WP 4 PILOT PROJECT DEPLOYMENT

A 4.4 – Assessment of pilot project's achievements

Forest fires and earthquakes are natural disasters that expose Croatian and Italian regions participating in the INTERREG Italy-Croatia Cross-Border Cooperation Program. The results of the READINESS project capitalized on the results of the HOLISISTC project, which was co-financed by the IPA ADRIATIC cross-border cooperation program.

After analyzing the results of the HOLISTIC project, the READINESS partners identified the pilot projects to be implemented through the three main groups of WP 4 activities. Each sub activity defined the number of outputs which will be archived during the project implementation.

WP 4 – Pilot projects deployment		
Activity 4.1	Advanced training campaign for civil protection	
4.1.1	Advanced training courses	12
4.1.2	Wildfire exercises	5
4.1.3	Combined earthquake and wild fire exercise	3
4.1.4	Cross border combined simulation/drill	2
Activity 4.2	Pilot implementation of SPB seismic monitoring innovative procedure	
4.2.1	Instrumentally monitoring buildings	90
4.2.2	Visual and dimensional screening	18
4.2.3.	Detailed analysis of SPB's (preliminary restoration designs)	6
Activity 4.3	Awareness raise campaign to improve citizen's promptness	
4.3.1	Info days addressed to students and school children	6
4.3.2	Cross border awareness day for children	6
4.3.3	Exhibition of civil protection vehicles and equipment	6
4.3.4	Citizen's involvement during combined earthquake and wildfire exercise	6

The aim of the completed document is to provide an analysis of partners actions realized during the implementation of the project, but also to assess the quality of the activities carried out and their impact on the safety of the Croatian and Italian regions, which are highly endangered by forest fires and earthquakes.

Thematic TFs, in collaboration with experts in these areas from the participating project regions, assessed the impact of the pilot projects carried out in individual areas to see what are the weak points in fire protection and the reduction of earthquake risk in the regions of Croatia and Italy.

WP 4 – Pilot projects deployment

		PP (AF)	PP (ACHIVED)
Activity 4.1	Advanced training campaign for civil protection		
4.1.1	Advanced training courses	12	**21**
4.1.2	Wildfire exercises	5	**8**
4.1.3	Combined earthquake and wild fire exercise	3	**5**
4.1.4	Cross border combined simulation/drill	2	**2**
Activity 4.2	Pilot implementation of SPB seismic monitoring innovative procedure		
4.2.1	Instrumentally monitoring buildings	90	**97**
4.2.2	Visual and dimensional screening	18	**45**
4.2.3.	Detailed analysis of SPB's (preliminary restoration designs)	6	**6**
Activity 4.3	Awareness raise campaign to improve citizen's promptness		
4.3.1	Info days addressed to students and school children	6	**13**
4.3.2	Cross border awareness day for children	6	**6**
4.3.3	Exhibition of civil protection vehicles and equipment	6	**7**
4.3.4	Citizen's involvement during combined earthquake and wildfire exercise	6	**6**

A substantial part of the 4.4 deliverable are WP 4 project deployment partners contributions by each activity. This deliverable represents an evaluation of pilot deployments in each pilot site and the achieved results of each activity.

WP 4

PILOT DEPLOYMENT

A 4.1

Advanced training for civil protection

(Partners contributions)

WP 4 PILOT PROJECT DEPLOYMENT

A 4.1 – Advanced training for Civil Protection

Deliverable: Pilot Deployment of Civil Protection Advanced Training

Partner	Dubrovnik-Neretva Region	
Type of trainings/exercises	1.	Advanced training courses (3)
	2.	Local earthquake and wildfire combined exercise (1)
	3.	Cross border simulation drill (1)

Advanced training course 1

Advanced training course for non-commissioned officers

Type of training

Advanced training course for non-commissioned officers consists of two parts. The first part is the theoretical part of the training and the second part is the training part. The theoretical part is devoted to the study of laws in the field of firefighting and civil protection, fire protection in construction, burning and extinguishing in general, fire equipment and various fire tactics. The exercises are related to working with various tools, hydraulic devices, specialized vehicles and protective technical equipment. A special part of the training was devoted to managing interventions and extinguishing fires in facilities where a large number of people reside and interventions in accidents involving dangerous and highly flammable substances.

Training team description

The training team includes professionals with many years of experience who are members of the Dubrovnik-Neretva Region Fire Association. An indispensable member of each training team is the Commander of the Dubrovnik-Neretva Region Fire Association as well as members of the Regional Fire Command. They must satisfy the requirements laid down by the Ministry of the Interior in the special Regulations for the training of firefighting personnel.

Outputs of advanced training course

The terms of reference predicted the training of 15 firefighters for non-commissioned officers. On this occasion, 18 firefighters were trained, which strengthened the chain of command during various interventions. Numerous interventions have become safer for both firefighters and possibly vulnerable people.

Recommended measures to be implemented

Following the training's outputs, it is recommended that the chain of command within the fire brigades must be further strengthened, as this leads to more successful interventions and

contributes to the safety of civil protection operational forces and people who may be affected by various natural disasters. Strengthening the chain of command in the fire brigades in the Dubrovnik-Neretva Region is contributing to neighboring Croatian and Italian regions as well. Natural disasters know no boundaries and it is often the case that members of a fire brigade go to a colleague for assistance in neighboring regions or states. Such interventions also become better quality interventions and guarantee a greater level of security for the vulnerable population.

Photos

Advanced training course 2

Advanced training course for firefighter specialist (1st class firefighter)

Type of training

Specialist firefighter training consists of two parts theoretical and practical, exercise part. The theoretical part includes lectures on the organization of fire protection, burning and extinguishing in general, handling of fire extinguishers and tools. The practical part consists of programs primarily related to work with fire pumps and respiratory system protection equipment, the use of airbags for rescues from high-rise residential buildings, and the common tactics and operations of multiple fire departments and brigades during interventions.

Training team description

The training team includes professionals with many years of experience who are members of the Dubrovnik-Neretva Region Fire Association. An indispensable member of each training team is the Commander of the Dubrovnik-Neretva Region Fire Association as well as members of the Regional Fire Command. They must satisfy the requirements laid down by the Ministry of the Interior in the special Regulations for the training of firefighting personnel.

Outputs of advanced training course

The terms of reference predicted the training of 20 firefighters in firefighter specialist. On this occasion, 30 firefighters were trained, which strengthened the preparedness of members of several volunteer and professional fire departments in almost all of the municipalities in the Dubrovnik-Neretva Region. Enhanced capability firefighters can also greatly benefit to the regions bordering Dubrovnik-Neretva Region when their engagement is needed as an aid in the event of major natural disasters.

Recommended measures to be implemented

It is recommended by all participants and evaluators to continue similar education since they lead to an increase in the individual and group readiness of the members of the voluntary and professional fire brigades. The recommendation specifically addresses firefighters in border areas. The READINESS training sessions are complementary to each other and, following the previous one that strengthened the fire brigade chain of command during the interventions, this training reinforced the readiness of the fire brigade members in general.

Photos


193

Advanced training course 3

Advanced training course for different kind of technical interventions

Type of training

Specialist firefighter training consists of two parts theoretical and practical, exercise part. The theoretical part of the training is dedicated to the education of specialized vehicles for technical interventions, work with various hydraulic equipment and tools is extremely important to rescue people in case of severe accidents. The practical part of the training included working with pneumatic lift cargo, work with equipment for first aid, work with geophones, ways of rescuing injured people from the depths and heights and transport of injured persons.

Training team description

The training team includes professionals with many years of experience who are members of the Dubrovnik-Neretva Region Fire Association. An indispensable member of each training team is the Commander of the Dubrovnik-Neretva Region Fire Association as well as members of the Regional Fire Command. They must satisfy the requirements laid down by the Ministry of the Interior in the special Regulations for the training of firefighting personnel.

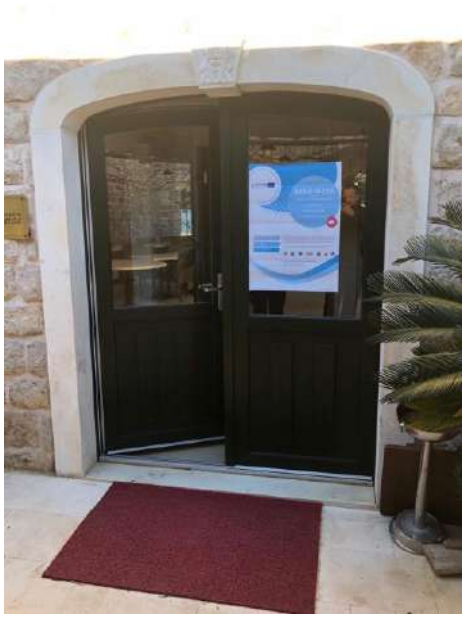
Outputs of advanced training course

The terms of reference predicted the training of 25 civil protection members for different kind of technical interventions. On this occasion, 28 firefighters were trained, which strengthened the preparedness of members of several volunteer and professional fire departments to respond in the event of severe traffic accidents or rescue from the depths or heights or after an earthquake. Taking into account the geographical characteristics of the Dubrovnik-Neretva Region, bad traffic connections with the rest of Croatia and traffic jams throughout the tourist season and the fact that civil protection members form all territories were trained the benefits of this advanced training course are extremely high and useful.

Recommended measures to be implemented

It is recommended by all participants and evaluators to continue similar education since they lead to an increase in the individual and group readiness of the members of the voluntary and professional fire brigades especially taking into account the risks of traffic accidents during the summer as well as in case of the earthquake which represents one of the highest risks for the Southern Croatia and the area of the Dubrovnik-Neretva Region. The READINESS training sessions are complementary to each other and, following the previous one that strengthened the fire brigade chain of command during the interventions, this training reinforced the readiness of the fire brigade members in general.

Photos of the event and/or other useful data



Local earthquake and wildfire combined exercise

PRIPRAVNOST 2018 / READINESS 2018

Type of training

Engaging and coordinating civil protection, operational forces in the event of an open space earthquake and fire in the Dubrovnik-Neretva Region. Checking the capabilities of civil protection operational forces to improve the preparedness of civil protection systems and training them for field interventions. The exercise sets two main goals; to explore and give a certain overview of the command capabilities of the Civil Protection Headquarter, but also to explore the ability to handle rescue equipment from ruins, extinguish fires and search for missing persons in accidents. The purpose of the exercise was to educate members of all ages about the risks and how civil protection operatives work and how they deal with the search and rescue actions.

Training team description

The training was managed by two major groups: the steering group and the exercise group. The steering group included representatives of the operational protection forces of civil protection of several units of local self-government, National Rescue and Protection Directorate, Firefighting Association of the Dubrovnik-Neretva Region and the police. The training group included members of various civil protection units and other emergency services such as the Emergency Department, the Red Cross, the Mountain Rescue Service, the Dubrovnik Harbor Master's Office and the Veterinary Services.

