SPECIAL MOBILITY STRAND

RISK UNDERSTANDING AND STANDARDIZATION AS A FACTOR OF DISASTER RISK MANAGEMENT
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Timeline

1972, Stockholm,
1st UN Environment Conference

1992, Rio de Janeiro, Earth Summit-Agenda
1994, Yokohama, 1st DRR Conference, 1995-2005

2002, Johannesburg, 2nd Earth Summit

2005, Hyogo, 2nd DRR Conference, 2005-2015

2009, ISO 31000 Risk Management Standard

2012, Rio de Janeiro, 3rd Earth Summit

2015, Sendai, 3rd DRR Conference, 2015-2030

2017, UN 72/218, Disaster Risk Reduction

1970	1980	1990	2000	2010	2020	2030

UN Office for Risk Reduction
Terminology Challenge

https://www.unisdr.org/we/inform/terminology

General Assembly

Seventy-first session
Agenda item 19 (c)
Sustainable development: disaster risk reduction

Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction

A and Q

Disaster - *serious disruption ... community or society...* **due to hazardous events** *... exposure, vulnerability ... human, material, economic and environmental losses and impacts.*

Iz disaster hazard?
Hazardous event?

Disaster risk governance - *institutions, mechanisms, policy and legal frameworks and other arrangements to guide, coordinate and oversee disaster risk reduction and related areas of policy*

Risk governance and policy?

Disaster management - *... **responding to and recovering from disasters**.*

Manage/Respon/Recover?

Disaster risk - *The potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of **hazard, exposure, vulnerability** and capacity.*

Potential?

Specific period of time?

Deremined probabilistically?

Disaster risk management - *... disaster risk reduction policies and strategies to **prevent new** disaster risk, **reduce existing** disaster risk and **manage residual** risk, contributing to the strengthening of **resilience and reduction of disaster losses**.*

Capacity?

Prevent vs. Reduce vs. Manage?

Existing vs.Residual risk

Introduction

- *Safety*
- *Hazard*

- *Risk*
- *Use this font*

ISO 31000:2009

Risk management -- Principles and guidelines

Hazard

Potential source of harm.

