced by the whole system of Fire Safety of which Testing remains but a part. This change also coincided with the author's appointment to the Chair on the retirement of Dr P.H. Thomas who had held the position since 1974.

The catalyst for the substantial change in scope was the emergence of the discipline of Fire Safety Engineering and the need for new work within ISO to support it. This process began to emerge following suggestions from CIB W14 that ISO needed to initiate work in the area.

The effect of this change to title and scope has been to considerably widen the Committee's remit beyond the fire testing of building products. This is in recognition of the growing importance of Fire Safety Engineering accepted as the new sub-committee 4 of TC 92 following proposals at the 14th meeting in 1989 and indeed the earlier establishment of SC3 concerned with toxic fire hazards. It also recognises the growing worldwide trend towards performance-based regulation. Both these committees have an influence beyond just the testing of building materials. This decision was the culmination of discussions that had been ongoing for several years within the former ISO Technical Advisory Group (TAG) 5 'Fire Tests.'

Some highlights from the current TC92 work programme

There is a substantial work programme within the subcommittees of TC92 and a list of the work items, and documentation in preparation, is too long to reproduce here. These can be found in the Technical Programme[4]. Just a few are mentioned because of the wide interest in these in particular.

Perhaps of greatest long term implication is the completion of the Fire Safety Engineering Technical Report, which will be published during 1998 following a final approval stage. This report written by all five WG's of SC4 comprises eight parts as follows:

The application of fire performance concepts to design objectives
Design fire scenarios and design fires
Assessment and verification of mathematical fire models
Initiation and development of fire and generation of fire effluents
Movement of fire effluents
Fire spread beyond the enclosure of origin
Detection, activation and suppression
Life safety: Occupant behaviour, position and condition

This report (of type 2 in ISO terminology [2]) has a lifetime of three years from publication, before which a review will be necessary to, extend it for a further three years, convert it to an International Standard or withdraw it. This approach is adopted because the subject is still very much under technical development and there is currently at least little prospect of any agreement on an International Standard.

The ISO/IEC 'Glossary of fire terms and definitions' Guide 52 has been revised and is being circulated as a draft international standard for parallel voting within ISO/IEC and CEN under the Vienna agreement.

The ISO 834-1 document on Fire Resistance tests is being modified to incorporate CEN EN 1363-1 text describing use of the plate thermometer. This is now scheduled for publication in May 1998.

Strategic Review

At the Tokyo plenary of TC 92 in October 1995, it was agreed that a "Groupe des Sages" task group would examine both a future strategy for the Committee to reflect these changes and a new structure for completion of this strategy.

To inform the strategic review a wide ranging consultation process was initiated in parallel to solicit views on the past programme and performance of TC 92 and of future needs in the area of standardisation of fire safety. Those consulted were the 'P' and 'O' members of TC92, liaison members and Committees, regional standards bodies and organisations or Committees who were thought would have an interest in fire safety. Over 30 responses were received which provided a valuable commentary on the needs for the future. There was a widespread consensus that there needed to be greater co-ordination across TC's on fire matters although there were several opinions as to how this could be achieved. As an illustration of this problem, Deakin [5] pointed out in the 1996 Fire Research Lecture, using the British Standards system as an example, that there are currently no less than 28 different match flame tests.

There was also a feeling that the internal structure of TC92 needed to reflect the growing importance of Fire Safety Engineering. Furthermore greater emphasis should be placed on market need and evidence of scientific progress before new work items were initiated. Some responses suggested that TC 92 should concentrate only on supplying standardisation for performance based

regulation.

Amongst the conclusions of the task group were the following:

- TC92's objectives are two fold; to facilitate international trade and to improve fire safety
- Because of their regulatory importance, national regulators will not usually adopt ISO standards, without local adaptation, in their prescriptive codes
- It is in the establishment of equivalent fire safety using performance based approaches where TC92 can offer appropriate standardisation
- There is an important need for co-ordination across the fire committees and that TC92 should provide a common strategy to avoid duplication and inconsistency between standards
- TC92 should not involve itself in pre-normative research but should look to others for this input, CIB W14 for example
- There is a need to conduct 'peer' review of new work items amongst the manufacturer, user, regulatory and scientific communities to ensure their market need and technical viability

From the technical perspective, new fire tests may be needed that provide consistent information on products usable by hazard assessment tools. The performance of building linings, structural elements, detectors and suppression devices, for example, need to be allowed for by these approaches and therefore tests needed to supply the appropriate information.

