Experimentation on Risk Reduction by Training: A Framework for Seminar Activity

Corrado Rindone(✉) and Marialuisa Moschella

DIIES, Università Mediterranea di Reggio Calabria, 89100 Reggio Calabria, Italy
corrado.rindone@unirc.it

Abstract. Every year, at the global level, disasters connected to natural and anthropic events produce relevant losses. This implies the necessity to plan, design and implement a system of actions for reducing risk and their components (occurrence, vulnerability and exposure). This paper focuses on the exposure component, by considering the training actions aimed at improving the community's preparedness for evacuation procedures deriving from the emergency planning process. By selecting the discussion–based training class, this paper presents a framework of a seminar, that is the simplest action aimed at orienting participants about the planned indications. The framework is inspired by the US standard approach to training actions. The structured seminar can be considered the first step of a wide training cycle that includes discussion and operation-based exercises. An example of a seminar is clear in the air transport sector. The seminar has become standard practice regulated by ICAO for defining procedures to follow in the event of danger on aircraft. The procedure is aimed at increasing awareness and it requires competency of operators. So, the entire cycle of a seminar must contribute to risk reduction by increasing awareness of the procedures provided and their testing in a stress-free environment. The entire cycle contributes to risk reduction by increasing awareness about planned procedures and their experimentation in a no-stress environment. Training and exercises constitute an opportunity to reduce risk and then the potential damages produced by disasters. Seminars are low-cost activities aimed at putting into practice the planned evacuation procedures. The paper is useful for decision-makers and takers involved in emergency planning procedures who want to increase the effectiveness of preparedness actions implemented before an emergency event.

Keywords: Disaster risk · Exposure · evacuation planning · training and exercises · seminars

1 Introduction

The increasing number and complexity of environmental and man-made threats require a prepared and coordinated community response. In this context, emergency planning, with a specific focus on evacuation procedures, plays a crucial role in reducing risks, particularly the exposure component.

© The Author(s) 2024
O. Gervasi et al. (Eds.): ICCSA 2024 Workshops, LNCS 14821, pp. 129–143, 2024.
https://doi.org/10.1007/978-3-031-65308-7_10

The 2030 Agenda's Sustainable Development Goals (SDGs) 1, 3 and 13 address risk reduction in three dimensions: the fight against poverty, the safety and resilience of cities and communities, and the fight against climate change [1]. According to the Agenda 2030, the 'Sendai Framework for Disaster Risk Reduction 2015 – 2030', promotes a global action plan that commits all subscriber countries to out-line a globally shared strategy, establishing seven general goals and four action priorities, to achieve a substantial reduction in disaster risk and loss of life. In particular, "Priority 1: Understanding disaster risk" promotes dialogue and cooperation between the scientific communities and decision-makers for sharing training programmes aimed at improving knowledge and understanding of existing risk reduction practices [2].

Literature indicates that planning initiatives to reduce risk and in particular exposure components through evacuations, are not homogenous among all countries [3]. An example is the difference between the United States (US) and European Union (EU) approaches. In the US, state and local federal agencies manage emergency planning and mitigation of natural and man-made hazards, with a specific focus on actions planned and implemented before an emergency event. This is connected to the disastrous events (e.g. the terrorist attack on the Twin Towers) that occurred at the beginning of the new millennium. These events underlined the necessity to increase the level of community preparedness for evacuation procedures as a fundamental strategy for reducing human losses [4]. In this context, the Federal Emergency Management Agency (FEMA) established the Homeland Security Exercise and Evaluation Program (HSEEP), a framework for planning, conducting, evaluating and improving exercises to define a common approach and improve national preparedness [5].

In case of a disaster within the European Union, all Member States and the 10 Participating States can ask the 'EU Civil Protection Mechanism' for assistance by communicating directly with the Emergency Response Coordination Centre (ERCC). The mechanism was launched in 2010 by the Directorate-General for Civil Protection and Humanitarian Aid Operations (DG ECHO) [6]. In short, while the EU focuses primarily on consequence management after the event has occurred, in the US, actions begin before the event occurs. In addition to this, in the EU there is a lack of standardised emergency management procedures requiring Member States to test emergency plans following a systematic cycle of exercises. In any case, there is a need to bridge the gap between planning actions and their implementation during emergencies. Training and exercises play a relevant role in bridging this gap. This research focuses on evacuation planning for reducing exposure risk components. The integrated adoption of Transport System Models (TSMs) [7], for evaluating ex-ante evacuation planning effects, with training exercises actions, for bridging the recalled gap, constitute the challenges of this research.