Outputs of advanced training course

The training was attended by almost 200 active participants, members of different operational forces at all levels: local, regional and national. This advanced training proved to be extremely useful given the fact that it required working with specialized equipment. The competence of the units in the field, communication and work with the communication equipment, the flow and exchange of information were assessed as satisfactory as the command of the units in the field, coordination between members of the civil protection operational forces and other participants of

the exercise. There were no objections to the technical equipment of the units and the safety of participants in the field exercise, and to the logistics, accommodation and food on the ground. Event simulation, coordination, and action of markers during the exercise met the needs of the field exercise. In the part of the preparation of the exercise and the training management system, informing and activating the participants of the operational forces, the implementation of SOP procedures, the flow and exchange of information, the decision-making process, the implementation of management principles, the general management of the exercise, the work with the media and the logistics were assessed as satisfactory. Two remarks were given during the evaluation process: communications and working with communication equipment at one time had different limitations and that cooperation with exercise participants in general could be better. In addition to members of the operational forces, citizens of all ages participated in the exercise. In this way, the level of awareness of the necessity of joint action in the event of fires and earthquakes and any other risks was raised.

Recommended measures to be implemented

It is recommended by all participants and evaluators to continue similar advanced trainings since they lead to an increase in the individual and group readiness of the members of the civil protection forces at all levels: local, regional and national. Communication between different emergency services has been dedicated as a topic which has to be tackled and improved in the future.

Photos

Cross border combined simulation/drill

READINESS SERM-ex-2019

Type of training

The exercise concluded a three-year cycle of activities of the SERM Academy (International training school in Seismic Emergency Response Management) which saw the collaboration between the Civil Protection of the Autonomous Region of Friuli Venezia Giulia, the University of Udine, National Fire Department, Municipality of Venzone and the Association of Earthquake and Mayors Municipalities of the Friuli Reconstruction, aimed at establishing an integrated system for the management of the response in seismic emergency. The goal was to verify the optimal methods of integrated response to a seismic emergency, from the early post-earthquake stages, by the National Fire Brigade and Civil Protection of the Region, also through the use of technologies and procedures innovative, developed by the PC FVG and by the University of Udine and, in particular, the use of the application called "iTriage" for the rapid evaluation of the state of damage to buildings following an earthquake, set up during the seismic events in Italy (L'Aquila 2009, Emilia 2012, Central Italy 2016) and in international missions.The possibility of acquiring images and videos was also tested, taken from a drone to monitor forest fires and the version aimed at detecting geological instability. Representatives of several volunteers and professional firemen brigades from Dubrovnik-Neretva Region took part in the exercise since both regions, are threatened by same risk which is an earthquake.

Training team description

Several C.P. operators and technicians with different tasks and functions: volunteers, fire brigade's operators, researchers and students of University of Udine and Trieste, professional and volunteer members of Firefighting Association of the Dubrovnik and Neretva Region. Participants of the exercise held are members of the Dubrovnik-Neretva County Fire Department and an integral part of its chain of command. In any case, the acquired knowledge and experiences from their Italian counterparts will fully apply in the area of Dubrovnik-Neretva Region which will improve future interventions of civil protection forces.

Outputs of advanced training course

The exercise involved the various components of the civil protection systems from both regions (countries), operators and volunteers as well as the members of the scientific community. One of the conclusions has been the possibility of setting up of the training center, which would be available to the civil protection of both participating regions (countries). Initiatives aimed at increasing disaster resilience on a supranational scale can be implemented and developed.

Recommended measures to be implemented

The most important benefit is the establishment of the cooperation between two project partners, regions or countries threatened by same risk according to risk assessments in both countries. The recommendation is to continue with the organization of the similar exercises, if possible, since they lead to a better preparedness of civil protection in both countries. Nevertheless, civil protection in both countries can study the rules of interventions which may, eventually, lead to the creation and publications of joint procedures which might be significant in case that either territory requires help in case of emergency interventions during heavy disasters.

Photos

WP 4 PILOT PROJECT DEPLOYMENT

Act 4.1 – Advanced training for Civil Protection

Deliverable: Pilot Deployment of Civil Protection Advanced Training

Partner	Marche Region	
Type of trainings/exercises	3	Advanced training course 1
	1	Advanced training course 2
	3	Local wildfire exercise
	0	Local earthquake and wildfire combined exercise
	0	Cross border simulation drill

Advanced training course 1

Civil Protection Volunteers Training for forest firefighting

Type of training

3 courses on forest firefighting activities were held in Fano, Fabriano and Sant'Elpidio a Mare Municipalities on 26th and 27th of May (18 hours each course).

Theoretical lessons related to active forest firefighting activities including reconnaissance, surveillance, sighting, and extinguishing by land were organized. Right behaviors, use of Personal Protective Equipment and accident risk information for trainees were underlined.

Training team and participants

Regional local Fire-Fighting brigades, specialized in firefighting operations, drills and procedures trained the volunteers. An agreement of cooperation between Marche Region and Fire Brigade Corps has been signed in order to face regional forest fire. Civil protection officers were the course tutors.

Outputs of advanced training course

88 Civil Protection volunteers, coming from several civil protection groups and associations, were trained and firefighting course certification obtained. A debriefing and a final test were performed at the end of the course.

Critical faced issues and envisaged changes

Program and activities were already tested and capitalized by Holistic Project. However, it was seen that the theoretical program was too dense compared with a basic background of volunteers. In the 2019 edition theoretical agenda is changed in order to reduce the amount of offered topics.

Photos

Civil protection volunteers' groups trained for forest firefighting in 2018

Advanced training course 2

Seismic risk course for civil protection volunteers

Type of training

An experimental and innovative training course for much territory, reserved for members of municipal groups and voluntary associations operating in the field of civil protection in Belforte del Chienti and in the nearby municipalities of Caldarola, Serrapetrona and Camporotondo di Fiastrone (MC) was organized.

The purpose of the course (held in Belforte del Chienti) was providing basic information on seismic risk in view of the possible future employment of volunteers as local observations of damage scenarios related to future earthquakes.

A multiple-answer test was compiled and handed out to the future participants in the training course, in order to evaluate their level of knowledge of the course subjects and to find out how best to organize the course itself. The course was planned in five lessons (topics: earthquakes, local seismicity, seismic hazard, seismic risk, civil protection procedure) that were held by researchers of INGV and Osservatorio Geofisico di Trieste (OGS-TS) and Civil Protection Officers. A particularly interesting part of the course was the detailed analysis of a similar experience (carried out in the Region Friuli Venezia Giulia under the coordination of OGS-TS) shown by one of its teachers. Educational materials (edurisk book www.edurisk.it) were provided to the attendees. The lessons took place from September to October 2018.

Training team and participants

4 researchers of National Institute of Geophysics and Volcanology (INGV)
1 researcher Osservatorio Geofisico di Trieste (OGS-TS)
2 civil protection officers

Outputs of advanced training course

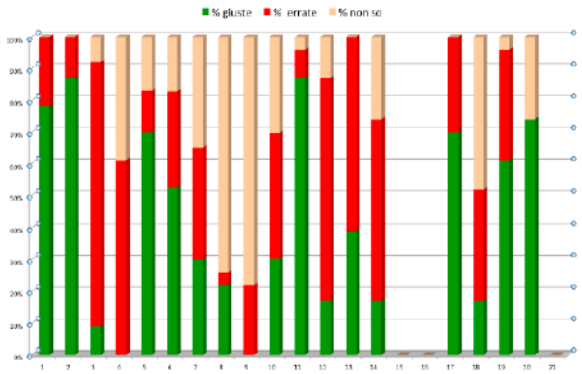
22 volunteers from 5 different civil protection groups were trained and certificate of attendance provided. At the end of the course the participants were again asked to fill the multiple-answer questionnaire in order to evaluate their progress. Answers were evaluated and analyzed. They showed an improving in earthquake issues and effects over local territories.

Critical faced issues and envisaged changes

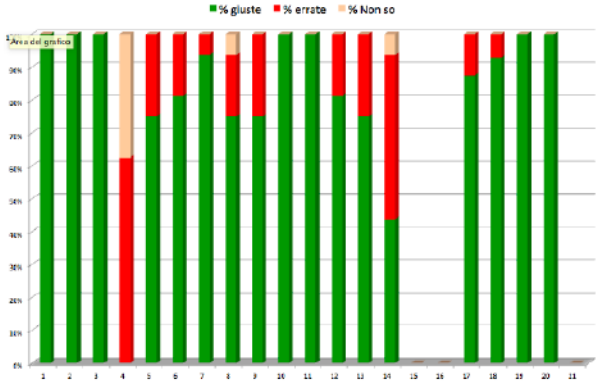
Volunteers have different educational backgrounds. It was difficult to level out basic knowledges. It was critical to organize a field survey due to previous engagements of volunteers and trainers. In order to improve the training, a field survey should have been organized, to show earthquake real effects on buildings and landscape. In a next edition, it must be planned.

Photos


PROTEZIONE CIVILE



Entry Test Results: pink- doubted answers, red wrong answers, green right answer.



Final Test Results: pink- doubted answers, red wrong answers, green right answer

Local wildfire exercise

Local field simulation

Type of exercise

3 field practices and simulations (for almost the same volunteers that attended module I – wildfire course -theoretical lessons) held in Fermignano, Fabriano and Venarotta Municipalities on 9th and 10th of June (18 hours).

Field simulations related to active forest firefighting activities including reconnaissance, surveillance, sighting, and extinguishing by land were organized. Operative procedures and command, responsibility roles of officers and volunteers, use of Personal Protective Equipment and forest fire equipment were tested.

Drill teams and participants

Regional local Fire-Fighting brigades, specialized in fire fighting operations, drills and procedures trained 93 volunteers.

Outputs of exercise

Forest fire fighting modules on off-road vehicles and Personal PPE (Personal Protective Equipment) was used and tested during simulations.

Volunteers from different 48 civil protection volunteer associations and groups were trained. A debriefing and a final test were performed at the end of the two day simulation.

Critical faced issues and envisaged changes

Programs and activities were already tested and capitalized by Holistic Project. No envisaged changes were reported. Regional local Fire-Fighting brigades formed for the first time volunteers with success. In the past editions private organizations or forest guard was involved.

Photos

WP 4 PILOT PROJECT DEPLOYMENT

A 4.1 – Advanced training for Civil Protection

Deliverable: Pilot Deployment of Civil Protection Advanced Training

Partner	Split-Dalmatia County	
Type of trainings/exercises	10	Advanced training courses
	1	Local wildfire exercise
	1	Local earthquake and wildfire combined exercise
	0	Cross border simulation drill (N/A)

Advanced training course 1-10

1. Makarska	(04.06.2018.)
2. Sinj	(05.06.2018.)
3. Trogir	(29.06.2018.)
4. Split / Solin	(06.07.2018.)
5. Hvar	(17.07.2018.)
6. Brač (Supetar)	(18.07.2018.)
7. Kaštel Sućurac	(18.07.2018.)
8. Split	(19.07.2018.)
9. Zagvozd / Imotski	(30.07.2018.)
10. Omiš	(17.08.2018.)