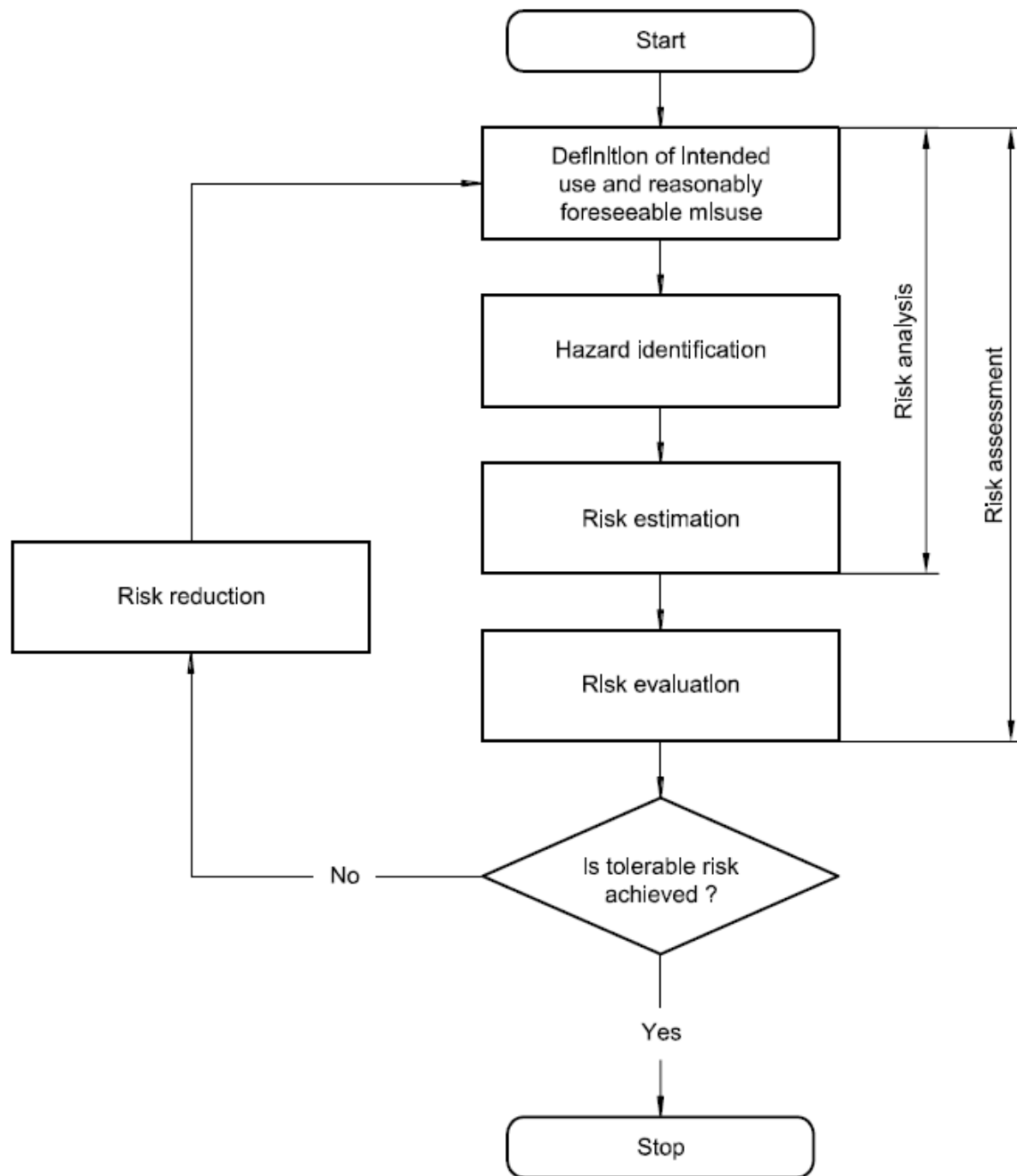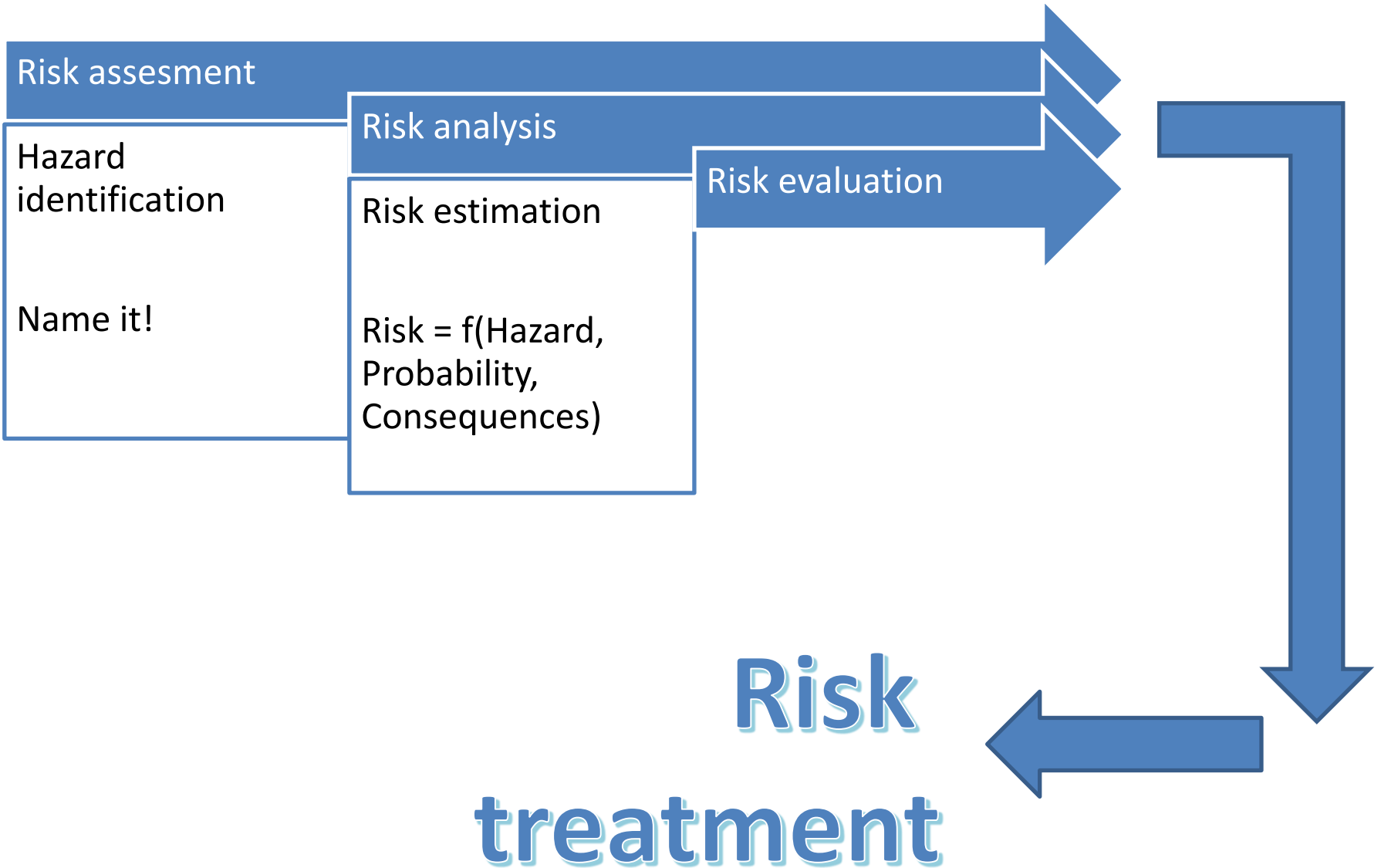„Make it simple, but do not simplify!"
P.Van-Impe