In this context, the specific research contributions of this paper regard:

- the investigation of the role of training and exercise actions to increase the level of preparedness;
- the presentation of a seminar framework starting from consolidated approaches toward the possibility of adopting TSM for evaluating seminars' effects;
- the illustration of some examples of seminars implemented.

In line with this research's contribution, after this introduction, the paper has four sections. Section 2 illustrates the main elements of actions of a planning process aimed at increasing preparedness, inside the entire cycle of risk management. Specific attention is on the seminar exercises. Section 3 describes the proposed seminar framework enhanced with the support of TSM. Section 4 reports some empirical evidence of seminars implemented at the global level. Section 5 closes the paper with a discussion and some final remarks.

2 The Role of Training and Exercises in the Preparedness Phase

2.1 Planned Actions for Increasing Preparedness

Risk reduction is the main objective of all phases constituting the entire disaster management cycle (preparedness, mitigation, response, recovery) [8]. This paper focuses on the preparedness phase. It comprehends all actions that can be implemented before the disaster event occurrence. This phase includes actions aimed at increasing awareness about the disaster's characteristics and defining how to face the potential consequences. As far as the exposure risk component, preparedness activities include models and methods for performing safe and effective evacuation procedures [9]. For this reason, the authorities, community at large, specific groups (e.g. households) and individuals need to be ready. Then the preparedness phase must plan the actions that must be taken when a disaster occurs [10]. By referring to an evacuation plan, different hierarchical levels are proposed for which preparedness actions can be specified. The information contained in the plan is transferred from top to bottom using different approaches. The content of the information is also adapted to the hierarchical level referred to (Fig. 1).

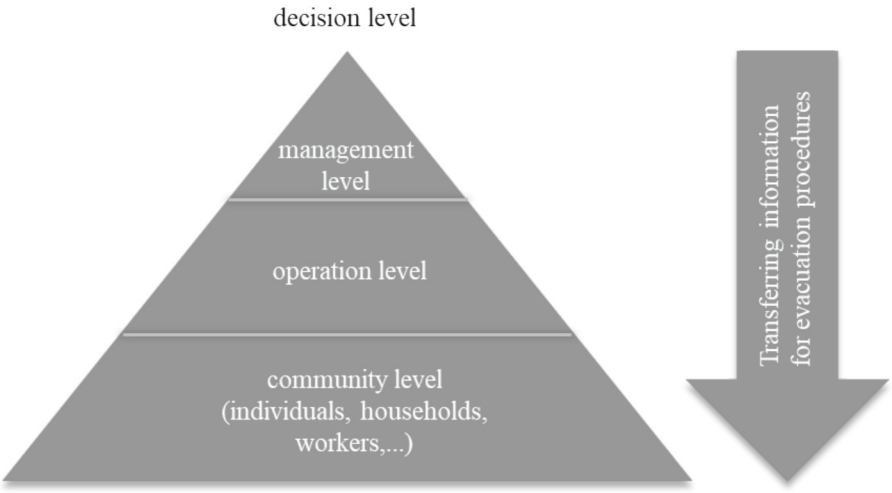

Fig. 1. Preparedness actions for different hierarchical levels.

- decision level, including decision makers that define planned actions and decision takers that adopt the planned configuration of a transport system in an evacuation condition [11];
- management level, including coordinators that implement planned actions and evacuation procedures;
- operation level, including emergency operators (e.g. civil protection volunteers) that provide aid and assistance in emergencies;
- community level, including population and subgroups (e.g. individuals, families, workers) moving from emergency areas to safe areas.

It is necessary to fill the gaps and distances between all hierarchical levels to increase the effectiveness of the planned actions during emergencies. Therefore, it is necessary to transfer the information and instructions about planned procedures (e.g. evacuation paths) from the decision-making level to the entire community.

2.2 Training and Exercises Actions

Training and exercise actions increase preparedness. The main aim is to fill the gap mentioned in Sect. 2.1. Furthermore, recent literature underlines the role of training and exercises in risk reduction [12]. The only redaction of an emergency plan process does not provide the expected outcomes. By performing training and exercise it is possible to experiment in a stress-free environment with the planned action to verify possible lacks (e.g. resources), for instance in terms of accessibility to local public transport services [13], and improving procedures. Training and exercise activities contribute to increasing the awareness of managers, operators and those involved during the emergency. The specific aim is to diffuse the information contained in the plan so that people are aware of the procedures set out in the plan. The general objective is to reduce the risk because the increase in awareness helps to increase the readiness of all those involved so that they can implement the planned procedures effectively. It should be considered that the effects on awareness of actions to be taken in the event of an emergency are not continuous over time but tend to diminish gradually. Actions should be planned on a cyclical basis. This contributes to reducing the exposure component of the risk ([3, 14]).