Type of training

- Introduction
- VATROnet, eHVZ and ICT basics
- A GIS system for tracking vehicles and firefighters
- Interactive database of hazardous substances
- Advanced alarm system
- Managing Firefighting interventions – UVI system
- Mimer Soft Radio communication system
- Adria Fire Propagator
- Meteorology, meteorological mobile station
- Practical exercises with VZŽ SDC Mobile Command Communication Center

Training team description

Professional seminars and a series of specialized exercises for advanced field training for commanders, members of public fire brigades (JVP) and voluntary fire brigades (DVD) in SDC. In total 141 personnel attended the event. Except the above mentioned the meeting was attended by several fire commanders covering the whole county area:

Commander of 5'th operation area (Omiš)
Commander of 6'th operation area (Makarska)
Commander of 8'th operation area (Imotski)
Commander of 9'th operation area (Vrgorac)

Outputs of advanced training course

All the participants acquired new skills and knowledge during the lectures and seminars and field training. After that specialized drill were organized with realistic simulations of the hazardous events in which the participants could test their newly acquired skills on the field.

Recommended measures to be implemented

As with all training drills, especially advanced specialized training, there are inevitable issues that participants are simulated to encounter. The purpose of the training is to familiarize participants to new scenarios and dangers that they can encounter during everyday rescue operations. In that sense the training course itself is evolving together with the participants making up new scenarios and using new methods and technology that saves lives and improves promptness and safety of the whole area and citizens in it. Changes will be in the form of improvement of procedures, skills and new equipment and technology that rescue services will use.

Photos

Local wildfire exercise

SAFETY 18

Type of training

The State Protection and Rescue Administration, in cooperation with the Ministry of Defense and the Ministry of Interior, organized Inter-sectional Coordination for the Homeland Security System "SAFETY 18". The main goal of the exercise is to assess readiness and co-ordination of operation forces on the ground involved in the 2018 firefighting implementation. The exercise is held in multiple locations in three counties in Dalmatia, during which a real-time image with an elaborated scenario will be (live) streamed, from the crushed area to the Operational Fire Department in Divulje from which the crisis is handled. The field exercise scenario envisions several major forest fires in Zadar, Šibenik-Knin and Split-Dalmatia County, where road and rail traffic and numerous settlements are endangered. A part of the exercise was held in the Muć area of Borovica, which involved the open-air fire drill as well as the simulation of overturning dangerous cargo tanks. All public fire brigade units and numerous voluntary fire brigade companies from the area of our counties, including Slovak firefighters, members of Croatian Forests and SDC Police Department, participated in the exercises with a total of 233 people and 73 vehicles. Civilian Guard of the Split-Dalmatia County was located in the separate command center and was monitoring the situation on the field and participating in the work of the Fire Department. The command vehicle procured by the Split-Dalmatia County through the HOLISTIC project was presented to the ministers Krstičević and Božinović and to the Interior Minister of the Slovak Republic Denis Sakova and other guests as one of the most sophisticated vehicles of this kind in this part of Europe which serves as a mobile command center.

Training team description

All public fire brigade units and numerous voluntary fire brigade companies from the area of our counties, including Slovak firefighters, members of Croatian Forests and SDC Police Department, participated in the exercises with a total of 233 people and 73 vehicles.

With the above mentioned, present was also prefect of SDC Blaženko Boban, the commander of fire department SDC Dražen Glavina, the chief firefighter of Republic of Croatia Slavko Tucanović, the president of Croatian Firefighting Association Ante Sanader, the commander of Public Firefighting Unit, Split Ivan Kovacevic, SDC Deputy Prefect Luka Brčić as Chief of the SDC Civil Protection Headquarters, A.D. Joint Affairs in SDC Damir Gabrić, Director of SDC Emergency Medicine Institute Leo Luetic as Deputy Chief of SDC Civil Protection and many others.

Outputs of advanced training course

All the participants acquired new skills and knowledge during the advanced training course. After that specialized drill were organized with realistic simulations of the hazardous events in which the participants could test their newly acquired skills on the field. Rescue services displayed exceptional skills and were able to adapt to any new unpredicted scenario promptly.

Recommended measures to be implemented

As with all training drills, especially advanced specialized training, there are inevitable issues that participants are simulated to encounter. The purpose of the training is to familiarize participants to new scenarios and dangers that they can encounter during everyday rescue operations. In that sense the training course itself is evolving together with the participants making up new scenarios and using new methods and technology that saves lives and improves promptness and safety of the whole area and citizens in it. Changes will be in the form of improvement of procedures, skills and new equipment and technology that rescue services will use.

Photos

Local earthquake and wildfire combined exercise

MAKARSKA Civil Protection exercise

Type of training

The training scenario is designed to test the local community's disaster response. Due to the earthquake, a fire broke out in Stjepan Ivičević's elementary school, and students are in need of emergency evacuation. Fire blocking the access needs to be extinguished, allowing access to the injured that are trapped in the earthquake demolished area. After the training, a technical assembly was held, and all present were able to see the vehicles and equipment used in the exercise. The biggest attention was attracted by the Mobile Command Center of the Split-Dalmatia County Fire Department, the only such in Croatia.

Training team description

Observing the training all the forces of the civil protection system were present and involved in the exercise: Firefighters, HGSS, Red Cross, Split-Dalmatian County special civil protection rescue unit and other emergency services with 80 personnel and 20 rescue vehicles.

Outputs of advanced training course

Children are always sensitive to any type of danger, especially considering they mostly don't have any experience in dealing with disastrous situations. Taking that into consideration the exercise was planned to mainly inform the children on how to act accordingly in case of seismic or fire hazards. There was a special team of firefighters that demonstrated extinguishing fire caused by a chemical spill, which children found intriguing and informative.

Recommended measures to be implemented

This type of educational training does exceptionally well with children, who love to see their favorite "heroes" fireman in action. This is why it is important to expose the children to real and live drills and exercises because only then they immerse into the experience and remember what they learn for the rest of their lives. Regular training courses and drills are obligatory for every

rescue unit. However, there is a notion that not enough effort is made to keep the forces on high alert. It is of utmost importance to enable the unit's regular training with the adequate equipment because in the case of a disaster they are the only ones that are professionally trained to save lives.

Photos






WP 4 PILOT PROJECT DEPLOYMENT

Act 4.1 – Assessment of Pilot Project's achievements

Deliverable: Pilot Deployment of Civil Protection Advanced Training

Partner	FVG Region	
Type of trainings/exercises	2	Advanced training course 1 (*AIB.SIM*)
		Advanced training course 2 (WEB CAM)
	1	Cross border earthquake and wildfire combined exercise (READINESS SERMeX-2019)

Advanced training course 1

Title	AIB.SIM

Type of training

The regional territory is characterized by extensive natural wooded areas in mountainous areas, of difficult access, where the timely intervention of aircraft extinguishing means, coordinated with the usual ground operations, can favor the greater effectiveness of the extinguishing operations, reducing the times of intervention and the extent of environmental damage. Other critical areas are located in costal and Carso district where many different infrastructures are located at a short distance, such as motorway, rail and electrical distribution lines, near industrial plants and residential areas.
The specific training function is aimed at enhancing the capacity for dialogue between the operators of ground forces and aerial vehicles, in emergency situations that do not occur frequently.
The training pilot projects, is for personnel dedicated to the management of extinguishing operations with the aid of aerial vehicles, through the acquisition of a specific HW-SW simulation system for the execution of refresher courses for PC personnel, the Regional Forestry Corps.
The new version of the SW Simulator (AIB. Sim), installed on special dedicated HW instrumentation updated to the state of the art and optimized for the simulation system, allows a better preparation of the AIB staff to deal with complex and high severity situations that require the coordination of ground force and aerial means for extinguishing operations, thanks to greater coordination and operational efficiency tested in a simulated environment before the camp tests.
The new equipment was used: PCs of the instructor and student stations with the new monitors and the new SWs' version.
Also real radio was used to test real communication situations between on ground operators and airplane or helicopter operators.

Training team and participants

The participants are identified in the operative personnel of C. P. Who over time have gained experience in the field of forest fires at the moment in the CFR personnel who carry out the function of D.O.S.
We organized 2 one day courses: the first oriented to 8 CP operators and the second to 20 people (mainly Forestal operators and other C.P. Operators (S.O.R.) used to communicate during emergency situations, also by radio.

Outputs of advanced training course

The specific training will allow a greater operating efficiency and the possible reduction of intervention times and the costs and damages related to forest fires.
New operators have to learn how to explain when and how to drain the water on the fire and provide details on the effectiveness of the launches already performed and to report the presence of obstacles to the flight (power lines, planes, etc.)

Critical faced issues and envisaged changes

Criticalities and the development needs that are encountered concern SW customization, a more realistic operational management of the vehicles in some real scenarios.
Finally, a training calendar must be defined for the personnel involved in future activities. The possibility of advanced training through the Forest Fire Simulator will allow for a more widespread and rapid training of the Forestry staff and C.P. Operators involved in the forest fire operations, when coordination with air forces is needed.
It will also allow for shorter intervention times, improving operational efficiency.

Photos

First day course in C.P. center of Palmanova

Second day course for Forestall and C.P. Operators for AIB.SIM and for “Air-Ground-Air” radio communications

Advanced training course 2

Title	Forest fire monitoring via web cam

Type of training

The territory of the FVG Region is characterized by a complex orography, mostly wooded. In particular, in the mountain area, relatively inhabited, there are some webcams aimed at controlling and monitoring the territory. The most obsolete have been replaced by integrating them with some that allow the possibility of shading the thermal characteristics of the area.

Training team and participants

The course was therefore oriented to the operative personnel of the C.P. and the Regional Operations Room to gain knowledge of the critical areas, of the operating methods of the image acquisition system, including thermal, by the time. At the first lesson 11 C.P. and Operational Room operators was present.

Outputs of advanced training course

The use of webcams and remote consultation from the Civil Protection operating room allows more constant monitoring of areas at risk of fire.

Critical faced issues and envisaged changes

At the moment the use must still be included in specific operating procedures. For example, for this purpose, it will be appropriate to establish adequate threshold values, in order not to trigger false alarms. The installation has unfortunately been slowed by bad weather conditions. The advanced training through web cams and in particular the thermal training of the Operations Room staff will improve the remote monitoring activities of extensive regional areas, characterized by the presence of extensive forests and difficulty in access. Further uses can be developed to orient the reclamation and extinction fires of forest fires that currently require the intervention of numerous Volunteers and interventions that can last for several days.