Risk

Combination of the **probability of occurrence of harm and the severity** of that harm. (ISO Guide 51:1999)

"Effect of uncertainty on objectives" and "characterized by reference to **potential events and consequences**", ISO GUIDE 73:2009

Risk management

Coordinated activities to **direct and control** an organization with regard to risk.

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              │   Definition of intended   │         ▲               ▲
              │   use and reasonably       │         │               │
              │   foreseeable misuse       │         │               │
              └───────────────────────────┘     Risk analysis   Risk assessment
                                │                     │               │
                                ▼                     │               │
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              │   Hazard identification    │           │               │
              └───────────────────────────┘           │               │
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              │      Risk estimation       │           ▼               │
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              No        ╱                 ╲
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Risk assesment

Risk analysis

Risk evaluation

Hazard identification

Name it!

Risk estimation

Risk = f(Hazard, Probability, Consequences)

Risk treatment

From hazard to risk

Hazard (definition/scenario)

→ Consequences + Probability

→ RISK

Kind of risk?

Risk level

Estimated risk level

Unacceptible Risk level

(a)   (b)   (d)

Treshold for tolerant risk

Reduced risk level

Acceptable risk level

(c)

(a) – Required risk reduction, (b) – Reduced risk, (c) – Residual risk, (d) – Total risk

