SLOVENSKI STANDARD
SIST-TS CEN/TS 16595:2014

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CBRN (kemična, biološka, radiološka in jedrska tveganja) - Ocenjevanje ranljivosti in zaščita ogroženih ljudi

CBRN - Vulnerability Assessment and Protection of People at Risk

ABC-Risiken - Verwundbarkeitsbewertung und Schutz gefährdeter Bevölkerungsteile

NRBC - Evaluation de la vulnérabilité et protection des populations à risque

Ta slovenski standard je istoveten z: **CEN/TS 16595:2013**

ICS:

13.200	Preprečevanje nesreč in katastrof	Accident and disaster control

SIST-TS CEN/TS 16595:2014 **en,fr,de**

TECHNICAL SPECIFICATION

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English Version

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (CEN/TS 16595:2013) has been prepared by Technical Committee CEN/TC 391 “Societal and Citizen Security”, the secretariat of which is held by NEN.

This Technical Specification (TS) on CBRN vulnerability assessment, awareness and management provides a common frame of reference and recommends methodologies to assess the vulnerabilities of citizens, first responders and other assets to an ‘all-hazard’, i.e. natural, incidental or intended, exposure to hazardous substances.

These hazardous substances could be Chemical, Biological or Radiological (the latter forming the hazardous part of Nuclear, together abbreviated to CBRN). CBRN agents can cause significant direct and indirect damage to persons, livestock, vegetation and environment as well as disrupt the system of products and services we need to sustain our daily livelihoods, i.e. our ‘Critical Infrastructure’.

This Technical Specification can be used as a starting point for further risk and vulnerability assessment and for guidelines on the many issues surrounding a CBRN incident. It is intended for any organisation involved or interested in CBRN, both in the private sector and for public authorities.

The elaboration of this European technical specification has been financially supported by the European Commission and the CIPS programme (Grant agreement HOME /2009/CIPS/FP/CEN-003 VAPPAR).

Important notice:

> Whereas the original request called for a ‘risk’-based approach, CEN/TC 391 ‘Societal and Citizen Security’ recommended to change this to a ‘vulnerability’-based approach. Terms such as ‘risk’ and ‘vulnerability’- and their assessment, awareness and management – can be approached from both a social sciences as well as a natural sciences approach. By combining the latest academic insights with operational lessons, this document attempts to reconcile some of the differences between these conflicting scientific approaches.

It cannot be emphasised enough that this Technical Specification:

- is intended to meet the complex and variable needs of a wide range of different end-users;
- is an initial document of which other versions can be developed in the future;
- offers a common frame of reference and a common context;
- can be viewed in the context of being a ‘standard’, a ‘scientific paper’ and an ‘open source’ document;
- puts a stronger emphasis on ‘recommendations’ then on ‘requirements'. These advantages include the fact that recommendations facilitate customisation by the end-users themselves and allow for an interactive, participatory format of tools such as models, tables and checklists;
- is not a European Standard. Technical Specifications such as the VAPPAR document can co-exist with any national standard whereby specific (national) regulations take precedence over any Technical Specification.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

National regulations in most European countries focus on emergency responders (e.g. personal protective equipment (PPE) and intervention procedures), and European and national regulations regulate contingency planning of chemical, biological, nuclear and radiological plants and industries. The protection of the population, animals, vegetation and environment from CBRN incidents is a field in need of a common understanding of vulnerability assessment, awareness and management.

1 Scope

This Technical Specification is based on an all-hazards approach, with a specific focus on terrorism and other security related risks. Looking at the combination of threats, vulnerabilities and values to be protected, threats may be terrorist attacks with chemical, explosive and biological agents, or nuclear waste materials, or with conventional means on CBRN plants, causing a similar devastating effect on a potentially large scale. Major CBRN incidents may jeopardise critical infrastructure, while emergency services may have great difficulty performing their response tasks.

The scope excludes the vulnerability assessment of some specific systems that comply, at the European and Member State level, with existing sets of legal measures: network for drinking water distribution, food chain supply and cosmetics and pharmaceutical products production and distribution chains.