Photos





First day course on Wildfire Monitoring by web cam

Local wildfire/earthquake exercise

Title	READINESS SERM-ex-2019

Type of exercise

The multi-risk exercise (forest fires and earthquake) called "Readiness-Serm-ex 2019" had taken place between Palmanova, Venzone, Portis Vecchio of Venzone, Osoppo and Bordano, from 11 April to 13 April 2019. The exercise concluded a three-year cycle of activities of the SERM Academy (International training school in Seismic Emergency Response Management) which saw the collaboration between the Civil Protection of the Autonomous Region of Friuli Venezia Giulia, the University of Udine, National Fire Department, Municipality of Venzone and the Association of Earthquake and Mayors Municipalities of the Friuli Reconstruction, aimed at establishing an integrated system for the management of the response in seismic emergency, this year integrated in the Interreg Project Italy -Croazia “Readiness“ (Resilience Enhancement of Adriatic basin from Fire and Seismic Hazards).

The goal was to verify the optimal methods of integrated response to a seismic emergency, from the early post-earthquake stages, by the National Fire Brigade and Civil Protection of the Region, also through the use of technologies and procedures, innovative, developed by the PC FVG and by the University of Udine and, in particular, the use of the application called "iTriage" for the rapid evaluation of the state of damage to buildings following an earthquake, set up during the seismic events in Italy (L'Aquila 2009, Emilia 2012, Central Italy 2016) and in international missions.

The possibility of acquiring images and videos was also tested, taken from a drone to monitor forest fires and the version aimed at detecting geological instability.

A group of Fire Brigades, READINESS Project partner from the County of Dubrovnik (Croatia), joined the PC operators of the FVG, Fire Brigade Operators, researchers and students of the University of Udine and Trieste on 12 and 13 April, some of which were observers, in training activities on seismic and forest fire scenario.

On the final day, in the presence of Authorities and citizenship, there was the inauguration of the "Serm Academy Training Center" di Portis Vecchio, where it is possible to train in the field, under conditions similar to reality, of Civil Protection operators, of VVF and Volunteers who have to intervene in case of real seismic emergencies.

Drill teams and participants

Several C.P. operators and technicians with different tasks and functions:
Volunteers
Fire Brigade Operators
Researchers and students of Univ. of UD and TS

Outputs of exercise

As anticipated, the exercise was the conclusive action that tested the reliability of the i-triage app, developed by C.P., on various seismic and forest fire scenarios, in a realistic context. The presence of operators from neighboring countries, including those belonging to the READINESS Project, will allow the identification of further areas of application.

- to fine-tuning the i-triage application,
- to operate in the field together with Fire Brigade operators, researchers and observers/university students
- to carry out geological surveys also by means of drones
- to deal with logistics (emergency camp and lunch and TLC services)
- to allow foreign Fire Brigade operators and observers to share the experience gained.

Critical faced issues and envisaged changes

Some problems with the app have been solved and shared in real time with the teams employed in the surveys. The exercise involved the various components of the Civil Protection System, Operators and Volunteers as well as the University research sector and the same citizenship. In the future, also thanks to Serm Academy, a training center can be set up, also open to the specialized bodies of the C.P. of neighboring countries. In this contest, initiatives aimed at increasing disaster resilience on a supranational scale can be implemented and developed.

Photos







WP 4 PILOT PROJECT DEPLOYMENT

A 4.1 – Advanced training for Civil Protection

Deliverable: Pilot Deployment of Civil Protection Advanced Training

Partner	Zadar County	
Type of trainings/exercises	1	Advanced training courses
	1	Local wildfire exercise
	1	Local earthquake and wildfire combined exercise
	0	Cross border simulation drill (N/A)

Advanced training course

Title	Training for the members of the Public Fire Brigade Unit of Zadar - training Program aimed at rescue from the ruins

Type of training

Location of training: premises of Public fire brigade Zadar and premises of "Kepol" - terminal storage and trade d.o.o. (Zadar, Port Gaženica). Training date: From March 4th, 2019 - March 15th, 2019. Theoretical part of the training included various topics: earthquake, work safety at rescue from ruin, search and rescue in ruins, security measures on the ruins, etc. The practical part of the Training consisted of field instruction on the polygon and day and night exercises. Also included: demonstrative exercises, knowledge test, rescue methods from ruin, the use of various hydraulic, electrical, pneumatic and mechanical tools, etc. For the practice exercise at the location, appropriate equipment was also provided from the budget of project Readiness.

Training team and participants

The training was carried out by Croatian Fire Department instructors. Twelve (12) members of the Public Fire Brigade Zadar participated in the implementation of the Program. This FB is the biggest of the PFB in Zadar County and consists of members that are a part of the County FB.

Outputs of advanced training course

According to the WP 4 expected outputs description; Output 1. the activities, interventions carried out, outputs and deliverables and faced issues in each territory for: (i) improving proactive readiness of Civil Protection and Inhabitant; and part of the Output 2. “readiness of Civil Protection Operators and Volunteers to react in occasion of earthquakes and forest fire then reactiveness of citizens in presence of forest fire and earthquake outbreaks. All the above-mentioned outputs were gained as described. The training course was first of that kind in Zadar County, till this course all the fireman and volunteers attended training in the city of Zagreb, mainly on the subject of wildfire. This output is for that reason very important, it was organized at the premises of Zadar County and it involved actual fireman and volunteers that are going to be active in the rescue from ruins if an earthquake comes.

Critical faced issues and envisaged changes

Critical faced issue was the lack of training in the area of rescues from ruins, especially caused by earthquakes. How to use the equipment, how to react..All these issues were tackled during the exercise. So, all the knowledge gained on the course was used during the exercise. The main change envisaged was that a number of 12 people active in the field of civil protection (fireman and volunteers) after the training have the skills and a practical knowledge of reaction in the case of an earthquake.

Photos




Local earthquake and wildfire combined exercise

Title	"DEVASTATING EARTHQUAKE GAŽENICA 2019" – project READINESS

Type of exercise

Location of exercise was the Unfinished Port Administration Building Zadar-Gaženica, Zadar Port d.d. The exercise took place on April 16th, 2019 from 10:00 am to 11:00 am. The exercise was organized on the occasion of the County Day in 2019. The character of the exercise was demonstrably terrain with the elements of depicting the particular activities of the operational forces of civil protection. The subject of exercise: Check the efficiency of handling of the operational forces of civil protection and emergency services in the Zadar County, in case of earthquake.

Scenario of the exercise:

Earthquake of devastating strength hit the wider area of the city of Zadar with the epicenter in Gaženica area. The most pronounced earthquake effects occurred at the location of Gaženica where housing and business buildings collapsed. County Center 112 on the occurrence of an event based on the announcement of citizens from Gaženica area immediately reports emergency services - County Fire Department, Operational Communication Center, Department of Emergency Medicine of the Zadar County - Notification Unit, Mayor of the City of Zadar and Chief of Civil Protection Headquarters of the City of Zadar, County Prefect of Zadar County and the Chief of Civil Protection Headquarters of the Zadar County.

The Coordinator at the location (firefighter commander) reports the Civil Protection Headquarters of the City of Zadar about the condition on the field and suggests the engagement of the Zadar County Red Cross Society for the implementation of the measures and activities within their competence (first aid, injured records, psychological assistance, care) as well as a working vehicle for cleaning of access roads provided by a legal entity possessing the necessary mechanization, which is designated as a legal person of interest for the civil protection system of the City of Zadar. County Center 112 informs the County Operational Center, the Department of Emergency Medicine of the Zadar County and the Operational - Communication Center of the Police Administration of Zadar. Some of the employees in the business building remained captured in ruins. As a result of the earthquake, electrical installations were damaged, resulting in a fire on the first floor of the business building. Due to the collapsed building material at the entrance of the building it is not possible to get injured, and it is necessary to hire a fire

department specialist for removal from the ruins and the search team with the dog. After securing the entrance to the building and finding the injured person, firefighters take out from the ruins easier injured person and hand her over the emergency medicine team. Due to the impossibility of finding a team of Emergency Medicine on the multiple floors of the building to help heal the difficult injured persons, firefighters with the help of the auto ladder descend the injured person from the higher floor of the building (3rd or 4th floor) and hand her over the emergency medicine team. Because of the large amount of collapsed building material on the upper floors of the business building, the Croatian Mountain Rescue Service, Station Zadar with the dog need to be engaged to find the crowded person and lowering of the height.
Members of the Croatian Mountain Rescue Service, Station Zadar, with the aid of
Sought-after dog, find and drop a seriously injured person from the higher floors of the building and hand her over to the emergency medicine team, that takes two injured persons to the Zadar General Hospital. All operational forces on the field report to the coordinator at the location of the completed activities. The site coordinator reports to the Chief of The Civil Protection Headquarters of the City of Zadar on completed activities.

Drill teams and participants

Exercise participants:
1.The Civil Protection Headquarters of the City of Zadar
2. The Civil Protection Headquarters of Zadar County
3. Public fire brigade - Zadar
4. Volunteer Fire Department Sv. Filip i Jakov
5. Ministry of the Interior RC - Police Administration of Zadar
6. Department of Emergency Medicine of Zadar County
7. Society of the Red Cross of Zadar County
8. Croatian Mountain Rescue Service, Station Zadar
9. Location Coordinator
Approximately 200 volunteers and inhabitants were included in the exercise.

According to the WP 4 expected outputs description; Output 1. the activities, interventions carried out, outputs and deliverables and faced issues in each territory for: (i) improving proactive readiness of Civil Protection and Inhabitant; and part of the Output 2. “readiness of Civil Protection Operators and Volunteers to react in occasion of earthquakes and forest fire then reactiveness of citizens in presence of forest fire and earthquake outbreak. All of the above mentioned outputs were gained as described. The exercise involved all the relevant Civil Protection Institutions and volunteers and they and the overall as well as the specific readiness of County Civil Protection were improved due to this activity.

Critical faced issues and envisaged changes

Critical faced issue tackled by this activity was mainly the lack of quality interaction between all the relevant stakeholders in the area of Civil Protection in Zadar County in the case of emergency or natural disasters. On mainly all the relevant natural disasters, there has been a drill or an exercise, in the case of an earthquake there has been only one in the last 15 years. This activity was very important due to several reasons:

1. To prepare all the member institutions for civil protection to react to natural disasters jointly and coordinated.
2. To gain the skills and expertise to handle the situation of the earthquake on the local county level

All the faced issues were resolved by preforming this activity.

