TECHNICAL REPORT

ISO/TR 17755

First edition
2014-04-15

Fire safety — Overview of national fire statistics practices

Sécurité incendie — Aperçu général sur les pratiques nationales de collecte de données sur les incendies

Reference number
ISO/TR 17755:2014(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword

ISO (the 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 92, *Fire safety*.

Introduction

This Technical Report assembles data on national fire statistics practices. Such practices are highly relevant to the estimation of model parameters in standards developed by ISO/TC 92. In the absence of any proposals for international standards on such practices, it is useful to ISO/TC 92 to have an overview of existing practices and their implications for existing fire statistical data.

This Technical Report is an overview of national fire statistics practices. A general call was issued to all nations participating in ISO/TC 92, and 10 countries completed a survey instrument prepared and distributed by TG1 of ISO/TC 92, WG 8:

— Australia

— Canada

— China

— France

— Japan

— Kenya

— (Republic of) Korea

— Russia

— United Kingdom

— USA

The survey instrument is included as Annex A.

In this Technical Report, the analysis is organized into four sections:

— Basic Aspects of Data Collection and Analysis (Clauses 1 to 7)

— General Characteristics of Fires (Clauses 8 to 10)

— Characteristics Related to Cause of Ignition (Clauses 11 to 20)

— Characteristics Related to Mitigation of Fire Severity (Clauses 21 to 25)

There is no analysis of Question 11c on three types of equipment used by fire departments (fire brigades), because there were too few responses for any meaningful analysis. There is no Question 13 due to a numbering error. There is no analysis of Question 15, which contained two general questions inviting uncoded responses on matters not covered in the survey.

Annex B is reserved for references, including published coding manuals for fire reporting for those nations that publish such manuals and websites providing national statistics and related analyses for many countries.

Fire safety — Overview of national fire statistics practices

1 Methods of estimation (Questions 1-3)

1.1 Summary comments on methods of estimation

Only two countries – Japan and the U.S.A. – reported use of statistical projection in addition to counting. The survey did not ask how statistical projection is used. Fire statistics based on the national fire database are used for Annual Report of Fire Statistics and White Book on Fire Service annually in Japan. All other countries treat their database as a census, but it is not known whether any of these countries calculate or publish the percentage completeness of their database (for example, by calculating the percentage of total national population represented by reporting jurisdictions). In the U.S.A., the National Fire Incident Reporting System (NFIRS) is voluntary and is known to fall well short of complete capture. Accordingly, tallies based on counting are projected to “national estimates” by statistical projection, using a second database that is based on a statistically valid stratified random sample survey.

An option used in the U.S.A. for a national non-fire-related incident database may be useful in other countries that do not want to shift to U.S.A.-style statistical projection for all statistics. The national crime database, maintained by the Federal Bureau of Investigation (FBI), is translated into statistics almost entirely by counting alone. However, for each major crime, there is also a calculation of the crime rate relative to population, based on the combined population of reporting jurisdictions, and the percentage of national population reporting is also reported.

1.2 Methods of estimation by country

Table 1 provides a summary of national responses on methods of estimation.

Table 1 — Methods of estimation, by country

Australia	The Australian Incident Reporting System (AIRS) is based on separate reports on each incident requiring a response by a fire brigade. There is a national standard for coding of incidents, overseen by the National Data Management Group. All fire brigades are participants, and all are required to report on all incidents regardless of size of loss or other characteristics; therefore, the design is a census and there is no adjustment for missing data. Not all fire services in Australia contribute to the national database. Of the fire services that do contribute, some do not include responses from the rural component of their service. Also, not all fires that occur in the community are included in the AIRS National Database. Analysis is by counting only. Most reports are completed by firefighters who lack extensive training in fire investigation and who obtain most of their information from non-professionals such as the owners and occupants of places where fire occurred.
Canada	Canada’s databases begin as individual-incident databases at the local fire department level. Data may be aggregated before passing from provincial level to national level. The national level is a council of provincial fire commissioners. There is no mention of any adjustments for missing fire departments or other missing data. There is no mention of an incident-specific database at the national level. Analysis is by counting only. All or nearly all reports are completed by firefighters who lack extensive training in fire investigation.