The objective of this Technical Specification is to strengthen common understanding and a common frame of reference for all organisations with an interest and involvement in CBRN. It does so by providing a number of considerations and tools that can be used in the development of a semi-quantitative conceptual framework for vulnerability assessment, awareness and management. The vulnerability assessment covers all members of the population at risk including the requirements of children, the elderly and those with disabilities.

2 Normative references

Not applicable.

3 Terms and definitions

There are various documents that contain terms and definitions related to CBRN. Unfortunately, not all documents are consistent with each other and it is therefore difficult to find a document which contains

a) all terms, and

b) meets with universal acceptance.

In the context of this document, the following documents are recommended for use by the end user of this Technical Specification:

— ISO 31000, *Risk Management – Principles and Guidelines*

— ISO/Guide 73, *Risk Management – Vocabulary*

— ISO 22300, *Societal Security – Terminology*

— ISO 22301, *Societal Security – Business Continuity Management Systems – Requirements*

— ISO 22313, *Societal security – business Continuity management systems – Guidance*

— CWA 16106, *PPE for Chemical, Biological, Radiological and Nuclear (CBRN) Hazards*

— ISO 22320, *Societal Security – Emergency management – Requirements for Incident Response*

The use of the CBRN Glossary of the European Commission is mandatory in Europe (see http://cbrn.jrc.ec.europa.eu.)

4 Abbreviated terms

B Biological

C Chemical

CB	Chemical, Biological
CBRN	Chemical, Biological, Radiological, Nuclear
CBRNE	Chemical, Biological, Radiological, Nuclear, Energy
CERT	Community Emergency Response Team
ED	Emergency Department
MD	Medical Doctor
PPE	Personal Protective Equipment
POC	Point Of Contact
R	Radiological
RN	Registered Nurse
SWOT	Strength, Weaknesses, Opportunities, Threats
VAPPAR	Vulnerability Assessment and Protection of People at Risk

5 Vulnerability assessment

5.1 Different approaches to vulnerability in social and natural science

It is very difficult to find universally accepted definitions of "vulnerability" [1].

Vulnerability assessment is only one component of loss estimation and risk assessment. Risk involves forecasting of loss (and/or gain) and is composed of several components – hazard, vulnerability, exposure, and coping capacity. Risk and its components are not specific to any feature or field, but are instead ubiquitous notions applicable to any situation or experience. It is the conceptualisation of these components (how they are considered, defined, divided, measured, and recombined) that differs.

Which components are considered to contribute to risk and how they are evaluated varies between disciplines. Investigations in the social sciences consider a more general view of risk for societies at large and for individuals, while investigations in the natural sciences and engineering give detailed consideration to structural damage to the built environment and to life-loss.

In natural science, emphasis is placed on characterisation of hazard and exposure, which is quantitatively strong. Vulnerability is considered a static factor that modifies the amount of loss caused by threats. Coping capacity receives little, if any, attention.

In social science, emphasis is placed on vulnerability and coping capacity, which are considered as dynamic and complex properties of a (social) system. Due to the complexity, qualitative methods are favoured. Hazard is viewed as a static state of the physical/cultural environment and receives minimal attention.

The complementary strengths of natural science and social science perspectives can improve the understanding and analysis of vulnerability. This requires an adaptation of the comprehensive views on vulnerability in the social sciences to the more quantitative approaches that are typical of the natural sciences.

One of the challenges is that certain qualities can be dimensioned in a probabilistic fashion and some cannot. While hazard and risk can be expressed in probabilistic fashion, this is much more difficult with vulnerability.

The often used formalisations of 'risk' and 'vulnerability' (such as *Risk = Probability x Consequence*, *Risk=Hazard x Vulnerability, Risk=Hazard x Vulnerability/Coping Capacity*) are generalisations that provide little conceptual understanding and cannot, in and by themselves, be used to consider losses with different metrics.

Understanding of vulnerability and coping capacity also requires clear and consistent risk terminology, which is often lacking between and within disciplines.