Photos





WP 4

PILOT DEPLOYMENT

A 4.2

Pilot implementation of SPB's seismic monitoring innovative procedure

(Partners contributions)

WP 4 PILOT PROJECT DEPLOYMENT

A 4.2 – Pilot Implementation of SPB's Seismic Monitoring Innovative Procedure

Deliverable: Report on conducted seismic monitoring procedures

Partner	Dubrovnik-Neretva Region	
Number of SPB's	17 (5)	Visual and dimensional screening
	17	Passive measurements
	1	Detailed seismic analysis

Visual and dimensional screening

Dimensional screening was performed for 17 SPBs. Additional visual screening was performed for 5 SPBs. The criteria used for selection of buildings for dimensional and visual screening were the following: selected SPBs are defined as buildings of importance class III and IV, as classified by Eurocode 8. Consequently, screening was performed for selected SPBs of different type of occupancy: schools, student dorms, health care centers, nursing home, fire station and municipality.

Monitoring team description

Visual and dimensional screening was performed by the monitoring team composed of two profiles of experts. Profile expert 1 has the university diploma/degree in geophysics with the experience and specific knowledge in the fields of seismology, earthquake engineering and/or engineering seismology. Profile expert 2 has the university diploma/degree in civil engineering with the experience and specific knowledge in the fields of earthquake engineering, engineering seismology and/or seismic risk assessment.

Outputs of performed activity

After defining the potential SPBs candidates for screening (in collaboration with the officials from the DNC), permissions needed to access the building and perform the activities were acquired. Dimensional and visual screening included on site visual survey of the SPBs and available graphic documentation from Owner and, where necessary, from Municipal Administration and cadaster. This preliminary survey resulted in collecting valuable information about the 17 SPBs – e.g. age of construction, year of design, dimensions, ground plan and position of the building, number of floors and height, function, type of construction, occupancy. Additionally, preliminary damage assessment according to EMS-98 damage scale was done for 5 SPBs based on the information collected on the Form for visual screening of buildings. This form was designed combining different international forms from countries with rich post-earthquake experience and additionally

customized for locally specific data. The initial idea was to define necessary attributes for preliminary building seismic assessment, with focus on the structural system identification.

Annexes delivered to PP

Results are presented in the form of Study: *Instrumental measurements of SPBs in the Dubrovnik-Neretva Region.*

Critical faced issues and envisaged changes

Incomplete or even missing original documentation and information about the building, foundation system and soil type. Not well documented certain design modifications, reconstructions and interventions on structural and non-structural elements, due to which as-built state sometimes do not correspond to the designed one.

Photos

Passive measurements for SPB's

Passive instrumental measurements using ambient noise as an excitation signal were performed for 17 SPBs. The criteria used for selection of buildings for passive measurements were the following: selected SPBs are defined as buildings of importance class III and IV, as classified by Eurocode 8. Consequently, instrumental measurements were performed for selected SPBs of different type of occupancy: schools, student dorms, health care centers, nursing home, fire station and municipality.

Monitoring team description

Passive instrumental measurements were performed by the monitoring team composed of 2 experts having university diploma/degree in geophysics with the experience and specific knowledge in the fields of seismology, earthquake engineering, engineering seismology and microzonation. All measurements were performed by the experts from the Department of Geophysics, Faculty of Science, University of Zagreb who have vast experience, both in performing measurement of building's vibrations and microtremor free-field measurements with these specific instruments and in data analysis and interpretation.

Outputs of performed activity

Passive instrumental measurements are low-cost and non-invasive measurements used to determine the building's dynamic parameters (frequency and damping of fundamental and higher vibration modes) and soil resonant frequency by using ambient noise as an excitation signal. These passive measurements do not disrupt the normal usage of the building, have no influence on the habitants, yield results as accurate as the ones obtained by active methods and are therefore used for a large-scale analysis. Instrumental measurements were performed for 17 SPBs in the DNC using Tromino, small all-in-one portable instrument for passive and active seismic surveys and vibration monitoring. Minimum of two measurements were performed for each SPB, one inside the building (at the highest reachable floor) and one in the nearby free-field. These instrumental measurements enabled estimation of dynamic parameters of buildings, as well as identification of

the buildings in danger of the soil-building resonance during earthquakes. Resonance approach in combination with visual screening has proven to be a powerful tool for identification of the buildings that are potentially seismically most vulnerable and which will result the weakest under the seismic shaking. Once identified, such building are primary candidates for seismic renewal and retrofitting which can reduce their vulnerability. Moreover, performed instrumental measurements enabled creation of each building's identity card comprised of information about the state of the health of the building at the time of measurement. This is very important for long-term structural monitoring of the buildings and for estimation of damage after stronger earthquakes based on detection of possible changes of its dynamic parameters. Ultimately, the results of this study will be important in mitigating seismic risk and represent a valuable prevention activity for the Region.

Annexes delivered to PP

Results are presented in the form of Study: *Instrumental measurements of SPBs in the Dubrovnik-Neretva Region*.

Critical faced issues and envisaged changes

Incomplete or even missing original documentation and information about the building, foundation system and soil type. Not well documented certain design modifications, reconstructions and interventions on structural and non-structural elements, due to which as-built state sometimes do not correspond to the designed one.

In this large-scale analysis study only one measurement inside of the building was performed, which is sufficient to yield well constrained and reliable estimations of dynamic parameters, especially for tall (three and more floors) and standalone buildings with the rectangular ground plan. The efficiency of the estimation of building's dynamic parameters decreases in the case of low-rise buildings (one or two floors), buildings with an irregular ground plan (e.g. L, C, or X shape) and buildings with complex position (e.g. part of a building block or surrounded by other

buildings). In such cases, reliable estimation of dynamic parameters calls for much more than one measurement point inside the building. This strongly effects the dynamics and the costs of the measurements and is therefore limited to a case study building, but is feasible.
Having in mind that the DNC is the area of the highest seismic hazard in Croatia, it is strongly recommended to perform such measurements for these 17 SPBs periodically every few years in order to monitor their structural state of health. Moreover, it is strongly advisable to perform these measurements after strong earthquake shaking since they enable estimation of structural damage after earthquakes and consequently insight in the serviceability status of the building.

Photos



Detailed seismic analysis for SPBs

For the City of Dubrovnik and the whole Dubrovnik-Neretva Region, General Hospital Dubrovnik is a key building of functioning of hospital services and rescue actions after potential earthquakes in the region. Therefore, seismic assessment of the largest building of the General Hospital Dubrovnik (Building D) was performed within this study, based on three-dimensional finite elements numerical models and analysis methods of various complexities, and experimental testing results.

Monitoring team description

Detailed seismic analysis was performed by the monitoring team composed of two profiles of experts. Profile expert 1 has the university diploma/degree in geophysics with the experience and specific knowledge in the fields of seismology, seismic hazard assessment, micro zonation, earthquake engineering and engineering seismology. Profile expert 2 has the university diploma/degree in civil engineering with the experience and specific knowledge in the fields of earthquake engineering, engineering seismology, numerical modelling and analysis, seismic risk assessment.

Outputs of performed activity

In order to enable high quality seismic analysis of the Building D of the General Hospital Dubrovnik, detailed building data were collected from existing documentation before performing measurements.

Detailed seismic analysis was made based on 1) continuous instrumental measurements performed using seismometer installed at the highest possible floor in order to monitor its structural integrity and response to ground shaking induced by an earthquakes and 2) operational modal analysis (OMA) performed in order to provide fundamental modal shapes together with corresponding natural frequencies and damping coefficient determined by the methods of Frequency Domain Decomposition (FDD) which is based on singular value decomposition (SVD) of power spectral density (PSD) matrix of the measured responses. This was then used for calibration of the initial

three-dimensional finite elements numerical model constructed on the basis of the collected building data and field surveys. Seismic analysis was carried out using initial and detailed three-dimensional finite elements numerical models, which included geometric and material non-linearities. Finally, the response of this SPB to representative earthquake scenarios was determined, in order to assess its seismic vulnerability and to propose strengthening measures. The representative ground surface shaking on the location caused by an earthquake was estimated on the basis of synthetic accelerograms (several different scenarios). The seismic vulnerability assessment was made on the basis of the obtained results, including the building collapse mechanism and identification of critical structural elements. Moreover, strengthening procedures were proposed for structural and non-structural building components and recommendations to limit reconstruction. In addition, optimal evacuation alternatives were recommended in the form of safest and most efficient routes.

Annexes delivered to PP

Results are presented in the form of Study: *Seismic performance assessment of Building D of General Hospital Dubrovnik*.

Critical faced issues and envisaged changes

All results clearly point out that the seismic performance of similarly important and complex buildings cannot be assessed by simplifying procedures used for assessments of building stock at an urban scale. Within this study, seismic assessment was performed using numerical and experimental analysis, with numerous useful observations for facilitating future decisions.

Detailed construction plans and bill of quantities were missing from the available documentation, so built-in reinforcement and detailing, necessary for calculation of structural load-bearing capacity and ductility, had to be inspected on site. Reinforcement check was partially performed, using the device for ultrasonic testing of the reinforcement. Reinforcement spacing was identified for particular structural elements, but the rebar diameter and built-in reinforcement in some of the beams could not have been reliably detected. Reconstruction data and modifications to the original

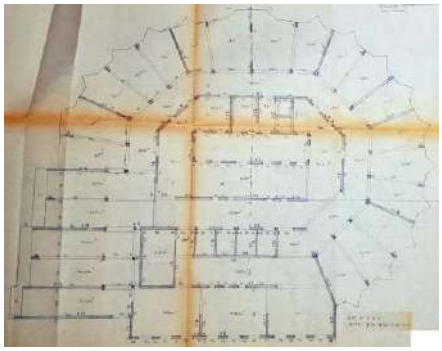
design have only partially been identified. Structural details were assumed according to construction practices applied at that time.

Reliability of the presented results depends primarily on the accuracy of input data, such as variations of the material quality, assumptions related to structural detailing, as-built reinforcement, existing structural damage, soil conditions, etc.

Exhaustive non-destructive experimental measurements were performed and numerical models of various levels of complexity (from the simplest to the most complex ones) were created in order to achieve the best possible accuracy without performing destructive testing which would disrupt the functioning of the hospital.

For more precise assessment (based on reliable input data), comprehensive experimental testing, including destructive methods for obtaining material properties are necessary.

