



Fire data — Collection and presentation system

Données sur les incendies — Système de collecte et de présentation

ISO (International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

The main task of ISO technical committees is to prepare International Standards. In exceptional circumstances a technical committee may propose the publication of a technical report of one of the following types :

- type 1, when the necessary support within the technical committee cannot be obtained for the publication of an International Standard, despite repeated efforts;
- type 2, when the subject is still under technical development requiring wider exposure;
- type 3, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example).

Technical reports are accepted for publication directly by ISO Council. Technical reports types 1 and 2 are subject to review within three years of publication, to decide if they can be transformed into International Standards. Technical reports type 3 do not necessarily have to be reviewed until the data they provide is considered no longer valid or useful.

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The reasons which led to the decision to publish this document in the form of a technical report type 2 are explained in the Introduction.

0 Introduction

Fire incident data are needed to guide fire test method development. The ISO Co-ordinating Committee on Fire Tests¹⁾ advises that any ISO Committee, Sub-committee or Working Group which undertakes to prepare a fire test standard should establish the need for the test and collect as much background information as possible on the fire aspects to which the test can be related. The Committee is further instructed to provide any known data on the relationship between the test findings and fire situations. These tasks, which are basic to any fire test development, cannot be accomplished without accurate, dependable data describing how many fires occur in what occupancies, how fires start, which materials/products ignite, what the consequences of the fires are, etc.

1) ISO Co-ordinating Committee on Fire Tests, Draft Document, *The Philosophy and Principles of Fire Tests and Their Design*. This Co-ordinating Committee has been redesignated TAG 5.

The importance of data on actual fire incidents for fire test development is apparent when it is remembered that each test method, whether large or small, simple or complex, if it is to be regarded as a useful tool in fire hazard assessment and control, needs to be related directly or indirectly to the real situation on which information is required. Thus, the design of each test should be selected so as to simulate or reflect the conditions likely to be experienced in a fire situation. Details of the test method such as the size and shape of the specimen and the nature of a composite product should be selected so that the validity of the test data is related to the manner in which the material is used in real life and its association with other materials. A given material or product may be used in different ways in practice, for example on walls, floors, ceilings, internally or externally, exposed or covered by other materials. A test should attempt to gather information on as many practical situations as possible.

The ISO Co-ordinating Committee for fire tests also points out that classification systems which imply an order of relative merit in fire performance should not be used unless there is established evidence to the order of merit with respect to real fire situations. Fire incident data are therefore required not only for the development of standard test methods but also for the presentation of fire test results for professional and technical purposes.

Fire incident data are collected and reported in a number of countries but there is no standardization on an international basis of the classification and methods used. Without such standardization, fire incident data from one country cannot be compared with those from another country and the development of standard test methods that reflect the international fire experience is severely hampered. Changes and trends in fire experience cannot be detected and one country cannot benefit from the experience of another country.

This Technical Report provides a method for collecting a core set of fire incident data using standard classifications. It fosters the development of national data bases that will be internationally compatible and comparable, and thus permits the development of fire and flammability test methods that reflect real-life hazards and predict material/product behaviour in actual use. It presents a composite set of basic data elements derived from existing national systems so that it can be adopted internationally with minimum delay, and requires minimum modification of existing national systems. It is based, for the most part, on the recommendations of a study performed by the Georgia Institute of Technology in which national fire reporting systems operating in ten countries were surveyed and the data elements common to the greatest number of systems were identified.

1 Scope and field of application

This Technical Report proposes a bi-level system for collecting and presenting fire incident data. One level provides general, broad-gauge data which are relatively limited and collected on all fires. The other level provides specific detailed data which are more comprehensive but are collected only on those fires which involve a material or product identified through the general level, or some other means, as presenting a high hazard. This saves time and effort and makes the system more acceptable to fire service personnel. Both levels use the same basic definitions and classifications, thus ensuring that one level supplements the other and that the collected data are comparable.

NOTE — It is intended that the general organization and classification of this report be adopted universally, i.e. that national and regional fire data systems include the core set of data elements that make up the international system. It is not intended that national and regional fire data systems be limited to the data elements described in this Technical Report. National or local conditions may call for an expansion of one or several categories of the international system. National or regional systems may be modified accordingly, provided that the modifications are consistent with the overall organization and classification scheme described in this Technical Report. In this way, the more detailed data collected by the modified systems can be aggregated into the broad categories of the proposed method and thus made internationally comparable and compatible.

2 General level — Basic data categories for reporting fire incidents

2.1 Data on at least four dimensions of fire experience are required for characterizing the fire problem on the general level. The following data element categories are required:

- a) type of occupancy (see 2.2);
- b) area of fire origin (see 2.3);
- c) causal factors (see 2.4);
- d) measures of fire loss (see 2.5).

Differentiation between civilian and firefighter deaths and injuries is recommended.