Table 1 *(continued)*

China	China's databases begin as individual-incident databases at the local fire department level. A national standard for coding is implemented through a computerized data entry system. There is no mention of any adjustments for missing fire departments or other missing data. Analysis is by counting only. All or nearly all reports are completed by firefighters who lack extensive training in fire investigation.
France	Undetermined
Japan	Every fire incident report should be submitted to the central government (Fire and Disaster Management Agency) from municipalities by legal basis. This agency makes and maintains a National Fire Incident Database with these data. A national standard for coding exists and some parts of these are translated from Japanese in separate sheets. Analysis is by counting and statistical projection is used for Annual Report of Fire Statistics and White Book on Fire Service annually in Japan. Most reports (60-89%) are completed by firefighters who lack extensive training in fire investigation, but some (11-40%) are completed by professionals with extensive training.
Kenya	Analysis is by counting only. Roughly half of all reports are completed by personnel with extensive training in fire investigation.
(Republic of) Korea	Korea uses individual-incident and summary information databases. Analysis is by counting only. Most reports (60-89%) are completed by firefighters who lack extensive training in fire investigation, but some (11-40%) are completed by professionals with extensive training.
Russia	Official statistics on fires and their consequences in the Russian Federation is the Federal Fire Service of the Ministry of the Russian Federation for Civil Defense, Emergencies and Disaster Relief (hereinafter - the Ministry of Emergency Situations of Russia) directly and through appropriate structural units of organs specially authorized to solve the problems of civil defense and the task of preventing and dealing with emergencies on the subjects of the Russian Federation, within the scope of which includes the organization and implementation of the state fire supervision.

Table 1 *(continued)*

United Kingdom	The United Kingdom's Incident Reporting System (IRS) is based on separate reports on each incident requiring a response by a fire brigade. There is a national standard for coding of incidents. All fire brigades are participants, and all are required to report on all incidents; therefore, the design is a census and there is no adjustment for missing data. Analysis is by counting only. Most reports are completed by firefighters who lack extensive training in fire investigation, but an estimated 10% of reports are completed by personnel with extensive training in fire investigation. The U.K. also conducts periodic household surveys, which provide regular estimates of the percentage of all home fires reported to fire brigades. The U.K. estimates that brigades are called to 1/5 of home fires.
USA	The National Fire Incident Reporting System (NFIRS) is based on separate reports on each incident requiring a response by a fire department and each casualty associated with a reported incident. There is a national manual for coding of incidents, overseen by the U.S. Fire Administration, which administers NFIRS. Fire department participation is voluntary, which means a significant fraction of fire departments do not participate, and some participating fire departments do not report every year. Therefore, NFIRS data is projected using a second database, the NFPA fire experience survey, which is based on summary information reported from a stratified random sample of fire departments. The methods used by most analysts to combine these databases for analysis are documented, but there is no national standard for analysis. Most reports (60-89%) are completed by firefighters who lack extensive training in fire investigation, but some (11-40%) are completed by professionals with extensive training.

2 Fires subject to reporting (Question 4)

2.1 Summary comments on fires subject to reporting

All countries limit reporting to fires that received a fire department response. Some countries incorporate a minimum-loss threshold for reporting, but far more countries recognize that reporting of very small fires often does not occur, even though there should be reporting under the rules. Some countries permit separate, more limited reporting of certain types of very small fires in order to encourage complete reporting of the existence of these fires.

Countries differ on the inclusion of vehicle fires, vegetation fires, and other outdoor fires in their reporting. (This fact was not determined from the survey but has been determined by the authors of the International Technical Committee for the Prevention and Extinction of Fire, now recognized as the International Association of Fire and Rescue Services (CTIF) annual reports on national fire statistics.)

When comparing fire statistics from one country to another, it is important to determine any differences in treatment of vehicle fires, vegetation fires, or well-defined categories of very small fires.

Some countries take special care in the reporting of certain damaging non-fire events that often but not always are associated with damaging fires, such as explosions, lightning strikes, and vehicle collisions.

2.2 Fires subject to reporting by country

Table 2 provides a summary of national responses on fires subject to reporting.