The views of the task group along with those expressed during the consultation exercise were discussed at the 1997 plenary in Philadelphia and the following resolutions agreed.

Resolution 229-Strategy for ISO TC92

ISO/TC92 agrees it strategy shall be
- To develop standards to satisfy our customers to facilitate international trade and to maintain and improve fire safety worldwide.
- To develop standards to satisfy market needs, be timely, cost effective and cover
  a) The assessment of fire hazard and risk to life, health, property and the environment
  b) The performance under fire conditions of materials, products, components elements of structure, structures and buildings (not covered by other TCs) in end use conditions, where appropriate.
  c) The application of fire safety engineering and fire safety management.
  d) Characterisation of occupant performance and occupant behaviour when subjected to fire conditions.

Resolution 230-Development of work programs and structure

ISO/TC92 agrees to establish a Task Group convened by Mr J Hoover to develop a work

programme and organisational structure to fulfil the requirements of the ISO/TC92 strategy.

The Task Group shall comprise up to 10 members and shall include
- The convenor to the Groupe des Sages
- The Chairman of ISO/TC92
- One representative of each subcommittee, who shall provide the response from their SC by 98-05
- Any others agreed by the convenor and Chairman of ISO/TC92.

The Task Group shall provide an initial report to ISO/TC92 by November 1998, to be considered by WG7 and a final report shall be circulated to ISO/TC92 in January 1999 for consideration at the next plenary meeting in May 1999.

Resolution 231-Co-ordination of fire safety standardisation in ISO

Noting the comments from ISO/TC21, IEC/TC20 and IEC/TC89, ISO/TC92 agrees to hold a joint meeting of representatives of committees interested in fire in spring 1998 to establish the best methods of achieving such co-ordination.

Resolution 232-Framework for the long term future standardisation of fire safety

ISO/TC92 agrees to establish a Task Group to consider a framework for the production of standards having a consistent approach across all areas of fire safety. The Task Group shall be established by the Chairman of ISO/TC92 taking into account all areas of fire safety and shall provide an interim report to the next meeting of ISO/TC92 in May 1999, and a final report circulated to members 5 months prior to the subsequent plenary meeting.

Concluding Remarks

The technical committee TC92 of ISO is facing substantial change brought about largely by the emergence of performance based regulatory approaches to the achievement of fire safety. Other factors also suggest the need for change. These include policy decisions within ISO to encourage a more 'top down' management style together with the introduction of information technology in the preparation of standards and even perhaps in the conduct of meetings. The technical issues being raised are likely to be mirrored in national and regional standards arenas.

TC92 have made an important start by first undertaking a thorough review of past performance and future needs for standardisation in this field and then agreeing, in particular, the Resolutions 231 and 232. These are aimed at assisting co-ordination across the fire committees within ISO and IEC and exploring, for the longer term, the prospect of establishing a more consistent approach to standardisation across all aspects (active and passive) of fire safety.

To improve dissemination of information on the work of the committee a world wide web site has been set up at the address: http://www.bre.co.uk/iso. This describes the work of the committee and has links to sites for its own subcommittees, to ISO headquarters and to organisations in liaison

with TC92 such as IMO and CIB W14 etc.

Glossary

AFNOR	Association Francaise de Normalisation
ANSI	American National Standards Institute
BSI	British Standards Institution
CIB	Conseil International du Batiment
DIN	Deutsches Institut fur Normung
IEC	International Electrotechnical Committee
IMO	International Maritime Organisation
ISO	International Organisation for Standardisation
JISC	Japanese Industrial Standards Committee
SC	Subcommittee
SFPE	Society for Fire Protection Engineers
TAG	Technical Advisory Group
TC	Technical Committee
WG	Working Group
WTO	World Trade Organisation

References

1.   Friendship among equals, ISO Central Secretariat, Geneva, 1997
2.   ISO Directives Part 1, Procedures for the technical work, ISO, Geneva, 1995
3.   ISO Memento 1997, ISO Central Secretariat, Geneva, 1997
4.   ISO Technical Programme 1997, ISO Central Secretariat, Geneva, 1997
5.   Deakin G., Fire Safety Standards-Help or Hindrance?, Fire Safety Journal, to be published 1998