1. *Acceptable risk level: previously agreed and documented*
2. *Reduced risk: subject of risk reduction strategy*
3. *Residual risk: subject of continusly risk management*
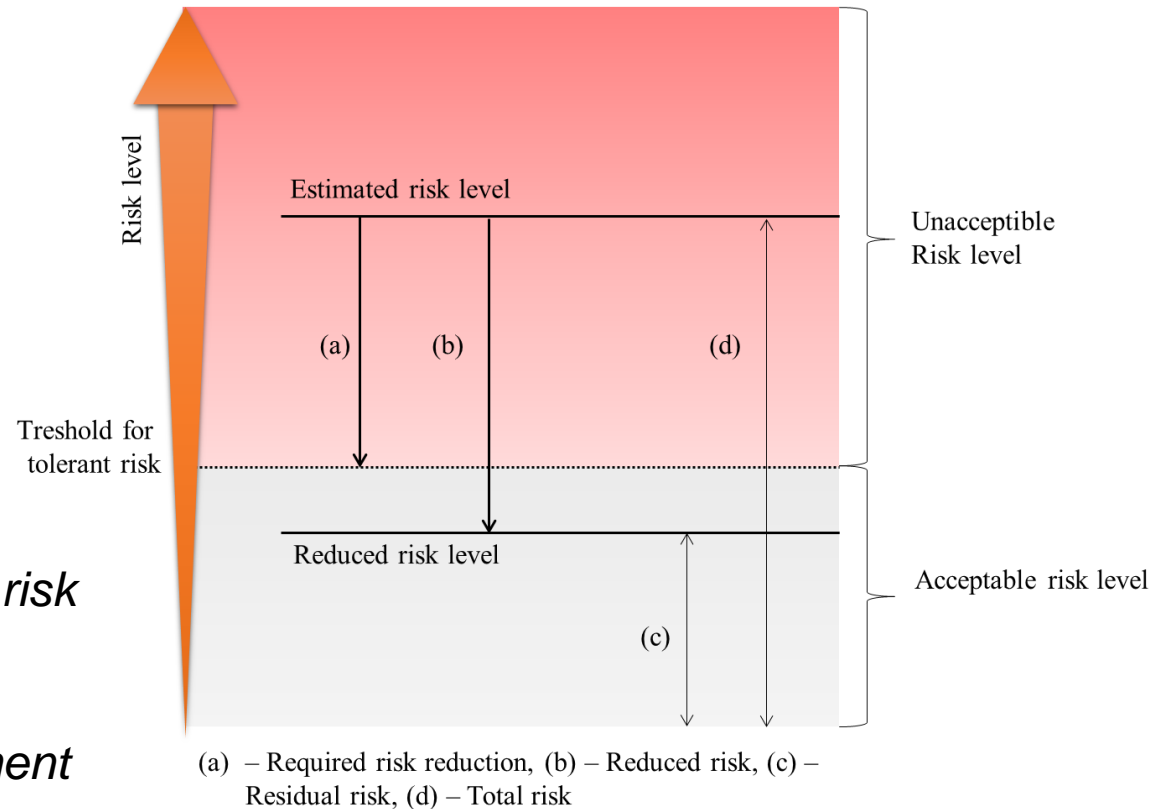
Criteria for defining acceptable risk level:
1. ***Ignoring**: accept estimated high risk levels*
2. ***Reacting**: react after „bad things" happend*
3. ***Normative**: obey rules and legislative*
4. ***Pro-active**: optimized according to specific criteria*
5. ***Active**: ALARP (as low as reasonable practicable)*

ESTABLISHING OF CLEAR, SPECIFIC AND QUANTIFIED CRITERIA IS ESSENTIAL

ALARP

As

Low as is

Reasonably

Practicable

Unacceptable region

Risk cannot be justified save in extraordinary circumstances

Tolerable only if risk reduction is impraticable or if its cost grossly disproportionate to the improvement gained

The ALARP or Tolerability region (Risk is undertaken only if a benefit is denied)

Tolerable if cost of reduction would exceed the improvement gained

Broadly acceptable region

(No need for detailed working to demonstrate ALARP)