Table 2 — Fires subject to reporting, by country

Australia	Fires not responded to by fire crew are not required to be reported to the national database. The data on fires and emergencies do not represent 100 percent coverage. An AIRS report is required whenever a fire brigade resource responds to an incident regardless of the size of the incident or the method of notification. Most fires are not reported to fire services. These are usually small fires in the home or in workplaces which go out by themselves or are extinguished by an occupant. We do not have sufficient information to be able to estimate the number of unreported fires.
Canada	All fires that result in Fire Department (FD) response should be reported.
China	Based on the document called "Provisions on the Administration of Fire Statistics" Clause 5, all fires, regardless of loss, should be included in the scope of fire statistics. But in practice, a fire with no property loss or loss less than a defined threshold will not be considered, such as a rubbish fire with no fire damage.
France	Undetermined.
Japan	Basically all fire incidents should be reported. The definition of a fire that should be reported is as follows: *"A phenomenon of combustion that is generated or spread against human intention or generated by arson and that requires extinguishment by use of fire control equipment or something with similar effects or is a phenomenon of spread explosion."* As for more concrete examples, some very small fires, such as a cigarette smoldering fire within a wastebasket, which can be easily extinguished with a cup of water or a similar method, would be excluded, even if it is unwanted. Some small fires may not be reported unless they are noticed and reported by neighbors. This is because people in Japan usually have the culture to regard having fire in their property as a social stigma.
Kenya	Fires should be reported if they exceed the threshold for minimum damages.
(Republic of) Korea	No matter how small the fire is, almost all fires can be either recognized by fire station or reported.
Russia	Official statistical accounting is required for all fires, for the elimination of which fire brigades were dispatched, as well as fires in the elimination of which fire brigades did not participate, but information of which came from individuals and legal entities.

Table 2 *(continued)*

United Kingdom	A fire is an incident, attended by a local authority, of uncontrolled burning involving flames and/or heat and/or smoke. An unknown number of departments employ truncated/reporting thresholds. These thresholds are determined on a department by department basis. Fire does *not* include the following except when they cause fire or occur as a consequence of fire: — Explosions * — Lightning — Electrical discharge * Fireworks/petrol bombs which extinguish themselves and do not cause damage are not reportable as a fire incident, but instead as a False Alarm, unless firefighting action is required, in which case, it will be a fire incident. All fires included in the official definition, given in the document named "Incident Recording System (IRS) Help and Guidance – version 2.3", should be reported. Fires are categorized for analysis and reporting purposes according to major incident type in the following way: — Primary fire: includes all fires in buildings, vehicles and most outdoor structures or any fire involving casualties, rescues or fires attended by five or more pumping appliances. — Secondary fire: an incident that did not occur at a Primary location, was not a chimney fire in an occupied building, did not involve casualties (otherwise categorised as a Primary incident) and was attended by four or fewer pumping appliances (otherwise categorized as a Primary incident). — Chimney fires: any fires in buildings where the fire was contained within the chimney structure and did not involve casualties, rescues or attendance by five or more pumping appliances.
USA	All fires that result in a fire department response should be reported. An unknown number of departments employ truncated/reporting thresholds. These thresholds are determined on a department by department basis. Fires are categorized for analysis and reporting purposes according to major incident type in the following way: — Structure fire: includes building fire, fire in structure other than a building, four types of mobile properties used as a fixed structure, such as a manufactured home, and six types of "confined" fires, such as a chimney or flue fire, for which detailed reporting is not required — Vehicle fire: includes nine categories of vehicles — Outside rubbish or trash fire: includes six categories of trash fires, which also do not require detailed reporting, including outside trash receptacle and two types of landfills — Vegetation fire: includes four types of cultivated vegetation and four types of other natural vegetation — Special outside fire: includes outside storage, outside equipment, outside explosion without sustained fire, outside mailbox, and unclassified special outside fire — Unclassified (other) The other database used for calibration does not estimate property damage for non-cultivated natural vegetation, which is a problem for estimates of wildland fire damages.

3 Fire deaths subject to reporting (Question 5)

3.1 Summary comments on fire deaths subject to reporting

Countries differ regarding their use of reports from fire departments and medical records, as well as on their efforts to coordinate both sources into a comprehensive database using consistent definitions.

Countries differ regarding the length of time after injury when a death is formally recognized as a fire death. Regardless of the formal length of time defined by a country, actual reporting may depend on

the country's ability to capture developments occurring after the victim leaves the fire scene. A delayed death may not become known to the fire authorities and may not be recognized as originating with a fire injury by medical authorities.

Countries differ in their treatment of fatal injuries received in an incident involving fire and non-fire harm to the victim, such as an automobile collision followed by fire or a building collapse following fire.

3.2 Fire deaths subject to reporting by country

Table 3 provides a summary of national responses on fire deaths subject to reporting.