A further complicating factor is the requirement that both 'intentional' and 'incidental' causes for a CBRN events are considered in this Technical Specification. This necessitates a CBRN-specific differentiation between 'security' (= intentional) and 'safety' (= incidental).

5.2 Vulnerability assessment

The vulnerability assessment is the overall process of the identification, analysis and evaluation of vulnerabilities which can be used as a methodology for measures and procedures for CBRN prevention, detection, decontamination, collective protection for emergency staff, mass protection for the citizens and mitigation.

A methodological, STEP-BY-STEP approach is needed because even though a vulnerability assessment is part of comprehensive emergency management, i.e. combining risk, response and consequence-management approaches, the vulnerability assessment in and by itself is also a complex, systematic process. Amongst others, it brings together elements such as:

Exposure and Coping Capacity When assessing vulnerability, 'exposure' can be considered as the "external" side of vulnerability and 'coping capacity' as the "internal" side of vulnerability.

Environment: local (physical) or context (culture/history)

Consequences: Physical, Economic, Environmental, Administrative, Health

STEP 1: A vulnerability assessment starts by determining the strategic focus of the assessment, such as:

— Geographical scale;

— Time frame (e.g. direct losses or long term losses);

— Which type of consequences to be evaluated (life/health, economic, environmental).

STEP 2: A vulnerability assessment then seeks answers to questions such as:

— Should vulnerability include exposure? Coping capacity? Resilience?

— What is the unambiguous definition of vulnerability?

— Vulnerability of what (elements)? Vulnerability to what (threats)?

STEP 3: A systemic vulnerability assessment model needs to be developed in order to conceptualise and clarify the relation(s) within and between elements.

The model below can be used as a reference point for vulnerability conceptualisation within risk assessment context [1].