Necessary to maintain assurance that risk remains at this level

Negligible risk

RISK ANALYSIS METHODS
## … adopt te different conditions and rqrmnts

Brainstorming, Interviews, Barrier Analysis, Checklists, PHA – Preliminary Hazard Analysis, TA – Task Analysis, HAZOP – Hazard and Operability Study, SWIFT (Structured "What If" Technique), Scenario Analysis, BIA-Business Impact Analysis, LOPA-Layers of Protection Analysis, FMEA – Failure Mode and Effect Analysis, FMECA - Failure Modes and Effects and Criticality Analysis, ETA/FTA – Event and Failure Tree Analysis, JHA – Job Hazard Analysis, QRA – Quantitative Risk Analysis, HEI – Human Effect Identification HRA-Human Reliability Analysis, Cause-Consequence Analysis, Case and Effect Analysis, Ishikawa Fishbone Diagram, Markov Analysis, Delphy technique, Monte Carlo Simulation, CBA - Cost and Benefit Analysis, Secret Analysis…

FAULT TREE ANALYSIS (ISO 31000)

Failed automatic start up of emergency generator

No start up signal

Diesel generator fault

Fault in sending signal — A

Fault in transmission of signal — Broken conductor

Fault in reception of signal — Fault in control module — Fault in circuit A, Fault in circuit B

Missing fuel — Blocked intake, No fuel

Mechanical fault in generator — B
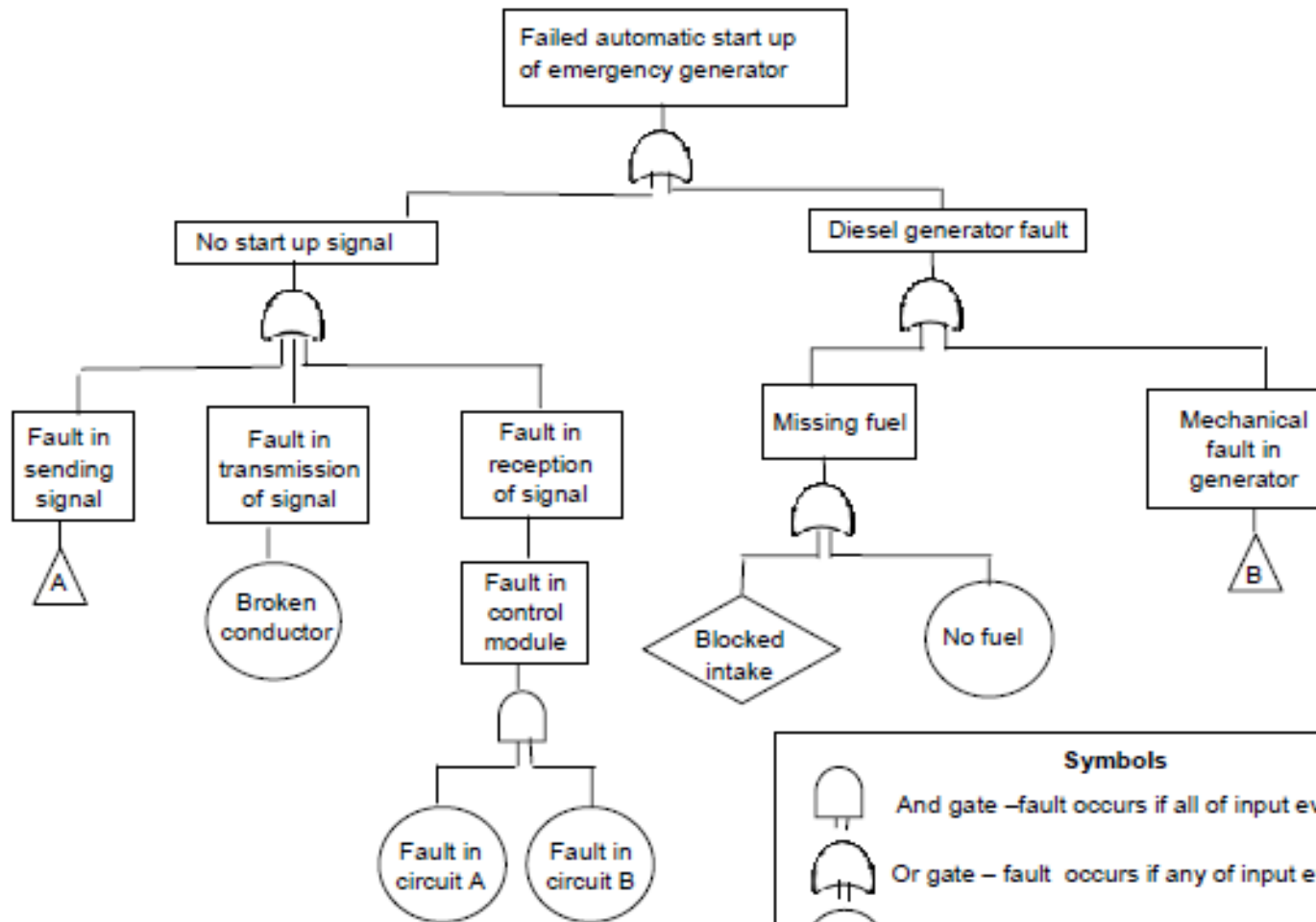
Symbols

