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Graphical symbols — Safety colours and safety signs — Natural disaster safety way guidance system

Symboles graphiques — Couleurs de sécurité et signaux de sécurité — Système de guidage pour mise en sécurité en cas de catastrophe naturelle

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Foreword

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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 of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 145, *Graphical symbols*, Subcommittee SC 2, *Safety identification, signs, shapes, symbols and colours*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

There is a need to standardize a system for giving safety information related to evacuation to safety evacuation areas in the event of natural disasters that relies as little as possible on the use of words to achieve understanding.

It is extremely important for people who do not understand the local language to figure out the evacuation route instantly when they encounter a natural disaster in a foreign country.

This document reflects best practice; the illustrations show installation practice designed to provide the optimum amount of information to clearly identify the hazards of different types of natural disaster in order to direct evacuation by the appropriate location of evacuation route signs and evacuation plan signs, and the selection of places of refuge.

International travel increases the need for standardized methods of safety communication. A standardized method of signing with the use of appropriate supplementary signs and text throughout the public environment assists the process of education and instruction on the meaning of the evacuation route signs and place of refuge signs, and the appropriate actions to take.

The illustrations within this document are based on the assumption that people might be unfamiliar with the features of the natural disaster or the location of places of refuge.

It is important that the application of safety way guidance systems is standardized to aid comprehension. While education in the comprehension of the signs and evacuation plan signs is essential, incomprehension caused by lack of standardization can lead to confusion and possibly hinder effective evacuation.

This document does not purport to include all the necessary aspects or requirements of the design of a natural disaster safety way guidance system. Users are responsible for its correct application.

Graphical symbols — Safety colours and safety signs — Natural disaster safety way guidance system

IMPORTANT — The colours represented in the electronic file of this document can be neither viewed on screen nor printed as true representations. For the purposes of colour matching see ISO 3864-4, which provides colorimetric and photometric properties together with, as a guideline, references from colour order systems.

1 Scope

This document specifies the principles governing the design and application of signs and plans used to create a natural disaster safety way guidance system to help people evacuate to safe areas or places of refuge in case of natural disasters (e.g. tsunamis, floods, debris flows, steep slope failures, landslides, tornados, large-scale fires, active volcanoes).

This document provides guidance on the selection and use of safety signs conforming to ISO 7010, public information symbols conforming to ISO 7001, and text on evacuation route signs, places of refuge signs and evacuation plan signs for information related to one or more particular natural disasters. Guidance on the design, location, mounting positions and maintenance of the sign components of a natural disaster safety way guidance system is also provided.

This document does not apply to the determination of the need for natural disaster safety way guidance. This document assumes that the risk assessment or requirements of an enforcing authority have established the need for such natural disaster safety way guidance systems.

This document is not applicable to the particular hazards of high winds, snow avalanches, earthquakes or hurricanes, which cause the natural disasters covered in this document.

This document is applicable to safety way guidance from natural disasters from the outside of buildings to safe areas. ISO 16069 is applicable to safety way guidance within a building to the emergency exit(s).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7010, *Graphical symbols — Safety colours and safety signs — Registered safety signs*

ISO 3864-1, *Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs and safety markings*

ISO 3864-3, *Graphical symbols — Safety colours and safety signs — Part 3: Design principles for graphical symbols for use in safety signs*

ISO 3864-4:2011, *Graphical symbols — Safety colours and safety signs — Part 4: Colorimetric and photometric properties of safety sign materials*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
evacuation plan
map or diagram displayed in public areas to assist users to understand the environment, locate facilities and determine evacuation routes to reach a safe area

3.2
evacuation route
direction from a person's location to the nearest safe area when a disaster occurs

3.3
natural disaster safety way guidance system
system that includes evacuation plan signs and evacuation route signs, and provides information to guide people from a location to a place of refuge when a natural disaster occurs

3.4
natural disaster supplementary sign
sign indicating the type of possible disaster

Note 1 to entry: Appropriate evacuation area and other related information are also displayed.

3.5
ordinary material
material which is not retroreflecting, fluorescent or phosphorescent, and neither involves powered light emission nor is activated by a radioactive source

[SOURCE: ISO 3864-4:2011, 3.11, modified]

3.6
phosphorescent material
material incorporating phosphors that, if excited by UV or visible radiation, store energy, which is emitted as light over a period of time

Note 1 to entry: A phosphorescent sign is the same as “photoluminescent”, commonly used in the literature of the photoluminescent safety sign industry.