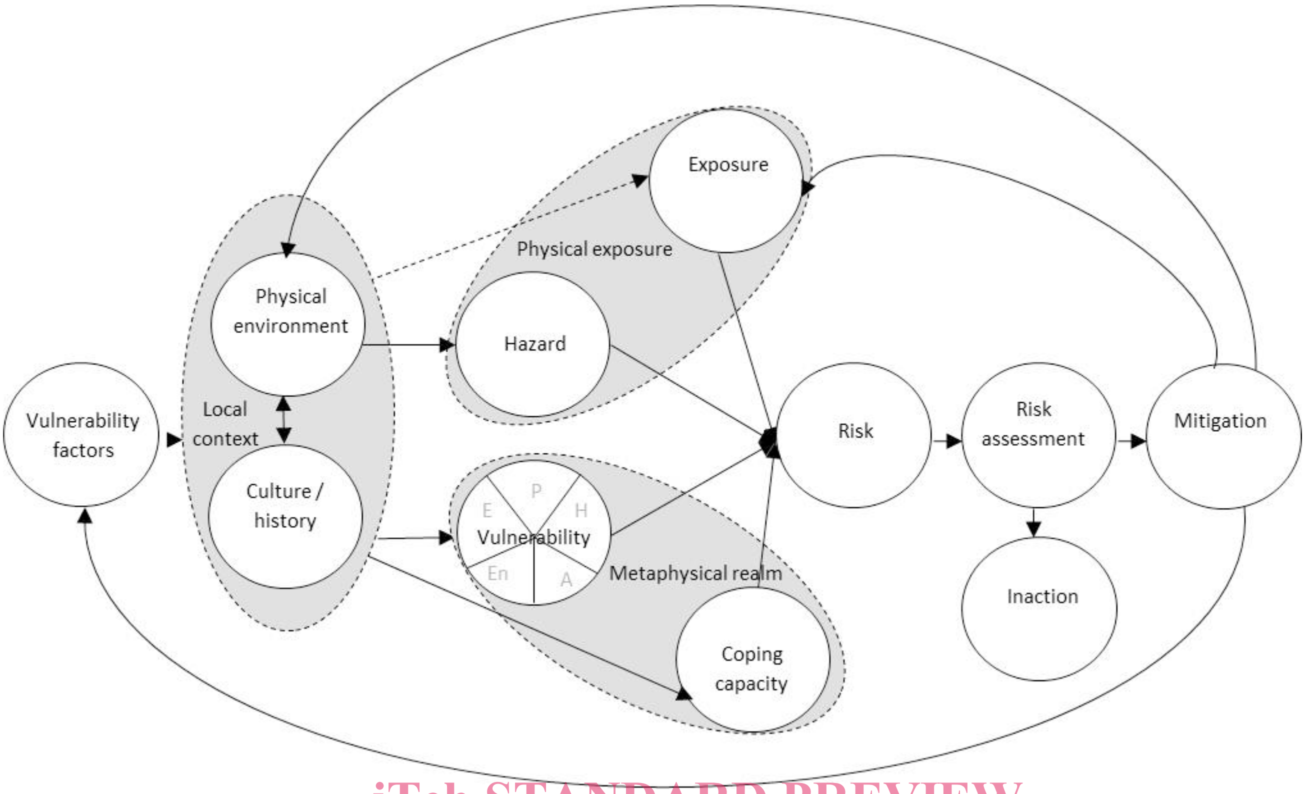

Figure 1 - Vulnerability conceptualisation within risk assessment context [1]

STEP 4: The selected factors of vulnerability need to be quantified by use of indicators and criteria. Criteria are often defined as: 'conditions that need to be met' and Indicators as: 'measurable states which allow the assessment of whether or not criteria are being met'. Their weighting shall be taken in local context. Consequently, weighting of vulnerability through indicators and criteria is expected to vary with context but will yield some quantitative estimation of overall vulnerability.

The components of the conceptual model below can be used as a reference point for the quantification of vulnerability [1].