And gate –fault occurs if all of input events true

Or gate – fault occurs if any of input events is true

Base events –further analysis not useful

Events not analysed further at this time

Events which are further analysed

Event analysed at point A on a different page
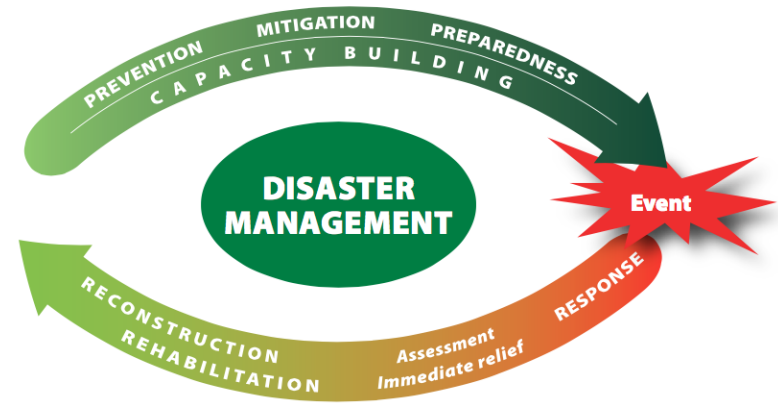
Source: National Policy on Disaster Management[7]
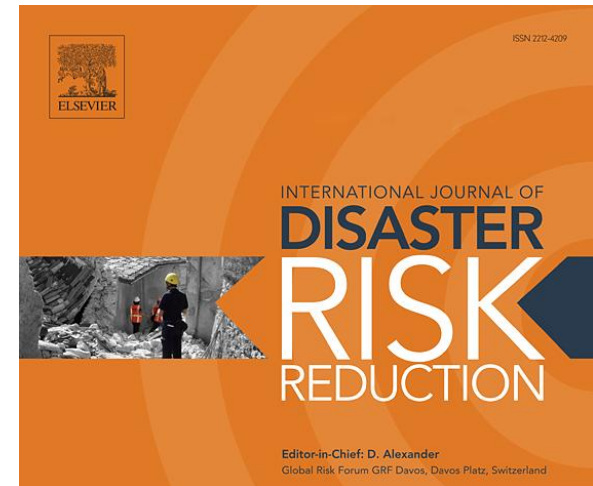
RISK REDUCTION PARADIGM

- *Risk reduction* appears in title of main disaster risk treatment international frameworks (Hyogo and Sendai frameworks).
- Risk reduction is just one part of broad risk treatment procedures.
- Family of ISO 31k standards defines risk management as "coordinated activities to direct and control an organization with regard to risk". Management is much more than monitoring, estimation or control. Risk treatment is defined as "process to modify risk", with regard to risk treatments that deal with negative consequences are sometimes referred to as "risk mitigation", "risk elimination", "risk prevention" and "risk reduction".