[SOURCE: ISO 16069:2017, 3.15]

3.7
place of refuge
outdoor area or indoor space to which people can quickly evacuate in order to remain safe when a disaster occurs or is likely to occur

Note 1 to entry: Places of refuge include protection shelters, outdoor refuge areas, tsunami evacuation areas and tsunami evacuation buildings.

3.8
protection shelter
facility that provides protection from a disaster

3.9
sign height
diameter of a circular geometric shape or height of a rectangular or triangular geometric shape of the type of safety sign

Note 1 to entry: Registered safety sign originals in ISO 7010 are in a uniform 70 mm size with corner marks to enable accurate enlargement and reduction scaling. A border is not shown.

[SOURCE: ISO 20712-3:2020, 3.8, modified — Note 1 to entry revised.]

4 Purpose and deployment

The natural disaster safety way guidance system is necessary to warn people in areas likely to be affected by a disaster when it occurs and help them take suitable action quickly according to the type of disaster.

The objective of the natural disaster safety way guidance system is to display information about the hazards of possible natural disasters in vulnerable regions so both visitors and people living in the region can evacuate quickly.

5 Planning natural disaster safety way guidance systems

Where risk mitigation plans related to natural disasters have been prepared and are available to civil protection agencies or relevant authorities, a natural disaster safety way guidance system can be designed to communicate important safety and evacuation information to populations in zones that can be affected by one or more types of natural disaster.

The designer of the system should identify the following, based on the mitigation plans:

a) locations of hazard zones;

b) locations of places of refuge and their names;

c) suitability of places of refuge for certain disasters;

d) locations of evacuation routes to places of refuge;

e) locations of accessible routes in the event of floods from inland waters and fire disasters;

f) locations of rescue facilities (e.g. medical, firefighting);

g) locations of facilities for enabling emergency evacuation (e.g. helicopters, lifeboats);

h) locations of emergency communication equipment;

i) locations of available emergency services, such as water and energy supply;

j) appropriate supplementary text on evacuation route signs, such as information on recorded heights of water at locations within flood zones;

k) use of local language(s) and other languages;

l) other sources of warning information, such as national and local media, and sound alarms.

6 Signs used in natural disaster safety way guidance systems

6.1 Signs

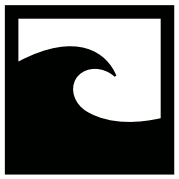
The safety sign components of natural disaster safety way guidance signs shall be registered safety signs from ISO 7010. Supplementary signs and combination signs shall meet the design requirements of ISO 3864-1. Signs used in natural disaster safety way guidance systems are shown in Table 1.

Safety signs shall be based on ordinary material or phosphorescent material. Safety signs shall meet the colorimetric and photometric specifications of ISO 3864-4 under the test conditions relating to safety signs being externally illuminated.

NOTE ISO 3864-4 defines colour under certain test conditions and not all conditions of observation of safety signs. Phosphorescent safety signs during luminance decay mode lack colour recognition of the green; however, they are designed such that the luminance contrast enables the graphical symbols to be or remain identifiable. Ordinary signs lack colour discrimination in night-time illumination.

Classification of emission colour of phosphorescent material is given in ISO 3864-4:2011, Annex B.

Table 1 — Signs used in natural disaster safety way guidance systems

Type of disaster	Safety signs			Supplementary signs
	Warning signs	Safe condition signs		
Tsunami	 **ISO 7010-W056** Warning; Tsunami hazard zone	 **ISO 7010-E062** Tsunami evacuation area	 **ISO 7010-E021** Protection shelter	 Tsunami
Storm surge			 **ISO 7010-E063** Tsunami evacuation building	
Flood (including flood from inland waters)	 **ISO 7010-W077** Warning; Flood zone	 **ISO 7010-E065**[a] Proposed new sign; Outdoor refuge area	 **ISO 7010-E021** Protection shelter	 Flood
Debris flow	 **ISO 7010-W076** Warning; Debris flow zone	 **ISO 7010-E065**[a] Proposed new sign; Outdoor refuge area	 **ISO 7010-E021** Protection shelter	 Debris flow
Steep slope failure	 **ISO 7010-W078** Warning; Landslide zone	 **ISO 7010-E065**[a] Proposed new sign; Outdoor refuge area	 **ISO 7010-E021** Protection shelter	 Landslide
Landslide				

[a] This safety sign is subject to registration/co-ordination through ISO/TC 145 and is currently at enquiry stage.