2.2 Type of occupancy

- a) Buildings and related areas
 - 1) Dwellings (self-contained dwellings, including mobile homes, apartments, rooming houses and temporary and vacation dwellings)
 - 2) Educational institutions and places of worship
 - 3) Public service facilities (hospitals, hotels and motels, prisons, establishments for the aged, establishments for children)
 - 4) Public assembly properties (theatres and cinemas, restaurants and cafes, stadiums and large meeting halls, cultural facilities)
 - 5) Distributive/mercantile properties, including associated storage areas (subdivided in accordance with standard industrial classification)
 - 6) Industrial and manufacturing facilities, including associated yards and storage areas (subdivided in accordance with standard industrial classification)
 - 7) Storage facilities, including outdoor storage (subdivided in accordance with standard industrial classification)
 - 8) Office facilities
 - 9) Public utility property, including outdoor equipment other than vehicles (subdivided by type of utility)
 - 10) Other facilities associated with buildings
- b) Vehicles
 - 1) Road vehicles
 - 2) Rail transport vehicles
 - 3) Aircraft
 - 4) Water transport vehicles
 - 5) Other vehicles
- c) Outdoor fires
 - 1) In crops
 - 2) In forests
 - 3) In open fields and bushes
 - 4) Other outdoor locations

2.3 Area of fire origin

- a) Assembly, sales area (lounges, sales area, meeting rooms, etc.)
- b) Function areas (sleeping rooms, dining areas, kitchens, lavatories, laundries, offices, personal service areas, electronic equipment rooms, operating rooms)
- c) Storage areas (by type of item stored)
- d) Service facilities (elevator, utility shaft, chute, duct, chimney, conveyor, light shaft)
- e) Structural areas (crawl spaces, ceiling and floors, walls, roof awnings)
- f) Transportation vehicle areas (by portions of vehicles)
- g) Other areas of origin

2.4 Causal factors

- a) Heat of ignition (the form of the heat energy igniting the fires)
 - 1) Heating systems (central heating, space heating, fireplaces, etc.)
 - 2) Cooking equipment
 - 3) Electrical distribution equipment

- 4) Electrical appliances (other than cooking, heating)
- 5) Smokers' material
- 6) Open flames and sparks (matches, lighters, hot ashes, welding torches, open fires, etc.)
- 7) Heat from hot object (friction, molten metal, electrical lamp)
- 8) Heat from explosives/fireworks
- 9) Heat from natural sources (sun, lightning)
- 10) Heat from spreading of another fire (exposure fires)

b) Material/product first ignited

1) Structure component of finish

- roof
- sidewall
- exterior trim, appurtenances (including doors, porches, etc.)
- floor
- interior wall
- ceiling
- framing
- thermal/acoustical insulation
- unclassified or unknown

2) Furniture and furnishings

- upholstered furniture
- non-upholstered furniture
- cabinetry
- appliance housing
- unclassified or unknown

3) Clothing and textiles

- wearing apparel on a person
- wearing apparel not on a person
- mattress, bedding
- carpets
- curtains, draperies
- upholstery
- goods not made up
- unclassified or unknown

4) Wood and paper products

- sawn wood (finished lumber)
- hardwood, plywood, fibreboard
- wood shavings, sawdust
- paper
- cardboard
- unclassified or unknown

5) Flammable liquid

- gasoline
- Class 1A flammable liquid (flash point less than 22,8 °C and boiling point less than 37,8 °C)
- Class 1B flammable liquid (flash point less than 22,8 °C and boiling point at or above 37,8 °C)
- Class 1C flammable liquid (flash point at or above 37,8 °C and boiling point at or below 37,8 °C)
- Class II combustible liquid (flash point at or above 37,8 °C but less than 60 °C)
- Class III combustible liquid (flash point at or above 60 °C but less than 93,4 °C)
- Unclassified or unknown

6) Flammable gas

- natural gas
- LP — city gas
- manufactured gas
- LP gas
- anaesthetic gas
- acetylene
- unclassified or unknown

7) Plastics, volatile solid, chemical

- solid chemical
- foamed (sponge)
- thin sheet plastics
- fat (grease, butter)
- adhesive, resin, tar
- combustible material
- explosives
- unclassified or unknown

8) Agriculture, forest product

- growing wood
- fence, pole
- grain
- grain, leaves, hay, straw
- food, starch (other than fat)
- unclassified or unknown

9) Unclassified or unknown

c) Material/product that made the greatest contribution to the fire or to casualties [use the same classification as in 2.4 b)]

d) Acts or omissions bringing about ignition:

- 1) Incendiary
- 2) Suspicious
- 3) Misuse of heat of ignition (improperly discarded, falling asleep, children playing, etc.)
- 4) Misuse of material ignited (fuel spilled, liquid too close to fire, improper container, children playing, etc.)
- 5) Mechanical failure, malfunction (part failure, control failure, short, lack of maintenance etc.)
- 6) Design, construction, installation, deficiency (design deficiency, construction deficiency installed too close to combustibles, etc.)
- 7) Operational deficiency (collision, overturn, overloaded, unattended, etc.)
- 8) Natural condition (wind, earthquake, lightning, floods, etc.)
- 9) Other acts or omissions

2.5 Measures of fire loss

a) Number of incidents

A fire is defined as an instance of destruction and uncontrolled burning, including explosion of combustible solids, liquids, or gases if followed by burning. Fires do not include lightning, explosion of non-combustible substances, or vehicular accidents or overheating unless they result in uncontrolled burning.

b) Number of serious injuries

The number of seriously injured persons is the number of persons who, as a direct result of a fire, incur non-fatal bodily damage to their persons sufficiently serious to warrant medical treatment other than first aid.