Literature groups training and exercises actions in two classes [5] (Fig. 2):

- discussion-based exercises, including seminars, workshops, Table Top Exercises (TTE) and games aimed at familiarizing with the planned evacuation procedures;
- operation-based exercises, including drills, Functional Exercises (FE); Full-Scale Exercises (FSE) to simulate, in an operational context, real evacuation procedures to be implemented in an emergency real situation.

The classification implies an increasing level of:

- complexity, in terms of involved subjects and simulated operations;
- capability, in terms of available human and material resources for achieving outcomes (e.g., reducing evacuation times) under specific conditions.

The first class of actions includes low-cost simulation activities aimed at reviewing and developing plans. The second class of actions includes simulated activities performed

in a more realistic environment involving stakeholders for testing emergency plans. It is possible to perform the exercises in a 'building block', or a sequence consisting of only two or more exercises belonging to different classes. An example is a sequence constituted by a seminar, followed by a TTE that evolves in an FSE.

This paper focuses on the seminar which is the first and simplest exercise. Section 3 presents the main characteristics of a seminar.

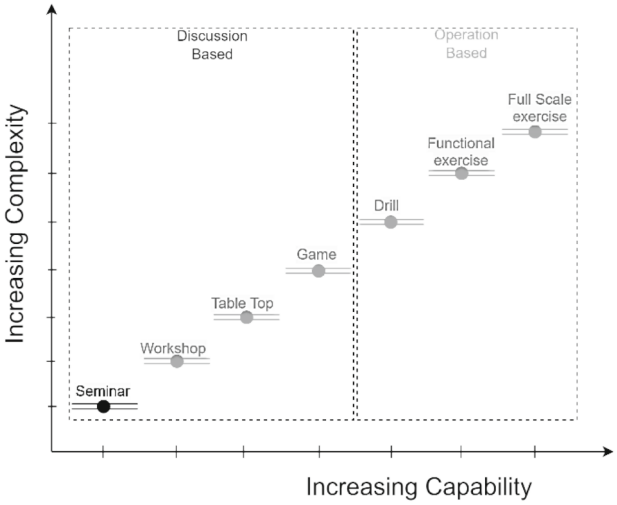

Fig. 2. Exercise classes.

3 The Seminar Framework

The seminar is an efficient tool to improve people's ability to carry out the preparation actions outlined in the plan on time. Through frontal lessons conducted by qualified staff, the seminar contributes to filling information gaps related to risks, providing a solid basis for awareness about planned actions. The activity is based on informal discussion about the contents of the emergency plan to familiarise participants with the planned procedures. Communication between the presenter and the participants is unidirectional (Fig. 3). The presenter explains the contents of the emergency plan to an audience consisting of a small but select group of key stakeholders, including industry experts, practitioners and community representatives. The activities are 'lecture-based' and involve the detailed presentation of the plan and its procedures.

The proposed framework is coherent with the international emergency exercises. In the consolidated approach, the seminar design is aimed at defining its contents according to the evacuation planning. In line with the paper's objectives, the proposed framework is enriched with a set of TSM applied to simulate the evacuation of people, by considering the effects produced by the information provided to users by the seminar (Sect. 3.1).



Fig. 3. Schematic representation of seminar exercise.

Then the seminar is conducted and evaluated by adopting a circular "Plan-Do-Check-Act" sequence (Sect. 3.2). A set of indicators measures the expected exposure reduction providing support for decision-makers to improve evacuation planning (Sect. 3.3).

Generally, seminars are designed, conducted and evaluated following the consolidated path. The general objective of this research concerns the possibility of following an advanced path aimed at estimating the seminar's contribution to risk reduction, with reference to the exposure component.

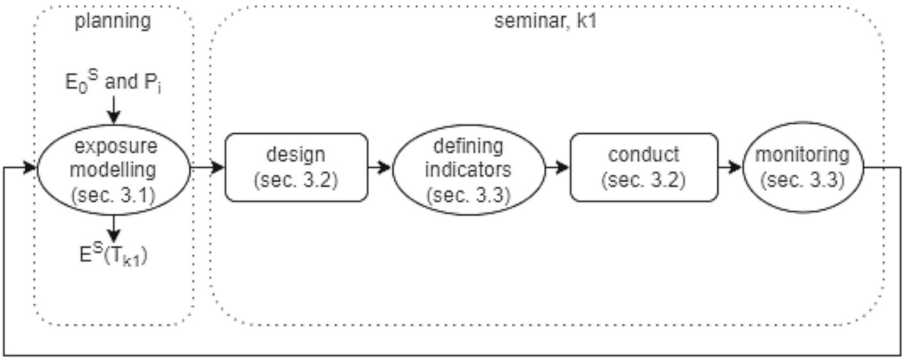

Fig. 4. Seminar framework.