Table 1 *(continued)*

Type of disaster	Safety signs			Supplementary signs
	Warning signs	Safe condition signs		
Large-scale fire	 **ISO 7010-W073** Warning; Large scale fire zone	 **ISO 7010-E065**[a] Proposed new sign; Outdoor refuge area	 **ISO 7010-E021** Protection shelter	 Large scale fire
Tornado	 **ISO 7010-W074** Warning; Tornado zone		 **ISO 7010-E021** Protection shelter	 Tornado
Volcano	 **ISO 7010-W075** Warning; Active volcano zone		 **ISO 7010-E021** Protection shelter	 Volcano

[a] This safety sign is subject to registration/co-ordination through ISO/TC 145 and is currently at enquiry stage.

6.2 Supplementary direction arrow signs

Arrows in direction signs shall be used in conjunction with safety signs to indicate the direction of movement a person should take to reach the indicated destination. The format of the direction arrow shall be arrow type D from ISO 3864-3. The meanings of different arrow orientations are shown in Table 2.

Table 2 — Use of supplementary direction arrow signs

Arrow	Meaning
	Proceed to the right from here
	Proceed to the left from here

Table 2 *(continued)*

Arrow	Meaning
	a) Proceed forward from here b) Proceed forward and through from here c) Proceed forward and up from here
	a) Proceed up to the right from here b) Proceed forward and across to the right from here
	Proceed down to the right from here
	a) Proceed up to the left from here b) Proceed forward and across to the left from here
	Proceed down to the left from here
	Proceed down from here

6.3 Supplementary symbols and suitability marking

Because the construction and location of a place of refuge might only be appropriate for particular natural disasters, it is necessary to indicate the type of disasters for which places of refuge are appropriate. Place of refuge signs help people who are unfamiliar with the area to properly identify a specific building's or area's suitability or unsuitability as a place of refuge.

In areas where different types of natural disaster can occur, the civil protection agency or authority shall decide on the suitability of the places of refuge for a certain disaster.

In place of refuge signs and evacuation route signs, the appropriate supplementary symbols given in Table 1 should be used to indicate whether a place of refuge is suitable or unsuitable for protection from hazards associated with one or more types of natural disaster.

Where it is necessary to warn people that the place of refuge is not suitable for particular types of natural disaster, an "x" or diagonal bar should be displayed.

A green tick may be used to indicate suitability. The green tick may be replaced by another element appropriate to the cultural requirements of the target audience.

Examples of suitability and unsuitability markings are presented in Figure 1.

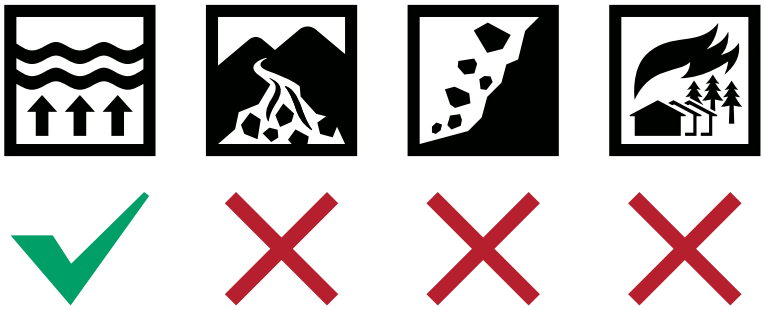


Figure 1 — Examples of markings displaying suitability for floods but unsuitability for debris flow, landslides or large-scale fires

For examples of signs, see Figures 6 a) and 6 b).

7 Structure of a natural disaster safety way guidance system

7.1 Overview of structure

In order to effectively and efficiently guide people to specific places of refuge when natural disasters occur, it is important for the system's signs to provide evacuees with clear, seamless directional information so they do not lose their way. The structure and content of the guidance system should be consistent with the information requirements defined in the planning stage (see Clause 5). The structure of seamlessly designed natural disaster safety way guidance systems is shown in Figure 2.

Natural disaster safety way guidance systems shall provide warning signs, evacuation plan signs, evacuation route signs and place of refuge signs continuously along the evacuation route in accordance with the risk mitigation plan.