Benefits and use of ISO/IEC TR 17032 for certification of the fire safety engineering process

Monideep Dey, PhD

Deytec, Inc.

Summary

This document provides a summary of how ISO/IEC TR 17032, *Guidelines and examples of a scheme for the certification of processes*, can be used for the certification of the fire safety engineering process used to develop a fire protection program. A specific annex (A.8) is included in ISO/IEC 17032 defining the use of the technical report for the development of certification schemes for designs based on fire safety engineering.

Background

Systems engineering designs of safety systems is generally a complex process involving several steps, including the use of mathematical and engineering tools. Examples are the design of building safety systems to safeguard against seismic, flood and fire events. Fire safety engineering is a process that utilizes emerging calculation methods through which fire safety measures in the built environment are designed in lieu of prescriptive measures required in building fire codes. Although fire safety devices such as sprinklers and fire barriers are required to be certified in building fire codes, presently there is no certification method for the fire safety engineering design process which results in the specification of the necessary fire safety devices.

In some cases, process certification is used when certification of the output is not feasible or prohibitively expensive. Therefore, certification of the process is the only indicator of quality of the output since the output itself is not certified. Fire safety engineering is a candidate for process certification since the output can only be assessed through large scale testing of each specific design, which would be prohibitively expensive.

ISO international conformity assessment standards

ISO CASCO Tool Box

The ISO CASCO Tool Box is a comprehensive and widely used set of conformity assessment standards developed by international experts. ISO/IEC TR 17032, *Guidelines and examples of a scheme for the certification of processes* is the latest addition to the CASCO Tool Box.

Certification of the fire safety engineering process

ISO 23932-1:2018 *Fire safety engineering — General principles* sets forth and outlines the general principles and requirements for a fire safety engineering design and the implementation of fire safety design plans and fire safety management. This international standard provides the process (necessary steps) and essential elements that are needed to design, implement and maintain a robust fire safety program. The fire safety engineering process not only involves fire safety design, but also extends to the implementation of fire safety design plans and fire safety management.

A fire safety engineering process certification scheme based on the technical requirements in the ISO 23932 series of documents, ISO/IEC 17065, which sets forth the basic requirements for conformity assessment bodies, and guidance in ISO/IEC TR 17032 can be developed by either an industry forum or regulator, or in coordination of both, for the certification of building fire protection systems based on fire safety engineering.

Use of National and Other Standards

The use of ISO/IEC TR 17032 is not limited to be used in conjunction with ISO technical standards. Other national technical standards can be used with the guidance from ISO/IEC TR 17032 and the requirements in ISO/IEC 17065 to develop certification schemes aimed at specific markets. Requirements for the development of a scheme for certification allows the scheme developer latitude to utilize different technical standards, and parts of standards, in the certification scheme.

The benefit of using ISO/IEC TR 17032 is that ISO CASCO conformity assessment standards are now widely accepted for the assurance of quality around the globe, and provides an internationally recognized **ISO** quality mark to the resulting systems and programs.

Benefits

As shown in Figure 1, there are different levels of certification, 1st, 2nd, and 3rd party. The main benefit of 3rd party certification, which ISO/IEC 17065 and ISO/IEC 17032 addresses, is that it provides independence and IMPARTIALITY in the certification process. Other important principles in a certification are openness, transparency, and truthfulness (see *How to develop schemes documents* for further details on scheme principles and development).

Not all tangible products or processes will require 3rd party certification. The need for the level of certification and impartiality depends on the risk of failure of the product or process balanced with the costs of implementing a 3rd party certification system. An example to consider would be the recent accidents of the Boeing 737 MAX airplanes and resulting tragedies. The software systems in question that caused the accidents were certified by Boeing, a 1st party certification. The question to consider would be whether an independent, 3rd party certification of those software system's performance, that provided independence and impartiality to the certification, would have added to the quality and reliability of the software?

Fire safety engineering is a process that utilizes emerging software (computer programs) through which fire safety measures in the built environment are designed in lieu of prescriptive measures required in building fire codes. The emerging software provides several benefits for designing fire safety systems, but also has limitations which warrant caution, as specified in ISO 16730-1. Although fire safety devices such as sprinklers and fire barriers are required to be certified in building fire codes, presently there is no certification method for the fire safety engineering design process which results in the specification of the necessary fire safety devices.