TECHNOLOGICAL, URBAN AND NATURAL FACTORS RISK ASSESMENT
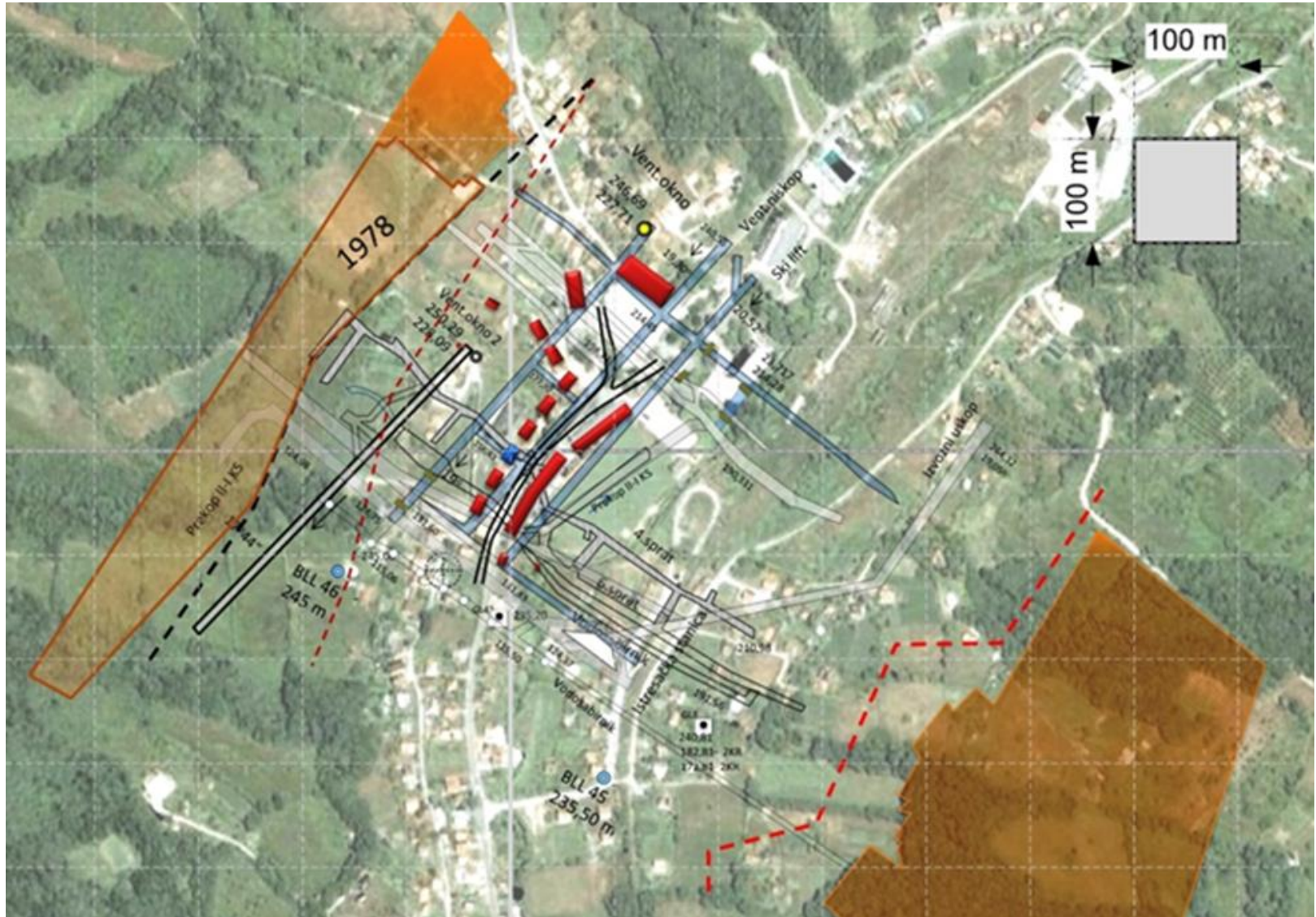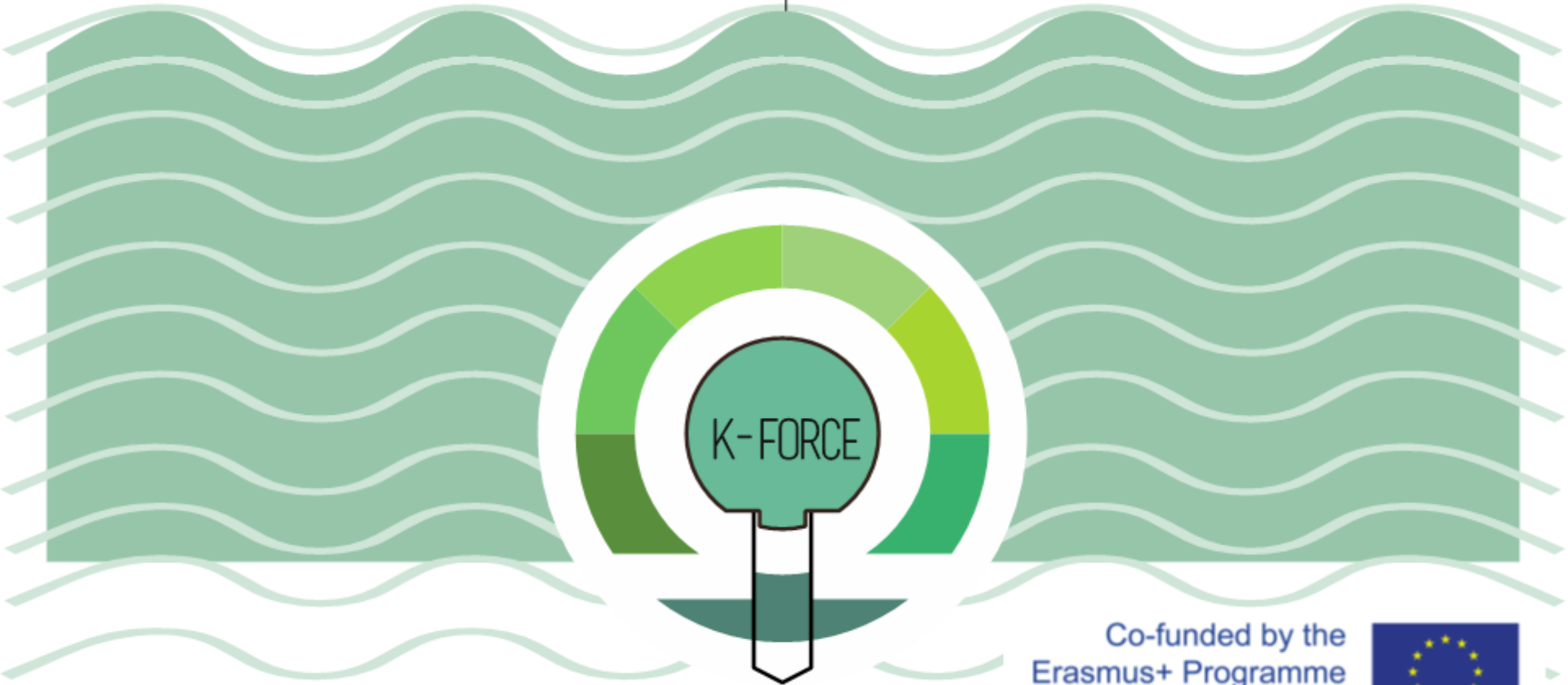
Thank you
for your attention

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Knowledge **FO**r **R**esilient so**CiE**ty