Table 3 — Fire deaths subject to reporting, by country

Australia	The Australian Incident Reporting System (AIRS) Standard defines fire fatalities as "***those people who died from injuries that are attributable to the incident or the action of handling the incident***". The number recorded is based on data which is the best available at the time of the incident. However, in recent years, fire fatality information has been sourced from the Australian Bureau of Statistics for reporting to Government and fire brigade databases. Annual fire death rate represents all deaths where the underlying cause of death is fire related to smoke, fire and flames including all (structure and landscape) fires — as recorded in *Causes of Death, Australia* (ABS cat. no. 3303.0). Fire deaths are identified from cause of death information supplied by the medical practitioner certifying the death or by a Coroner. Fire deaths are reported by year of registration of death at State and Territory Registrars of Births, Deaths and Marriages.
Canada	The Canadian definition of a fire fatality is "***a person who dies as a result of injuries sustained during a fire incident***". Examples of fire-related deaths that are likely to be recorded as non-fire deaths and not included in the database include people who die by fire resulting from vehicle accidents and deaths from a fire that is otherwise controlled (e.g. death by CO poisoning) and so does not receive a fire department response. As for fire deaths likely to be missed, as opposed to captured but not reported under fire, some jurisdictions in Canada (ON) count a death as a result of injuries sustained that must occur within one year and one day of the incident. There are differences between jurisdictions.
China	The Chinese official document called « Provisions on the Administration of Fire Statistics », clause 7, defines that "***all of the deaths due to burn, throwing, smashing, fried, suffocation, poisoning, electric shock, high temperature, radiation and other causes during fire and fire-fighting, should be considered into fire statistics***". The fire deaths taken into account are those which occurred within 7 days after the fire. If a fire is followed by an explosion or by any other incident, and identified as another safety incident, the death(s) should not be included into the input data of a fire death. Furthermore, if the fire is suspected to be an arson fire, and if it is proved, after investigation, that it is an arson fire, the death(s) should not be included in the input data of a fire death.

Table 3 *(continued)*

France	Officially undetermined (No survey returned). But actually there are two different fire fatality databases in France: one is realized by the Home Ministry-DGSCGC and the other by the INSERM- CepiDc. The database realized by the Home Ministry - DGSCGC is implemented by the fire services. All the deaths which occurred on the scene of a fire are taken into account. Deaths (due to acute fire effects) of firefighters, fire officers, fire brigade personnel and other emergency responders are also reported. This database does not take into account the fire casualties which will die at the hospital or during their transportation to the hospital by EMS. Some elements of this database are published every year by DGSCGC through a special document. The 2012 edition (for 2011) detailed the number of French fire services which have contributed to the national database and the number of fire fatalities which occurred on the scene of fires. This publication does not detail the age, gender, ethnicity (strictly forbidden by the law), activity when injured, type and severity of injury, behaviors that contributed to injury, part of body injured. It just specifies the type of fire during which the death occurred, such as home building, public building, forest fire. The database realized by the INSERM- CepiDc is compiled from the medical death certificates completed by physicians. Since 2000, the causes of death are coded according to the tenth revision of the International Classification of Diseases of WHO. The data are based on the underlying causes of death selected by the WHO rules. This database includes all the fire deaths which occurred in France (Metropolitan and ultramarine): on the scene of the fire, during the transportation and at the hospital. Suicides by fire are also included in this database. INSERM-CepiDc uses CIM 10 codes: X00-X009, X01-X019, X02-X029, X03-X039, X04-X049, X05-X059, X06-X069, X08-X089, X09-X099, W35-W409, X97-X979.
Japan	Fire brigade, who handled casualties at the fire, confirms whether or not a death was caused by fire. "***The death within 48 hours after fire***" is regarded as fire death by definition in Japan. But, at the same time, for the purpose of reporting the number of fire deaths to WHO, fire deaths within one month are also recorded. The deaths by fire in a report are confirmed by fire brigade after listening to the medical doctor who treated the fire casualties.
Kenya	The Kenyan definition of a fire fatality is a death which is caused by "***accidental fires and fires caused by non-fire conditions e.g. lightning, electrocutions and natural fires***". Lightning, negligence, arson, and scalding are examples of circumstances that can result in a death being recorded as a non-fire death.
(Republic of) Korea	The Korea definition of a fire fatality is "***a death occurred within 24 hours from a fire***".
Russia	For the Russian Federation, a fire fatality is a "***person who died from exposure to hazards of fire and/or related manifestations of the hazards of fire, falling from a height of panic***", except when the death occurred during a road traffic accident, air and rail disaster force-majeure circumstances, and in sites enjoying the right of extraterritoriality.