3.1 Exposure Modelling

The use of simulation models such as Transport System Models (TSMs) in the urban context facilitates the quantification of exposure components for different scenarios. This allows analysts to assess the effects of the planned actions included in the evacuation plan and subsequently described in the seminar. According to Russo and Rindone [3], if P_i is the generic best plan, the maximum theoretical exposure reduction that can be achieved with the evacuation plan alone, $E(P_{min})$, represents the exposure limit level to target by performing training and exercises. Indeed, without adequate training of the users and operators involved, the plan is not sufficient to achieve the expected exposure reduction. Each training and exercise action contributes to the overall risk reduction; in particular, the impact of each action is independent of the others. This means that the exposure reduction resulting from each action can be assessed separately. Figure 5 is a graphic representation of exposure reduction obtained from the implementation of

all exercises. This paper focuses on the seminar's contribution to exposure reduction (ΔE^{S}_{k1}).

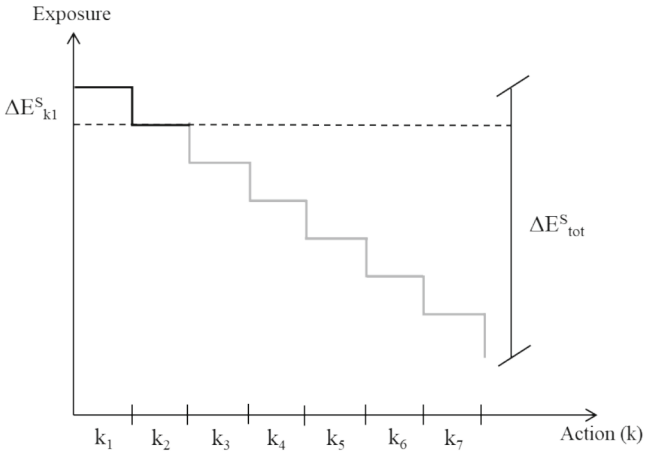

Fig. 5. Reduction of exposure levels as a function of operating classes (see Fig. 2) k_1: Seminar; k_2: Workshop; k_3: Table Top Exercise; k_4: Game; k_5: Drill; k_6: Functional Exercise; k_7: Full-Scale Exercise).

Exposure reduction resulting from the seminar can be expressed through the following equation:

$$\Delta E^{S}_{k1} = E^{S}_{0} - E^{S}(T_{k1})$$

where E_0 is the exposure value without the evacuation plan; while $E(T_{k1})$ is the exposure after implementation of the seminar, measured ex-ante through simulation models.

3.2 Design and Conduct

Seminar's Design. The seminar can be designed according to the US HSEEP guidelines. The design concerns the definition of the event that produces the emergency scenario (e.g. an imminent explosion of a tank transporting dangerous goods) and the planning contents defined for facing each emergency (e.g. evacuation procedures). The critical phases occurring in the emergency event are identified. These include a description of the nature of the emergency; the area and the population involved; and the planned responses of local authorities, non-governmental organisations and other entities during the phases of the event. The key factors should be described following the temporal dynamics of the specific emergency event, from the start time to a possible conclusion.

The output of this step constitutes the exercise material containing the above characteristics. The material comprehends documents of the exclusive use of exercise planners, facilitators, evaluators and other material useful for players. For instance, the guide of a seminar can be a Situation Manual (SitMan) that provides exercise participants with the tools to perform their roles in the exercise.

Seminar's Conduct. According to the designed characteristics, the seminar is conducted involving the presenter and different classes of participants. During the seminar specific to each emergency event, the planned actions are illustrated by the presenter to the participants (e.g. the evacuation procedures for moving people from the dangerous area to shelter areas). Intervention strategies are outlined identifying: the persons in charge of overseeing and controlling the implementation of the emergency procedures; the arrangements for requesting the intervention of the authorities in charge; the necessary information upon their arrival; the functional network of cooperation between the various territorial bodies, rescue operations, evacuation plans; the allocation of available resources such as emergency and logistical infrastructure.

3.3 Evaluation

To assess the level of exposure, it is necessary to consider the variables that may differ based on the context and type of emergency. The variables are defined before the seminar is conducted. Upon conclusion of the seminar, the evaluator has the assignment of monitoring the previously defined variables.

Variables Definition. Evaluation of the exposure reduction can be performed by adopting different kinds of indicators. A first attempt is to measure this contribution to the quantity and quality of the scheduled seminars.