Photos



A 4.2 – Pilot Implementation of SPB's Seismic Monitoring Innovative Procedure

Deliverable: Report on conducted seismic monitoring procedures

Partner	Marche Region	
Number of SPB's	0	Visual and dimensional screening
	19 permanent seismic stations 57 temporary measurements	Instrumental monitoring
	0	Detailed seismic analysis

Instrumental monitoring

Continuous monitoring of 19 SP: 11 SPB already instrumented in Holistic project were maintained; 3 buildings already instrumented within the convention between INGV and Marche Region were integrated into the project Readiness; 4 new sites (Belforte del Chienti, Sarnano, Amandola and Ascoli Piceno) were instrumented to increase a widespread monitoring on the territory, also an experimental site (Università Politecnica Marche) was instrumented (this site was not originally planned in the project). The areas considered for sites were the south-western sector of Marche Region and the Province of Pesaro-Urbino. The last SPBs were chosen in the areas hit by the earthquake of Central Italy in 2016-2017 where the seismic activity is still high and increases the probability of recording significant seismic events during the project. Two buildings were chosen with sensors at the base and 2 low-cost accelerometers were installed on a higher floor to provide data useful to calculate further engineering parameters. The most part of SPBs are masonry buildings and only one reinforced concrete. One of these buildings was chosen in the municipality concerned with dissemination activities and civil protection volunteers training on seismic risk (Belforte del Chienti). Moreover, for all 19 SPBs, 3 temporary measurements for each building were performed and project technical documents collected in order to characterize soil and building resonance frequency and seismic ambient noise.

Monitoring team description

Latina Chiara received the master's degree in geological science and technologies from the University of Milano-Bicocca in 2008, and the Ph.D. degree in geophysics from the University of Genova in 2012. She is currently a Research with the Istituto Nazionale di Geofisica e Vulcanologia. Her main research topics include geological site effects, seismic signal processing, rapid, strong motion assessment, and seismic building monitoring.

Marzorati Simone received the master's degree in environmental science and the Ph.D. degree in geological sciences. Since 2001, he has been with the Istituto Nazionale di Geofisica e Vulcanologia, where he is currently a Research. His main research topics include seismic network

monitoring, seismic signal processing, rapid, strong motion assessment, seismic building monitoring, and seismic data quality.

Monachesi Giancarlo He has 39 years of experience in the field of seismic monitoring on a regional scale in Central Italy (starting in 1980, and -from the year 2000 – working as a researcher of the Istituto Nazionale di Geofisica e Vulcanologia). In 2009, he was the first to carry out accelerometric monitoring in the Marche Region in real time. Since 2011 he coordinates an experimental project for accelerometric monitoring of strategic buildings of the Marche. This project has two objectives: (1) using accelerometric data to improve the earthquake location and shaking evaluation; (2) analyzing the shaking data collected for each monitored building for to analyze the likely damage suffered by the building.
Frapiccini Massimo is a technician at the Istituto Nazionale di Geofisica e Vulcanologia. He deals with the installation and maintenance of seismic stations; interpretation of seismic data.
Pantaleo Debora is a technician at the Istituto Nazionale di Geofisica e Vulcanologia. She deals with the configuration, installation and maintenance of seismic stations.
Speranza Gabriella geologist at the Functional Center of Civil Protection of the Marche region. She mainly deals with the prediction of ground effects caused by bad weather events and snow and avalanche problems, she is an expert in GIS for the creation of thematic maps concerning the phenomena that contribute to determining the hydro-geological risk. Given the scientific training and for purposes related to the type of work, he has a good knowledge of the territory. She has participated in the main earthquake emergencies since 2009 (L'Aquila) and the last of 2016, carrying out the preliminary post-event inspections on October 30th.

Outputs of performed activity

Permanent seismic instrumentation was installed at the base of the buildings. The ground motion was recorded with accelerometer sensors during significant seismic events. The aim of permanent monitoring is to record the seismic input at the base of the monitored structure and to assess the impact of the earthquake. Continuous recording allows to archive the instrumental seismic history of the monitored buildings and construct a database of engineering parameters. These parameters are useful to evaluate the relationship between the ground acceleration and macroseismic intensity, engineering fragility curves and amplification effects.
13 permanent stations were equipped with a 24 bit GAIA2-INGV data logger and a Colybris accelerometer with high dynamics, high gain and low instrumental noise. In two cases, stations

equipped with the accelerometric sensor Episensor FBA and a 24 bit GAIA2-INGV data logger. The other 4 stations at the base were equipped with instrumentation Lunitek (data logger Atlas and Mems accelerometer LTME-90), the same instruments were used for the upper floor of the buildings.

The accelerometric stations have been installed in basements and the sensors were fixed to the ground. At each site the GPS antenna was installed outside the building, for the synchronization of the recorded signal with other stations of INGV Ancona so they are integrated into the seismic network and they are available for earthquake localization and shake map. The stations record ground acceleration continuously, with a sampling of 200 sps.

The seismic signals of earthquakes with the local magnitude ≥ 3.0 were processed to extract accelerometric waveforms of the events from the arrival time of the P and S phases. The semi-automatic procedures were developed to calculate the value of engineering parameters, for example, one of the most commonly used is peak ground acceleration.

Temporary seismic analysis consisted of the three measurements (top, base and outside the building) of ambient seismic noise with velocimetric sensors. Temporary seismic analysis has been performed to obtain an estimate of the vibratory characteristics of the structures through spectral analysis techniques with the aim to identify soil-structure interaction. The measurement at the top of the building was performed with the aim to extrapolate the main dynamical behavior of the building. The fundamental frequency of vibration of the building was extracted from the record of this measurement. The measurement at the base of the building near the permanent instrument helps to verify possible coupling between permanent sensor and structure. The fundamental frequency of the soil was evaluated with the last measurement outside the building in free field where it was possible. Only in one municipality was not possible to perform the free field measurement.

A temporary seismic survey was performed with Reftek-130A 24-bit data logger and a velocimetric sensor Lennartz 3D/5s. Most of the sensors were oriented with their North-South axis parallel to the longitudinal axis of the building and consequently with the orientation of the East-West axis along the transverse axis of the building. Such measures lasted at least 30 minutes and up to 2 hours.

A scientific program was used to analyze seismic noise signals. The data processing was performed selecting the windows of three component signal to exclude those that were particularly disturbed by transients of high energy generated from sources very close, such as human activities or the transit of vehicles. Each selected signal window was used to calculate the Power Spectral Density

(PSD) and Horizontal to Vertical Spectral Ratio (HVSR). So, to get more information from the spectral analysis, the direction of oscillation of the fundamental frequency was added to the results, obtained by the comparison of the longitudinal and transversal recording of the motion on the building.
Analogously, temporary seismic analysis was performed outside of buildings, in free field, to evaluate the resonance frequencies of soils. These additional measurements allow to investigate the soil-structure interaction. Indeed, if the fundamental frequency of the ground is similar to the natural period of the building it is possible a resonance effect during an earthquake.
During the project seismic surveys were carried out, information on surface geology was collected through thematic and digital maps and morphological characteristics were defined using geospatial analyses performed by a Geographical Information System (GIS) technologies. Digital data raster was collected and organized for the characterization of the geological formations on the surface under buildings. Geological cartography of Marche Region was available at 1: 10,000 for the most part of the territory. The information about geological and morphological characteristics allowed to propose a classification of the various categories of the sites according to Eurocode 8 for the subsoil and topographical conditions.

Critical faced issues and envisaged changes

Developing an enhanced monitoring procedure combining the low cost and non-invasive instrumental seismic measurements.
The possible interaction of the structures with the soil during earthquakes, passive measurements of construction parameters and soil using microtremors and accelerations.

Photos

Apecchio Municipality

Ascoli Piceno Municipality

Belforte del Chienti Municipality

Fano

Treia seismic station *Moresco*

Fig. 1 examples of SPBs – permanent seismic stations implementation

Fig. 2 examples of SPBs – temporary seismic stations measurements

WP 4 PILOT PROJECT DEPLOYMENT

A 4.2 – Pilot Implementation of SPB's Seismic Monitoring Innovative Procedure

Deliverable: Report on conducted seismic monitoring procedures

Partner	Split-Dalmatia County	
Number of SPB's	15	Visual and dimensional screening
	15	Passive measurements
	1	Detailed seismic analysis

Visual and dimensional screening

The choice of buildings was made by the officials of the Split-Dalmatia County because SPBs are not defined by law in Croatia. As children and school-age youths are important target groups in the READINESS (Resilience Enhancement of ADrIatic basiN from firE and SeiSmic hazards) project, and schools are buildings of importance class III in the Eurocode 8 (Table 3.1), 10 schools were selected as SPBs. At the end screening was done on 15 SPBs in total.

Monitoring team description

Department of Geophysics, Faculty of Science, University of Zagreb
Krešimir Kuk, mag. phys.- geophys.
Marija Mustać, Ph.D.
Iva Dasović, Ph.D.
Josip Stipčević, Assist. Professor
Snježan Prevolnik, mag. phys.- geophys.
Ines Ivančić, M. Sc.
Marijan Herak, Full professor
Snježana Markušić, Assoc. Professor
Ivica Sović, Ph.D.
Tomislav Fiket, mag. phys.- geophys.
Danijel Štih, electrical engineer

Outputs of performed activity

To warrant reliable results for a sufficient number of SPBs, we have performed measurements for 15 elementary and secondary schools, and estimated their dynamic parameters. The investigated buildings were different types of construction – RC (reinforced concrete), C (concrete) and SRC (stone/reinforced concrete). To inspect if the dynamic parameters have been determined in the past for any of the 15 selected SPBs, we have examined the database of measured buildings from the

Department of Geophysics, Faculty of science, as well as the accessible literature in the area. Such measurements were performed for more than 200 buildings in Croatia (e.g. Herak 2011, Herak et al. 2013), but not for buildings considered in this study.

Photos






Passive measurements for SPB's

Classification of buildings according to Eurocode 8, depending on the consequences of collapse for human life, on their importance for public safety and civil protection in the immediate post-earthquake period, and on the social and economic consequences of collapse.

Potential candidates for instrumental measurements were chosen based on the proposals from the SDC officials and suggestions from a team of experts at the Department of Geophysics, Faculty of Science, University of Zagreb. Prior to performing the instrumental measurements, permissions to measure inside the buildings and in the nearby free-field were requested from the municipalities. The final set of 15 buildings was chosen based on the situation in the field (e.g. depending on acquired permissions to access the building, ability to perform the measurements in the free-filed and inside the building, weather conditions etc.) during the measurement campaign in February 2019. Dynamic parameters need to be assessed for 10 SPBs according to the Contract. To ensure that reliable results are obtained, we have performed measurements in 15 elementary and secondary schools.

