DRAFT INTERNATIONAL STANDARD

ISO/DIS 22328-1

ISO/TC **292**

Secretariat: **SIS**

Voting begins on:
2019-05-10

Voting terminates on:
2019-08-02

Security and resilience — Emergency management — Community-based disaster early warning system —

Part 1:
Guidelines for implementation of a community-based disaster early warning system

ICS: 03.100.01

This document is circulated as received from the committee secretariat.

Reference number
ISO/DIS 22328-1:2019(E)

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Published in Switzerland

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Foreword

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This document was prepared by Technical Committee ISO/TC 292 *Security and resilience.*

A list of all parts in the ISO 22328-series can be found on the ISO website.

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

Disasters such as earthquake, tsunami, volcanic eruption, flood, drought, landslide, and hurricane events can have devastating impacts. Disasters could happen anytime to anyone who lives in a disaster prone area. These disasters have injured and killed human lives and resulted in tremendous losses in economics, social and environment. Disasters can be both natural and human-caused.

Disaster mitigation can be conducted by hard and soft approaches. Hard approaches include the construction of prevention works and protection works, all of which would require a high cost and time. Furthermore, the implementation of these measures might not be effective considering that disasters can have a varied and wide range of impact. Therefore, effective disaster risk reduction is implemented by not only hard approaches but also soft approaches by means of improving the community's preparedness through the implementation of early warning system.

The community-based disaster early warning system is proposed to empower individuals and communities who live in hazard prone areas, to increase their awareness, to react or evacuate in a sufficient time and to reduce losses caused by disaster such as injuries, loss of life, and damage of property and the environment.

The implementation of a community-based disaster early warning system is consistent with the Sendai Framework for Disaster Risk Reduction of 2015–2030[1]. Based on the fourth priority of the framework, the improvement of preparedness is the basis for the capability to respond effectively to a disaster. Improvement of preparedness can be achieved by implementing an early warning system, in addition to the improvement of the dissemination and communication of knowledge about early warning of disasters at local, national, regional and international levels.

According to UN-ISDR[2], a complete and effective early warning system consists of four interrelated key elements:

a) risk knowledge,

b) monitoring and warning service,

c) dissemination and communication, and

d) response capability.

All of these elements are strongly correlated to the implementation of a community-based early warning system.

Early warning systems are incorporated to, not only engineering, but also social aspects such as demographic, economic, and culture. This document encourages active response of the community to disasters with the consideration of social aspects in general. Further training and socialization to the community are carried out by experts/researchers and by decision-makers at local and national levels.

By referring to the four key elements of community-based early warning systems, this document promotes uniformity in the development and implementation of early warning systems and will improve the preparedness of the communities and stakeholders vulnerable to disasters.

This document recognizes population behaviour response planning as a key part of the preparedness. It takes into account the approach of ISO 22315 and provides additional specifications for disaster early warning system.

Security and resilience — Emergency management — Community-based disaster early warning system —

Part 1: Guidelines for implementation of a community-based disaster early warning system

1 Scope

This document provides guidelines for the implementation of a disaster early warning system. It provides a definition, aims to improve understanding, and describes methods and procedures to be implemented.

It is applicable to communities vulnerable to disasters, without taking secondary effects into consideration.

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 22300, *Security and resilience — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 22300 and the following apply.

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

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

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

3.1
community vulnerability
characteristics and conditions of individuals, groups or infrastructures that put them at risk for the destructive effects of a hazard

3.2
early warning
provision of information through local networks, allowing affected individuals to take action to avoid or reduce risks and to prepare responses

3.3
community-based early warning system
method to communicate information to the public through established networks

Note 1 to entry: The warning system can consist of risk knowledge, monitoring and warning service, dissemination and communication, and response capability to avoid, reduce risks and prepare responses against disaster.

[SOURCE: ISO 22315:2014, 3.3, and ISO 22300, 3.43 modified — “early” added, Note added]

3.4
evacuation command
series of orders to evacuate people

3.5
evacuation drill
activity that practises a particular skill related to evacuation and often involves repeating the same thing several times

EXAMPLE A drill to practice safely evacuating a neighbourhood or village from a disaster.