For each hierarchical level of disaster management, a common indicator for assessing exposure reduction can be defined. By concerning a specific emergency scenario (s), the indicator is defined as follows ([15]):

$e^s{}_{sem}$ = *time needed for the individual to acquire the plan documentation*

The indicator measures the "capability", by evaluating the exposure reduction, and "complexity" by quantifying the number of actors involved. In particular, this indicator can be scaled up according to the number of seminar participants. Then the following specified indicators are proposed with reference to:

- The groups belonging to the decision levels introduced in Sect. 2.1 (m: managers; o: operators; c: people community) and belonging to Fig. 1;
- The organisational characteristics of the seminar in terms of
  - temporal length, or seminar duration (h) (e.g. 3 h),
  - frequency, or number of seminars to be held (k_1) in a time interval (t) (e.g. one seminar per year),
  - and human resources;
- Number of seminar participants (n_p), which measures the maximum number to whom the seminar lecture can be addressed.

Indicators can also be specified with reference to the different emergency scenarios (s) for which the plan was developed.

A greater number of participants at the different hierarchical levels, together with the correct organisation and implementation of the seminar, has a positive effect in terms of

Table 1. Indicators for seminar planning.

Hierarchical level	n. of participants	Temporal length	Frequency	Human Resources
Management level	$n^m{}_p$	h^m	$k_1{}^m$ /t	$n^m{}_p$
Operation level	$n^o{}_p$	h^o	$k_1{}^o$ /t	$n^m{}_p/n^o{}_p$
Community level	$n^c{}_p$	h^c	$k_1{}^c$ /t	$n^o{}_p/n^c{}_p$

increased diffusion and awareness of the indications contained in the plan. This helps to reduce the value of the indicator used to measure ex-ante and ex-post exposure reduction (e_m).

Monitoring. Monitoring consists of measuring the variables defined before the conduct of the seminar, this phase can be carried out in different ways.

An immediate way that can be used to monitor a seminar exercise, is to check that the evacuation plan has been received by all the actors involved. A more complex procedure is direct observation by the evaluator. During the seminar, the evaluator, through the drafting of a document, collects quantitative data related to the indicators defined previously.

4 Test Cases

4.1 Example of Modelling

The United States has adopted a planning model based on 'capabilities' with reference to the emergency management capacities of the agencies involved. The assessment of this capability is part of the THIRA (National Threat and Hazard Identification and Risk Assessment) process, organised in three phases identified with the following questions: "1) How prepared is the Nation? 2) What preparedness gaps does the Nation face? and 3) What strategies does the Nation need to develop to address those gaps?". To achieve the goals outlined in THIRA, FEMA developed the National Risk and Capability Assessment (NRCA), which brings together a suite of assessment products to measure risk and capability across the nation through a standardised process [16]. In parallel, FEMA introduced the National Stakeholder Preparedness Review (National SPR), a tool that can measure the current capability level and thus the distance to capability goals defined in contingency plans. Together, these tools make it possible to define and measure gaps at the national level [17].

According to US experiences about THIRA Fig. 6 (a) shows the contribution of training actions performed before a disaster event. The expected results are to increase the capability to deal the emergencies. According to Russo and Rindone [3], the exposure component of risk is related to the quantity and quality of training actions. More training over time leads to greater awareness of the actions to be taken (capability) in the event of various risk situations. Then Fig. 6 (b) represents the contribution of the implementation

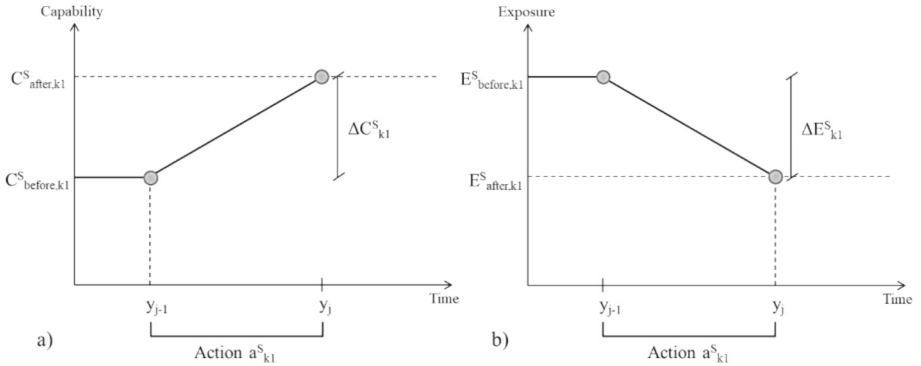

Fig. 6. Comparison of Capability (a) and Exposure (b) as a function of training time. The 'Action' time interval represents the time spent on training actions (in this case seminar).

of training and exercise actions before a disaster event. Generic event (S). One of the potential effects of capability enhancement is exposure reduction.