The question to consider would be whether fire protection programs based on fire safety engineering should also undergo 3rd party certification to add quality and robustness? This would depend on the risk of failure and cost, as mentioned earlier. A fire protection system for a one-family household may not warrant costly 3rd party certification, but a fire protection system in a high rise building whose failure could potentially result in a loss of a large number of lives may warrant a higher level of quality assurance.

A certification program could be developed for the entire fire protection program for a building, including the certification of individual devices (such as sprinklers and devices used for fire detection), and the fire safety engineering process used in the development of the program. ISO 23932-1 not only provides the process (necessary steps) and essential elements that are needed to design a fire safety program, but also to implement and maintain a robust program. This international standard recognizes that the fire safety engineering process not only involves fire safety design, but also extends to the implementation of fire safety design plans and fire safety management. Inclusion of fire safety management as an element of the certification can provide additional benefits for assuring a reliable, quality and effective program on a continuing basis.

Workshops or lecture available

Dr. Monideep Dey, the principal of Deytec, Inc., was the US (ANSI) expert to the ISO CASCO working group which developed ISO/IEC TR 17032.

Content

Dr. Dey is available to provide a workshop or lecture on the use and benefits of using ISO/IEC TR 17032 to develop schemes for the certification of fire safety designs based on fire safety engineering.

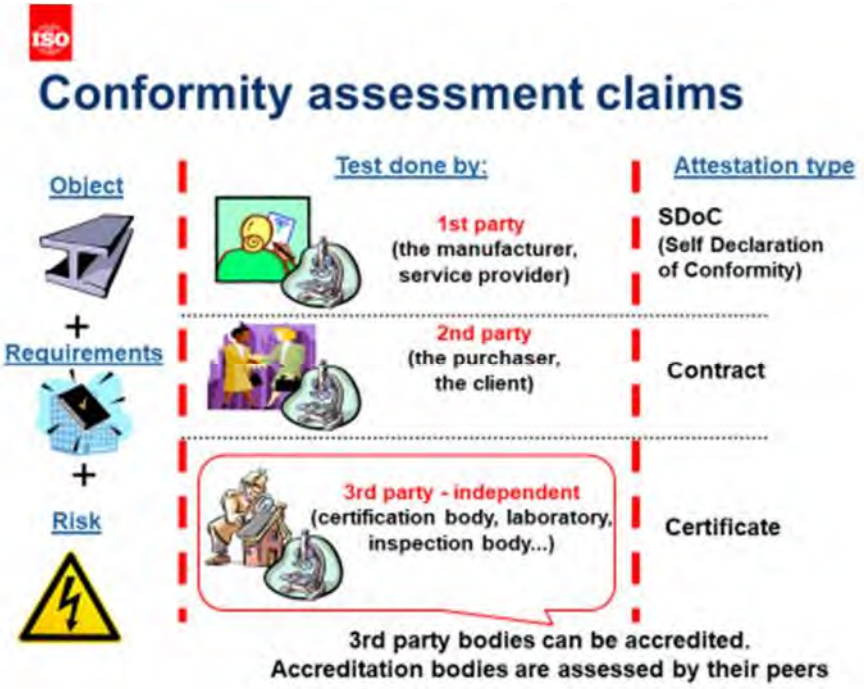
Figure 1 Workshop delivered by Monideep Dey

Background

Monideep Dey, PhD, President of Deytec, Inc., is an expert on fire safety engineering and methods. Dr. Dey served as Chairman (Convenor) of ISO TC 92 SC 4 WG 7, Fire safety engineering: *Verification and validation of calculation methods* from 2013 to 2017 and convened ISO meetings in over 10 countries around the globe. Dr. Dey was also a key contributor to the development of ISO 23932-1. Deytec, Inc. is a company member of the American National Standards Institute (ANSI), and an active participant in the ISO CASCO committee.

Please send a message to Dr. Dey at deytec@frontiernet.net if you need any further information, or are interested in a lecture or workshop.

Figure 1 Conformity assessment claims



Useful reading

1) ISO and UNIDO. Building trust –The Conformity Assessment Toolbox. ISO, 2010
2) NIST Special Publication 2000-01 - ABC's of Conformity Assessment. NIST, 2018
3) ISO. How to develop scheme documents - Guidance for ISO technical committees. ISO, 2019
4) ISO. Conformity assessment — Guidance for drafting normative documents suitable for use for conformity assessment. ISO, 2009