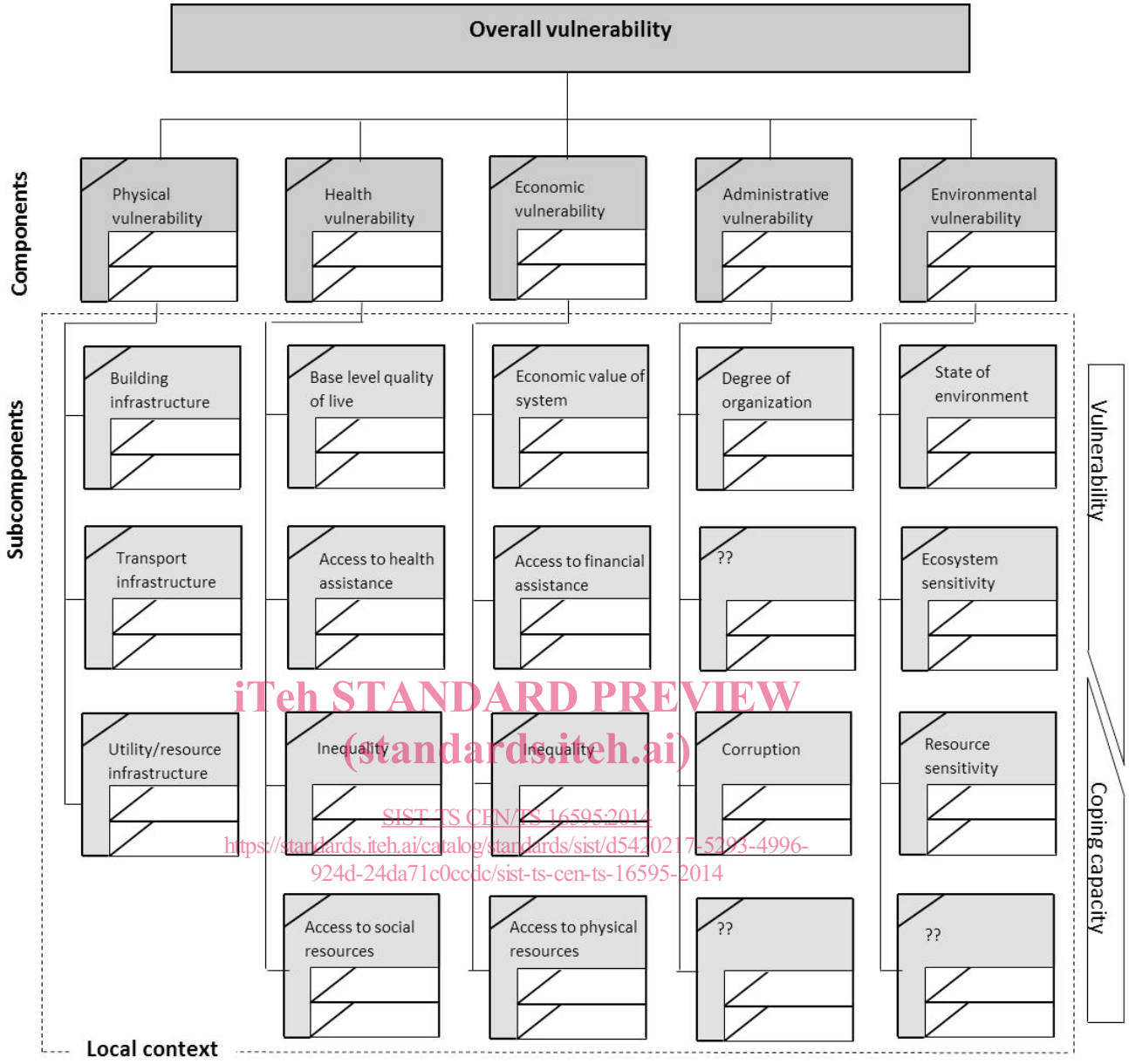

Figure 2 - Quantification of vulnerability [1]

Suggestions for CBRN Vulnerability indicators

This list presents suggestions for CBRN vulnerability indicators. The list is not intended to be complete but serves as a mere start to find most appropriate indicators for the specific situation. The measurement of performance against these indicators may involve fundamentally different scales. An indication is given of the likely scaling involved and compliance with published criteria.

— Awareness (citizens, responders, management);

— Responsiveness and effectiveness intelligence;

— Social control (neighbourhood watch (who, where, what);

— Willingness to act (citizens, guards, police);

— Possibility of chain effects in storage/transport of CBRN agents;

— Accessibility of indoor public area's for CBRN agents;

— Accessibility of air inlet or direct vicinity of indoor public area's for CB vapour/aerosol;

— Accessibility of primary life lines (water, electricity generation and distribution, electronic communication, food distribution centres);

— Preparedness (training / equipment) (citizens, responders, management);

— Quality of warning systems (C/B/R different detection);

— Total response time;

— Information systems: quality and resilience/back up;

— Prepositioning of resources;

— Response of civilians / community emergency response teams (CERT);

— Amount of citizens within danger range of CBRN industry/storage/transport;

— Ventilation capacity of homes/public area's after alarm;

— Amount/capacity of responders;

— Amount/capacity of medical aid;

— Redundancy of mass transport possibilities;

— Possibility of chain effects of CBRN agent on critical infrastructure, i.e. 'cascading' effects or 'systemic' risk (see below).

6 Protection of the population at risk

6.1 Vulnerability awareness

As stated in the scope, a vulnerability assessment covers all members of the population at risk including groups that are less self-reliant such as children, the infirm, the elderly and those with disabilities. The population at risk often does not realise that it is in fact 'at risk' unless the (potential) consequences become visible. When intentional or incidental CBRN events cannot be prevented, these potential consequences need to be considered ahead of time in order to initiate measures and pre-position resources that are required to reduce the adverse effects.

The required level of awareness is often lacking at the level of (organisations responsible for) the population at risk because most planning, procedures and policies in Europe tend to focus on pre-impact risk management (prevention) instead of post-impact consequence management (preparedness).

The level of awareness however, is an important factor in determining the capacity of individuals and groups of individuals (communities) to anticipate, to cope and to recover from CBRN events (*community resilience*).

Vulnerability awareness requires, amongst others:

— a focus on consequence management;

— attention directed at the psychological-emotional dimensions of risk ("fear");

— an effective risk/crisis communication strategy;