In each capability target, a critical task is described, which is the one listed in the emergency plan developed by the planner; the ability to perform critical tasks is an indicator of preparedness. In addition, each target consists of standardised impact metrics, which represent the main quantifiable consequences associated with the threat, and a timeframe metric, which defines the time interval in which the action must be performed. In the case of evacuation, Fig. 7 shows an example of a critical task using the THIRA capability target as a reference:

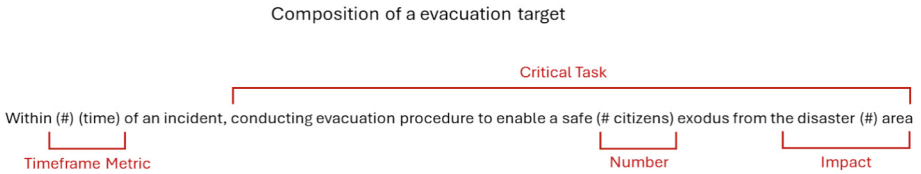

Fig. 7. Example of a capability target (Adapted from [17]).

The literature review reveals a limited use of TSM to simulate and evaluate the effects of a seminar in terms of exposure reduction.

4.2 Examples of Design and Conducted Seminars

Some studies emphasise the importance of promoting training courses and emergency drills to increase community awareness and resilience. At the same time, there is a communication gap between experts and citizens that includes not only sharing information but also assessing the understanding of the content of information [18]. In Italy, communication between institutions and citizens mainly concerns the immediate post-disaster phases. Other international examples, however, promote emergency preparedness through local events. For example, Australia, Canada or Nepal provide citizens

with emergency kits and updated guidelines [19]. In the study carried out by Hoffmann and Muttarak [20], the importance of psychosocial factors in disaster preparedness, in addition to socio-demographic characteristics and structural/geographical variables, is highlighted in the low- and middle-income countries of Southeast Asia. Increased awareness of hazards and risk perception increases people's ability to implement the actions foreseen in the plans.

In some contexts, seminars are usually used with internationally standardized procedures.

It should be considered that the discipline governing safety in the workplace includes obligatory training and refresher courses. For example, in Europe, the Framework Directive 89/391 on the Safety and Health of Workers (OSH) lays down general principles on the prevention of risks at work, including planning and managing evacuation in case of emergency. The guidelines of the Framework Directive set minimum safety requirements and do not include specific details on the procedures to be performed, which can be supplemented by individual EU member states. In Italy, D.Lgs. 81/08 [21] provides for the mandatory drafting of the Emergency and Evacuation Plan (EEP). The planning and implementation of the EEP is the responsibility of the Employer in cooperation with the Prevention and Protection Service Manager (RSPP), who is obliged to attend a training course and a refresher course every 5 years. Mandatory training in this case only ends at the management level.

In some transport systems, seminars are already common practice.

An example of a seminar implemented on a high-frequency basis concerns the air transport sector. Reference is made to the safety briefing provided by flight personnel to passengers before take-off. The pre-flight briefing is a requirement established by the national civil aviation authority (for Italy ENAC) under the recommendation of the International Civil Aviation Organisation [22] which provides a specific training course on aircraft landing and emergency evacuation procedures for cabin crew (ICAO training). The way airlines choose to carry out the briefing depends on the company's internal policies: safety information can be pre-recorded or provided live. A live demonstration involves a flight attendant standing in the aisle while another attendant explains the procedures to be implemented.

Another example of a seminar is the one that takes place on ships established by European Regulation No. 1177 of 2010 on passenger rights [23]. In this case, information is provided to passengers in the form of recorded audio. A special case is the Cruise Ship. According to the International Convention for the Safety of Life at Sea (SOLAS) [24] dictates, safety instructions are provided to passengers before departure in the form of a seminar combined with an evacuation exercise.

4.3 Examples of Evaluation

As far as concerns Table 1, the application of the indicators in the training context of the RSPP figure is shown below (Table 2):

Table 2. Indicators for planning a RSPP training seminar.

Hierarchical level	n. of participants	Temporal Length	Frequency	Human resources
Management level		100	5	

Considering the known references for seminars used in the aeronautical field, we have assumed the application of the indicators proposed in Table 1 in a scheduled flight context (Table 3):

Table 3. Indicators for planning a seminar for scheduled flights.