Table 3 *(continued)*

United Kingdom	For United-Kingdom, the definition of a fire fatality is given in the document named "Incident Recording System (IRS) Help and Guidance – version 2.3" **question 3.5**: "***Killed/ Fatality - a person who has died as a direct or indirect result of injuries received at the incident***" and specified at **question 9.21**": "***in general, fire-related deaths are those that would not have otherwise occurred had there not been a fire***".
USA	For United States of America, a fire fatality is "***a person who is killed as a result of a fire, including death from natural or accidental causes sustained while involved in the activities of fire control, attempting rescue, or escaping from the dangers of the fire***". Independent of fire incident data collection, a fire related death will be captured when exposure to fire, fire products, or explosion was the underlying cause of death or was a contributing factor in the chain of events leading to death, as reported on the death certificate through vital records reporting channels. Examples of circumstances that can lead to exclusion of a death, include automobile collision resulting in fire, in which the fire caused death may not be identified as fire deaths. Deaths captured through coroners/vital records reporting channels are dependent upon recording personnel ability to determine original cause of a fire-related condition that contributes to death. Examples of deaths that may be missed include deaths that occur after the fire incident report is completed – not necessarily just due to extended time lag. Closing the loop between medical and fire reporting systems requires a degree of coordination that does not happen in an unknown number of instances. Although not common, there may be some fire departments that do not report fire deaths on NFIRS records. Governmental and Non-Governmental Organizations (NGOs) may choose specific ICD-10 codes for inclusion in analysis of vital records data, depending upon the scope of the study. United States Fire Administration (USFA) uses ICD-10 codes F63.1, W39-W40, X00-X09, X75-76, X96-97, Y25-26, and Y35.1 to define fire deaths.

4 Fire injuries subject to reporting (Question 6)

4.1 Summary comments on fire injuries subject to reporting

Countries differ regarding their use of reports from fire departments and medical records, as well as on their efforts to coordinate both sources into a comprehensive database using consistent definitions.

Countries differ in their treatment of injuries received in an incident involving fire and non-fire harm to the victim, such as an automobile collision followed by fire or a building collapse following fire.

4.2 Fire injuries subject to reporting by country

Table 4 provides a summary of national responses on fire injuries subject to reporting.

Table 4 — Fire injuries subject to reporting, by country

Australia	The Australian Incident Reporting System (AIRS) Standard defines injuries as those people who received injuries that are attributable to the incident or the action of handling the incident. For the purposes of incident reporting, an injury is defined as requiring: — treatment by a medical practitioner or; — at least one day of restricted activity immediately following the incident. However, for reporting purposes in recent years fire injury information has been sourced from the Australian Institute of Health and Welfare. Fire injuries are represented by hospital admissions (excluding emergency department non-admitted casualties) and are reported by the State or Territory where the admission occurs. A person injured by fire may be treated more than once, and in more than one State or Territory. Deaths from fire injuries after hospitalization are removed from the fire injury data for the time series because these are counted in the fire death rate. In fire department systems, fire injuries where the victim has been transported to hospital prior to brigade arrival may be missed in fire injury reporting.
Canada	A fire injury is a person who is injured as a result of a fire incident.
China	The definition of fire injury refers to the clause 7 of "Provisions on the Administration of Fire Statistics" as follows: all of the fire injuries due to burn, throwing, smashing, fried, suffocation, poisoning, electric shock, high temperature, radiation and other causes during fire and firefighting, should be considered into the fire statistics. The statistical standards for injuries are identified by the relevant provisions of the Ministry of Labor.
France	Officially undetermined (No survey returned). But actually the database realized by the Home Ministry - DGSCGC is implemented by the fire services. The database realized by the Home Ministry - DGSCGC is implemented by the fire services. All the injuries which occurred on the scene of a fire are taken into account. Injuries (due to acute fire effects) of firefighters, fire officers, fire brigade personnel and other emergency responders are also reported. Some elements of this database are published every year by DGSCGC through a special document. The 2012 edition (for 2011) detailed the number of French fire services which have contributed to the national database and the number of fire injuries which occurred on the scene of fires. This publication does not detail the age, gender, ethnicity (strictly forbidden by the law), activity when injured, type and severity of injury, behaviors that contributed to injury, part of body injured. It just specifies the type of fire during which the injury occurred, such as home building, public building, forest fire.
Japan	Fire brigade, who handled casualties at the fire, confirms whether or not an injury was caused by fire. The cause of injuries in an automobile collision where there was also a fire is confirmed by fire brigade after listening to the medical doctor who treated the casualties in order to make sure of whether or not the injury is attributed to fire. An example of injuries that could be missed would be someone who suffers minor burns caused by ignition on apparel by flame of a cooking stove, but the burn is not so serious for him or her to go to hospital.
Kenya	Shock, smoke inhalation, body damage, fire injuries due to fire effects.
(Republic of) Korea	An injury which needs medical care within 1 year or needs emergency room care at least for 1 day.
Russia	All people injured on the scene of fire from exposure to hazards of fire and/or related manifestations of the hazards of fire, such as falling from a height of panic, are to be recorded.