Monitoring team description

Department of Geophysics, Faculty of Science, University of Zagreb
Krešimir Kuk, mag. phys.- geophys.
Marija Mustać, Ph.D.
Iva Dasović, Ph.D.
Josip Stipčević, Assist. Professor
Snježan Prevolnik, mag. phys.- geophys.
Ines Ivančić, M. Sc.
Marijan Herak, Full professor
Snježana Markušić, Assoc. Professor
Ivica Sović, Ph.D.
Tomislav Fiket, mag. phys.- geophys.
Danijel Štih, electrical engineer

Outputs of performed activity

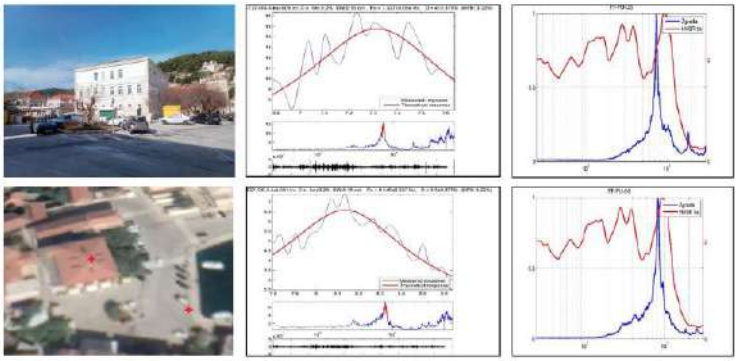
The main goal of this study was to perform passive instrumental measurements of selected Strategic Public Buildings, in order to determine their dynamic parameters (fundamental period and damping ratio), and resonant frequency of the underlying soil. A total of 30 instrumental measurements for 15 SPBs in the Split-Dalmatia County were performed, 16 measurements inside buildings and 14 in the free-field. More details about the measurements are given in Annex II. All of the measurements had a micro - tremor as the excitation signal; they were passive and did not disrupt the normal usage of the building. Various factors may influence the estimation of building's dynamic parameters and tall (three or more floors) and standalone buildings with a rectangular ground plan are known to grant reliable and well constrained results. A minimum of two measurements was performed for each SPB: one inside the building and one in the nearby free-field. Since the measurement campaign was conducted during harsh weather conditions (strong wind), we have doubled the 39 measurements and used two instruments at different locations in the free-field. The better of the two sets of records was used in the analysis.

Photos

Elementary school Pučišća, Pučišća

Direction	f_0 [Hz]	ξ_0 [%]	Resonance danger
Longitudinal	7.327 ± 0.054	4.0 ± 1.4	
Transversal	8.145 ± 0.037	3.5 ± 0.9	

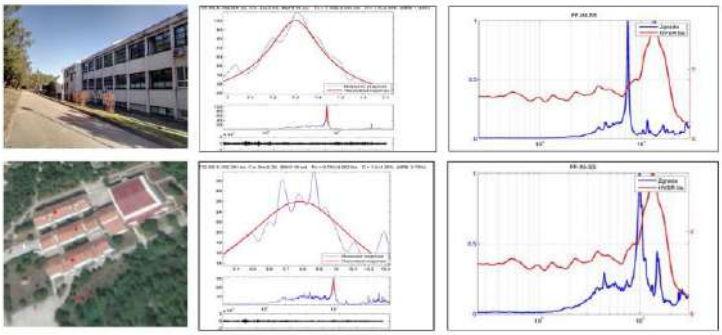
HIGH
MEDIUM
LOW



North building

Direction	f_0 [Hz]	ξ_0 [%]	Resonance danger
Longitudinal	7.302 ± 0.021	1.5 ± 0.3	
Transversal	9.794 ± 0.062	4.5 ± 1.4	

HIGH
MEDIUM
LOW



Detailed seismic analysis for SPBs

Name of the school: Primary school Pučišća
Year of construction: 1902 (reconstructed in 2004)
Floor space of the object in m2: 385
Ground floor + 2 floors + attic
Number of students in the facility: 138

Monitoring team description

Department of Geophysics, Faculty of Scienc and Faculty of Civil Engineering, University of Zagreb
Krešimir Kuk, mag. phys.- geophys.
Marija Mustać, Ph.D.
Iva Dasović, Ph.D.
Josip Stipčević, Assist. Professor
Snježan Prevolnik, mag. phys.- geophys.
Ines Ivančić, M. Sc.
Marijan Herak, Full professor
Snježana Markušić, Assoc. Professor
Ivica Sović, Ph.D.
Tomislav Fiket, mag. phys.- geophys.
Danijel Štih, electrical engineer

Outputs of performed activity

Assessment of the earthquake resistance of Primary School, Pučišća, which includes:

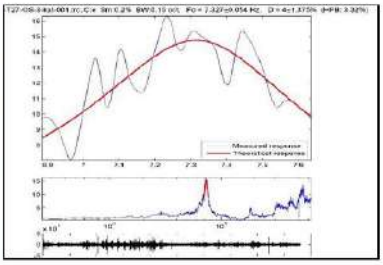
1. Measurements of the building surroundings in order to determine the soil properties (characteristic frequencies, etc.) due to the high risk of the resonance of the soil and school building
2. Perform continuous instrumental measurements of the building's response (using an optimal number of seismographs) over a period of not less than one month with the aim of monitoring its structural integrity and responses to the earthquake
3. Development of synthetic accelerometers for several different earthquake scenarios, which will represent the estimated representative soil movement at the site caused by earthquake action
4. Review of existing documentation, visual inspection of the building (comparison with existing documentation, review of damage and the like) and making of architectural footage
5. Creating and calibrating the numerical model based on available building data and measurements
6. Analysis of the behavior of the structure during the earthquake operation, identification of critical (weakest) parts of the structure and possible form of structural failure
7. Evaluation of seismic resistance of the building and the idea of intervention in the sense of improving the behavior of the structure (reinforcement) in the operation of the earthquake
8. Creating an Elaborate that will show the results of the above activities

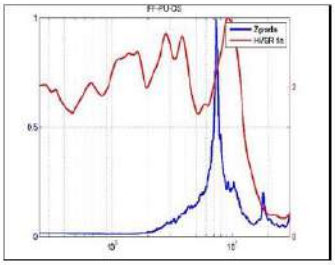
Photos

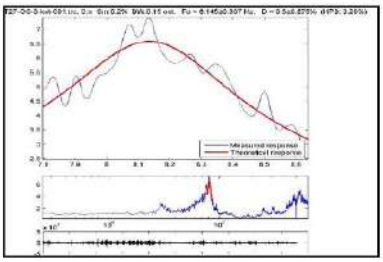
Elementary school Pučišća, Pučišća

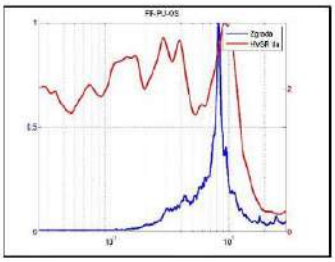
Direction	f_0 [Hz]	ξ_0 [%]	*Resonance danger*
Longitudinal	7.327 ± 0.054	4.0 ± 1.4	
Transversal	8.145 ± 0.037	3.5 ± 0.9	

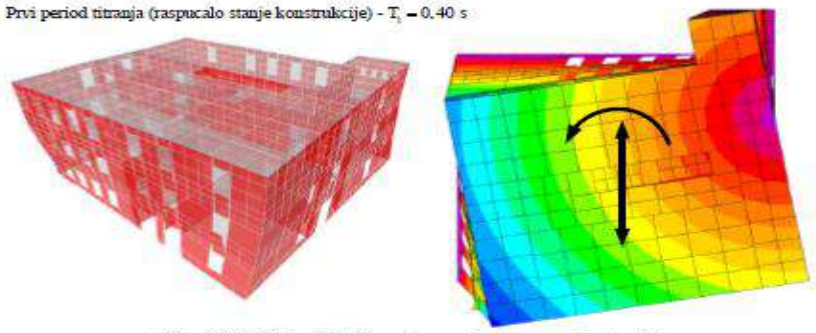
HIGH
MEDIUM
LOW



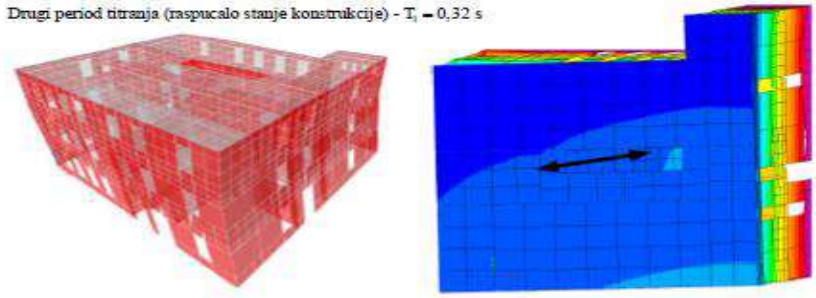




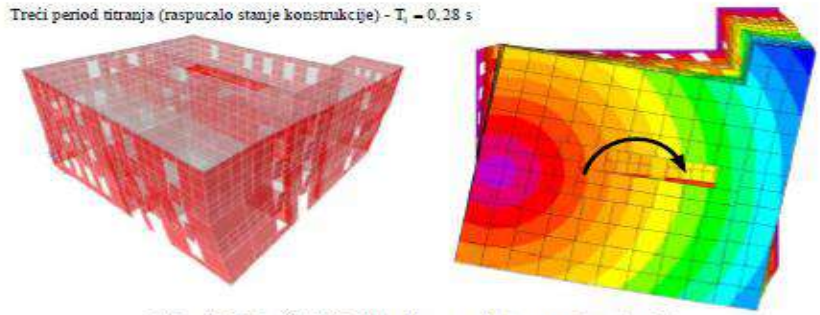




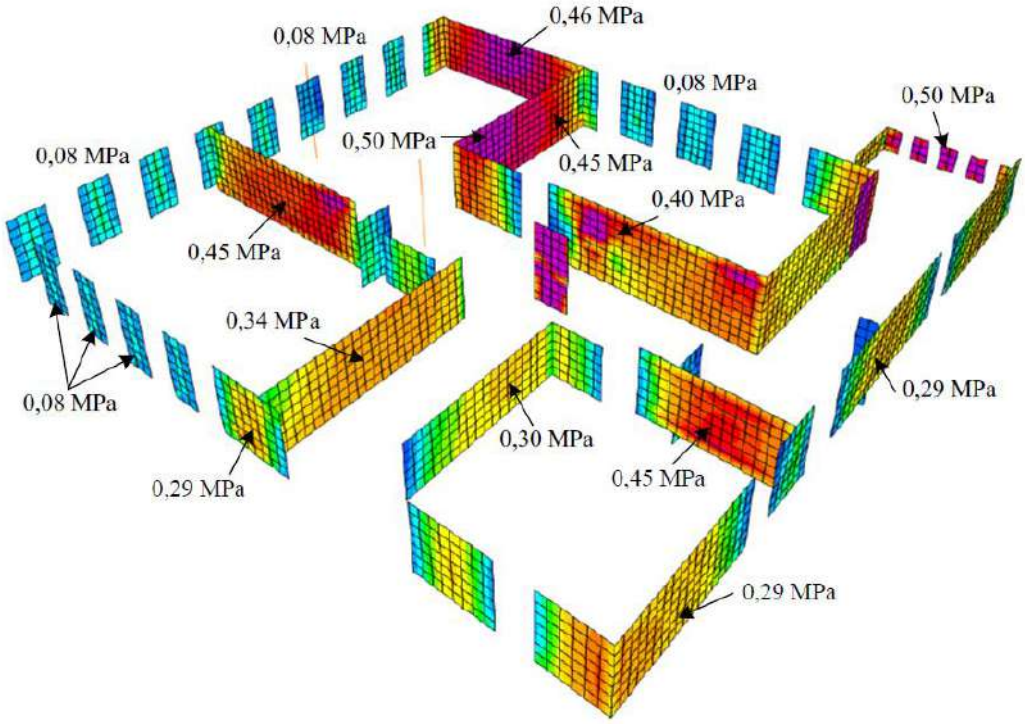
Slika 10.5 Prvi oblik titranja zgrade (raspucalo stanje)



Slika 10.6 Drugi oblik titranja zgrade (raspucalo stanje)



Slika 10.7 Treći oblik titranja zgrade (raspucalo stanje)



Slika 10.24 Posmična naprezanja u zidovima prizemlja za PRTECQ (PP 475 godina)

WP 4 PILOT PROJECT DEPLOYMENT

A 4.2 – Pilot Implementation of SPB's Seismic Monitoring Innovative Procedure

Deliverable: Report on conducted seismic monitoring procedures

Partner	FVG Region	
Number of SPB's	18	Visual and dimensional screening
	18	Passive measurements
	0	Detailed seismic analysis

Description of the activity

Eighteen buildings were continuously monitored, these were also dynamically characterized with measurements at different levels.