Hierarchical level	n. of participants	Temporal length	Frequency	Human resources
Operation level	20	95	-	1
Community level	180	0.17	1/flight	3

We considered an average number of passengers of about 180 (Boeing 737–800 or Airbus A320), three flight attendants and a seminar time of about 10 min for the level of passenger training. The flight crew training data were obtained from [25]. Considering the method by which the seminars are conducted (e.g. frequency), a significant contribution to reducing exposure can be expected, considering also that evacuation instructions in the event of an emergency are always available to passengers. Therefore, the value of indicator e_m is limited.

5 Discussion and Final Remarks

In some sectors, the seminar is a standard practice already adopted. This is the case, for example, of air transport. Before the departure of an aircraft, the standard procedure requires the on-board staff to inform the passengers on board about the procedures to be adopted in the event of an emergency. The objective is to increase the passengers' awareness about the actions to be taken in the event of a plane crash. This type of seminar contributes significantly to the reduction of exposure.

The same type of exercise is not common in civilian systems. European legislation on civil protection establishes the procedures but does not require the carrying out of exercises. However, the seminar form is the easiest to design and implement. Repetition of the same exercise (e.g. a seminar) helps to increase awareness of procedures, and errors and improve elements. Instead, the increase in complexity of an exercise allows people to increase their ability to respond to an emergency event. At the same time, it is necessary to adopt a TSM approach to simulate the effectiveness of actions, before their implementation. In this case model simulations and exercise simulations should be integrated. Mutual interchanges must be generated between the two simulation activities

to increase knowledge of the phenomenon. The real phenomenon occurs with a very low frequency and is therefore difficult to observe directly. However, the exercises are a tool to approximate reality, even if some conditions (e.g. panic) are difficult to reproduce.

This research can have further developments in different directions.

The first direction concerns the models' accuracy in simulating the transport system in evacuation conditions. It is possible to use ICT technologies to acquire information to better understand the phenomenon. Greater integration between ICT technologies and TSM models is needed to offer support and reliable tools to decision-makers.

A second direction concerns the ability to carry out and observe the exercises. Existing methods for evaluating exercises can be supported by TSM. Also, in this case, it is necessary to adapt ICT solutions integrated with the TSMs to support the carrying out of the exercises.

The third direction concerns the estimation of the risk reduction connected to the adoption of the models and exercises. It is necessary to build models for estimating the contribution of each training and exercise activity to risk reduction. These quantifications require more insights. For instance, efficacy must also be assessed in relation to people's actual behaviour in an emergency; not only in terms of output but also in terms of outcomes [9].

Acknowledgements. This study was carried out within the research project "RISK: Recovery Increasing by Social Knowledge" -2022B4TT2M (CUP C53D23004800006), PIANO NAZIONALE DI RIPRESA E RESILIENZA (PNRR) Missione 4 "Istruzione e Ricerca" - Componente C2, Investimento 1.1 "Fondo per il Programma Nazionale di Ricerca e Progetti di Rilevante Interesse Nazionale (PRIN)", D.D. n. 104 del 2 febbraio 2022, ERC SH7 "Human Mobility, Environment, and Space". This paper reflects only the authors' views and opinions, neither the European Union nor the European Commission nor the Italian Ministry of the University and the Research can be considered responsible for them.

References

1. United Nation. UN: Sustainable Development Goals (SDG). https://sdgs.un.org/goals. Accessed 07 May 2023
2. Busayo, E.T., Kalumba, A.M., Afuye, G.A., Ekundayo, O.Y., Orimoloye, I.R.: Assessment of the Sendai framework for disaster risk reduction studies since 2015. Int. J. Disaster Risk Reduction **50**, 101906 (2020). https://doi.org/10.1016/j.ijdrr.2020.101906
3. Russo, F., Rindone, C.: Methods for risk reduction: training and exercises to pursue the planned evacuation. Sustainability **16**, 1474 (2024). https://doi.org/10.3390/su16041474
4. US Commission: The 9/11 Commission Report. https://www.9-11commission.gov/report/911Report.pdf. Accessed 08 Aug 2023
5. US Federal Emergency Management Agency. FEMA: Homeland Security Exercise and Evaluation Program. Volume I: HSEEP Overview and Exercise Program Management, https://www.ojp.gov/pdffiles1/Archive/205244NCJRS.pdf. Accessed 03 Jan 2024
6. Monet, J.-P., et al.: Civil protection in Europe: towards a unified command system? Lessons learned, studies and ideas about change management. In: Presented at the Proceedings of the International ISCRAM Conference (2020)
7. Cascetta, E.: Transportation Systems Engineering Theory and Methods. Springer, US, S.l. (2013). https://doi.org/10.1007/978-1-4757-6873-2