[SOURCE: ISO 22300:2018, 3.74, modified —"related to evacuation" added in the term, example changed]

4 Disaster early warning system

4.1 General

The community-based disaster early warning system (EWS) should comprise five main sub-systems:

a) risk assessment;

b) dissemination and communication of knowledge;

c) monitoring and warning service;

d) response capability;

e) commitment of the authority and community on the sustainability of the EWS.

4.2 Risk assessment

The risk assessment should be based on ISO 31000 and should consist of technical, institutional, socioeconomic and cultural surveys of vulnerable communities.

ISO 31000:2018 should be adapted to meet the specific requirements including risk identification.

A technical survey for risk identification should be conducted to understand physical conditions of vulnerable area, to classify the types and range of hazard, to collect information regarding the indicators of a disaster, and to determine vulnerable and safe zones. These indicators may include specific symptoms that indicate the potential hazards area. These indicators may be used to determine the placement of the early warning system instruments.

The purpose of an institutional survey is to understand whether there are established organizations currently responsible for monitoring and mitigating in the disaster-prone areas.

Socioeconomic and culture surveys collect information on community demographics, such as population, by age, education and financial situation, the number of households, vehicles and livestock, and cultural considerations. It also provides information on the community's knowledge concerning disasters. This information provides insight into the community's perception of disaster risk and disaster risk reduction means (technology, population preparedness, etc.) that can be used to improve the successful introduction of the early warning system and to gain an understanding of the community's vulnerabilities and complexities.

NOTE 1 Information on potential vulnerable inhabitants and infrastructure due to disasters are important to determine the level of community vulnerability.

NOTE 2 The community's eagerness and motivation to actively participate is relevant to design strategies for disaster risk reduction programmes that are suitable for the local social conditions.

NOTE 3 The programmes can give knowledge and increase people's capacity to be able to decide what needs to be done in order to prevent and protect themselves from disasters.

4.3 Dissemination and communication of knowledge

Dissemination and communication of knowledge provides the community with comprehension and understanding with respect to the potential for disasters. Methods and materials of the dissemination and communication should be developed based on the preliminary data of the risk assessments.

The community should be provided with information on the types of disasters, how and why they occur, the factors that control and trigger the event, and the structural and non-structural strategies to mitigate the consequences, including an early warning system, warning levels and signage.

The dissemination and communication of knowledge should use clear language, provide useful information, identify the authoritative agency and provide multiple communication methods to ensure the maximum number of people is reached.

Effective dissemination provides for better understanding about disasters and knowledge how to minimize risks once the early warning systems are in place.

The dissemination of information should lead to the identification of key people with an interest in participating in a disaster preparedness team.

4.4 Monitoring and warning service

Early detection devices should be placed in areas that cover the high risk zones.

Installation of the equipment should be coordinated with the authority and the community, with the aim to increase the sense of ownership and responsibility for the equipment's condition to guarantee safety.

The type and amount of early detection and alert levels should be appropriate to the type and the scale of the disaster.

The early detection devices installed to support early warning systems should include required devices to ensure the work of early warning system and additional tools to improve measurement accuracy.

To implement a community-based disaster early warning system, the monitoring and early detection devices should use appropriate and most adaptive technology.

For information on warning services to the public and communities refer to ISO 22322, 5.4.

4.5 Response capability

4.5.1 General

The community is encouraged to respond in sufficient time with the right manner by means of establishing a disaster preparedness team, determining evacuation shelter, developing an evacuation map and routes, developing a standard operation procedure and conducting evacuation drill.

4.5.2 Establishment of a disaster preparedness team

Disaster preparedness team members should be selected based on their knowledge and abilities in disaster preparedness, prevention, mitigation and post-disaster management.

Annex A gives an example of a community disaster preparedness team.

The disaster preparedness team should have expertise including knowledge of the disaster-prone area, data and information management, early warning and mass evacuation systems, first aid, logistics and security. The additional expertise required on the disaster preparedness team should be determined according to the needs of the community.

The disaster preparedness team should conduct preparedness activities, including

a) determining risk zones, evacuation shelter and evacuation routes,