8. Rindone, C., Panuccio, P.: Planning for risk reduction in the transport system at urban level. IJTDI **7**, 27–34 (2023). https://doi.org/10.18280/ijtdi.070104
9. Russo, F., Rindone, C.: Safety of users in road evacuation: the logical framework approach in evacuation planning. Presented at the URBAN TRANSPORT 2008, Malta August 15 (2008). https://doi.org/10.2495/UT080721
10. Russo, F., Rindone, C.: Planning in road evacuation: classification of exogenous activities. WIT Trans. Built Environ. **116**, 639–651 (2011). https://doi.org/10.2495/UT110541
11. Russo, F., Rindone, C.: Regional transport plans: from direction role denied to common rules identified. Sustainability **13**, 9052 (2021). https://doi.org/10.3390/su13169052
12. Russo, F., Rindone, C., Trecozzi, M.R.: The role of training in evacuation. Presented at the RISK ANALYSIS 2012, Island of Brac, Croatia September 19 (2012). https://doi.org/10.2495/RISK120411
13. Campisi, T., Russo, A., Tesoriere, G., Al-Rashid, M.A.: A two-steps analysis of the accessibility of the local public transport service by university students residing in enna. In: Gervasi, O., et al. (eds.) Computational Science and Its Applications – ICCSA 2023 Workshops: Athens, Greece, July 3–6, 2023, Proceedings, Part III, pp. 147–159. Springer Nature Switzerland, Cham (2023). https://doi.org/10.1007/978-3-031-37111-0_11
14. Musolino, G.: Methods for risk reduction: modelling users' updating utilities in urban transport networks. Sustainability **16**, 2468 (2024). https://doi.org/10.3390/su16062468
15. Russo, F., Rindone, C.: Planned and implemented actions by exercises. (submitted to) International Conference on Computational Science and Its Applications-ICCSA 2024 (2024)
16. US Federal Emergency Management Agency. FEMA: Homeland Security Exercise and Evaluation Program. https://www.fema.gov/emergency-managers/national-preparedness/exercises/hseep. Accessed 03 Jan 2024
17. US Federal Emergency Management Agency. FEMA: Threat and Hazard Identification and Risk Assessment (THIRA) and Stakeholder Preparedness Review (SPR) Guide (2018). https://www.fema.gov/sites/default/files/2020-04/CPG201Final20180525.pdf
18. Antronico, L., Coscarelli, R., De Pascale, F., Condino, F.: Social perception of geo-hydrological risk in the context of urban disaster risk reduction: a comparison between experts and population in an area of southern Italy. Sustainability **11**, 2061 (2019). https://doi.org/10.3390/su11072061
19. Kubás, J., Bugánová, K., Polorecká, M., Petrlová, K., Stolínová, A.: Citizens' preparedness to deal with emergencies as an important component of civil protection. IJERPH. **19**, 830 (2022). https://doi.org/10.3390/ijerph19020830
20. Hoffmann, R., Muttarak, R.: Learn from the past, prepare for the future: impacts of education and experience on disaster preparedness in the Philippines and Thailand. World Dev. **96**, 32–51 (2017). https://doi.org/10.1016/j.worlddev.2017.02.016
21. Italian Government: Decreto Legislativo 9 aprile 2008, n. 81-Testo Unico sulla salute e sicurezza nei luoghi di lavoro (2008). https://www.normattiva.it/atto/caricaDettaglioAtto?atto.dataPubblicazioneGazzetta=2008-04-30&atto.codiceRedazionale=008G0104&atto.articolo.numero=0&atto.articolo.sottoArticolo=1&atto.articolo.sottoArticolo1=10&qId=caadf6ad-ac6b-4dbb-93a2-abcf9a5c4fac&tabID=0.6404640151414289&title=lbl.dettaglioAtto
22. ICAO: Aviation Security Policy Section/Annex 17 - Aviation Security. https://www.icao.int/security/sfp/pages/annex17.aspx
23. European Union: regulation (EU) No 1177/2010 of the European parliament and of the council of 24 November 2010 concerning the rights of passengers when travelling by sea and inland waterway and amending Regulation (EC) No 2006/2004

24. IMO - International Maritime Organization: International Convention for the Safety of Life at Sea (SOLAS) (1974). https://www.imo.org/en/About/Conventions/Pages/International-Convention-for-the-Safety-of-Life-at-Sea-(SOLAS),-1974.aspx
25. EASA's Cabin Safety Expert Group: Initial Training for Cabin Crew - EASA Guidelines on the conduct of Initial training (2022)

Open Access This chapter is licensed under the terms of the Creative Commons Attribution 4.0 International License (http://creativecommons.org/licenses/by/4.0/), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