The process of identifying the buildings monitored in continuous has followed a logic based on the holistic principle that aims to identify a criteria for the location of the measurement points that allow, at the same time, to maintain an overall view of the entire regional territory.

Outputs of performed activity

Continuous monitoring was carried out by installing a cost-effective strong-motion accelerometer designed for monitoring the effects of strong-vibrations.

The dynamic seismic characterization of the buildings was performed with velocimeters with adjustable dynamic range and ultra-high sensitivity for seismic ambient noise recordings and lower sensitivity but higher dynamics for strong anthropic vibration.

Monitoring team description

The team is composed of two technicians able to process the seismic signal.

Recommended measures to be implemented

Both continuous and characterization investigations are non-invasive and therefore sustainable.

There was interest from the territory in the activities carried out.

However, a greater communication effort is needed to illustrate the aims of the findings and in particular their practical use.

Photos

Distribution of monitored building

One of the buildings monitored (Gradisca d'Isonzo)

Measurements of dynamic characterization

Accelerometer for continuous monitoring

WP 4 PILOT PROJECT DEPLOYMENT

A 4.2 – Pilot Implementation of SPB's Seismic Monitoring Innovative Procedure

Deliverable: Report on conducted seismic monitoring procedures

Partner	Zadar County	
Number of SPB's	10	Visual and dimensional screening
	2	Passive measurements
	1	Detailed seismic analysis

Visual and dimensional screening

The buildings determined by this project have been selected in accordance with the Croatian Law: Law on Civil Protection System, Law on Critical Infrastructures, Rulebook on Holders, Content and Procedures of Preparation of Planning Documents in Civil Protection and the manner of informing the public in the process of their adoption, etc.

The aforementioned legal acts prescribe the preparation of planning documents and assessments of great importance for civil protection. Also, when selecting buildings, one of the more important criteria with regard to the appearance of the building itself is the geology of the area.

The area of Zadar County is characterized by the contrast of different geomorphologic units: low straight valleys and fields of Lika with hilly, hilly, mountainous and mountainous regions of Bukovica, Velebit and Lika. The coast is very indented, with numerous smaller and larger islands in front of it. The rivers Zrmanja with Krupa, V. and M. Paklenica, Kozjak and Tribanjska draga cut into the karstic terrain of narrow and picturesque valleys of the Sutjeski or canyon type. The cryptodepression of Vransko jezero is geomorphologically prominent in the low part of the county. The geological structure of this area is marked by Mesozoic rocks in Lika and the younger Mesozoic and Cenozoic deposits in the coastal part of the County. The old Paleozoic rocks of Perm and Carboniferous erupt to the surface in the higher zones of Velebit. The carbonate rocks of Jurassic, Cretaceous, and Tertiary, especially limestones, predominate. In the mountainous parts, the Triassic, Jurassic, and Cretaceous deposits are most abundant. The lower parts of the valleys are filled with younger deposits of the Eocene (flysch), Pleistocene and Holocene.

Considering the time of construction and the type of construction, we can make a rough estimate of their seismic resistance, because there is no cadastre with data on the exact year of construction of the buildings themselves. The area of Zadar County can be divided into V category of buildings by type of residential construction:

I - masonry buildings up to 1920 - ceiling structures made exclusively of wood - **10%**
II - masonry buildings with reinforced concrete circlings from 1921 to 1945 - **5%**
III - reinforced concrete skeletal buildings from 1946 to 1964 - **15%**
IV - system of reinforced concrete load-bearing walls from 1965 to 1980 - **50%**
V - skeletal buildings with reinforced concrete load-bearing walls from 1980 - **20%**

10 buildings from Zadar County were selected.

1. Gracac High School
2. Benkovac High School
3. Biograd na moru High School
4. Plant storing petroleum products Tankerkomerc d.o.o.
5. Zadar County Building
6. Zadar General Hospital
7. Zadar Airport
8. Valentin Klarin Elementary School, Preko
9. University of Zadar
10. Juraj Dalmatinac Primary School

The selected buildings are in categories III to V, and they are predominantly concrete to reinforced concrete. If the redevelopment of the building will be done then it will be made accordingly EN 1998-1. (2004). Eurocode 8: Design of structures for earthquake resistance.

Monitoring team description

- Mišo Kucelj, mag.eng. geol/PhD Candidate at Faculty of Civil Engineering Rijeka (Department of Hydrotechnics), a longtime environmental expert, certified civil protection specialist
- Nikolina Miočić, Zadar County
- Božo Padovan, mag. Geophy/degree in physics - geophysics, Senior Seismologist, Expert Geophysicist, Geophysical consultant

Outputs of performed activity

In seismic active regions or in a region with potentially seismic in the early phase of construction or in the reconstruction phase, the basic principles of the conceptual design of the construction that will provide collapse resistance may occur due to earthquakes of appropriate orientation EN 1998-1. (2004). Eurocode 8: Design of structures for earthquake resistance.

The guiding principles of this conceptual solution are:

- Structural significance
- Uniqueness, symmetry and redundancy
- Two-way resistance and rigidity
- Torsional resistance and rigidity
- Diaphragm behavior
- Adequate basis

These principles are further elaborated in their points and sub-points. The report on conducting geophysical exploration in the area of Zadar County offers information on the potential danger of resonance effects in case of an earthquake. Out of the ten locations, three are showing potential for this kind of effects. Zadar General Hospital and both University of Zadar buildings (main and side) show some danger of resonance effects.

Besides those buildings, more measurements should be done on location of Zadar airport to prove or disprove conclusions that are given within the report.

The results of this measurement do not unambiguously show that this effect will occur, but without more in depth measurements one cannot rule out that possibility.

Further in-depth measurements should be carried out across a wider range of buildings and locations as resonance effects can be very localized.

WP 4

PILOT DEPLOYMENT

A 4.3

Awareness raise campaigns to improve citizen's promptness

(Partners contributions)

WP 4 PILOT PROJECT DEPLOYMENT

A 4.3 – Awareness raise campaigns to improve citizen's promptness

Deliverable: Report on conducted awareness raise campaigns

Partner	Dubrovnik-Neretva Region	
Number of events	2	Info days addressed to schoolchildren and students
	1	Exhibition of CP vehicles and equipment
	1	Citizen's involvement during simulations and exercise
	1	Cross border awareness day for children

Info days addressed to schoolchildren and students (2)

Dubrovnik-Neretva Region organized two info days addressed to school children and students. On this occasion, the event participants were introduced to the goals of the READINESS project. Both events were organized on the same day in different areas and schools in Dubrovnik-Neretva Region, and as an introduction to the celebration of the International Day of Civil Protection.

Campaigns description

Particularly important is the importance of working together in fire prevention. Members of professional and voluntary fire departments presented firefighting equipment and tools and how they were handled during forest and other wildfire interventions. Members of the Firefighting Association of Dubrovnik-Neretva Region as well as the civil protection staff gave several lectures and disseminated various promotional materials that are thematically related to fire protection.

Team description

The team whose members worked with the kids included professionals with many years of experience in fire protection and emergency interventions in general. An indispensable member of each training team were the commander or the president of the Dubrovnik-Neretva Region Fire Association as well as members of the Regional Fire Command.

Recommended measures to be implemented

The organization of two info days in the Dubrovnik-Neretva County proved to be extremely good as it encouraged the understanding that we are largely responsible for the fire protection in the Dubrovnik-Neretva County. Teachers, but also members of the various operational forces, support and recommend similar actions to be held to raise awareness of joint action to prevent fire.

Photos

Exhibition of CP vehicles and equipment

READINESS 2018 exhibition of the civil protection equipment used in case of fire and earthquake interventions

Description of the event

An exhibition of firefighting equipment and all other equipment used by members of the civil protection operations forces was organized after the READINESS 2018 exercise of the same name. In this way, the participants who participated in the exercise or observers were able to see the tools and equipment used during the exercise. In addition to the participants in the exercise, many of the tourists who were staying in Dubrovnik-Neretva Region visited the exhibition. Beside the equipment purchased during the READINESS project, other equipment purchased by the Dubrovnik-Neretva Region through other European projects in the field of civil and environmental protection could be viewed. The event was well covered in local media.

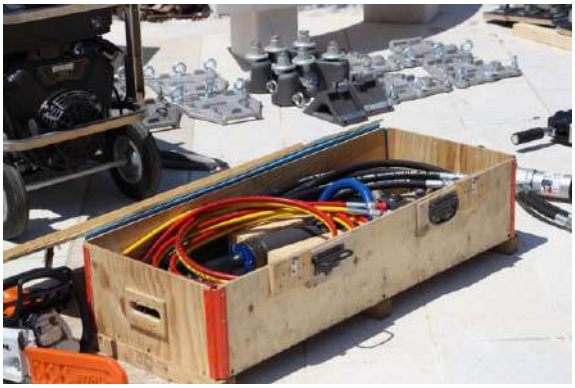
Team description

The exhibition was organized by the Civil protection Headquarter members with the participation of the groups (steering and training group) who were in charge of organization of the READINESS 2018 exercise. The training group included members of various civil protection units and other emergency services such as the Emergency Department, the Red Cross, the Mountain Rescue Service, the Dubrovnik Harbor Master's Office and the Veterinary Services. They were at the disposal of visitors during the duration of the exhibition.

Recommended measures to be implemented

The organization of an exhibition of this type was very useful given that the general public was impressed with what kind of equipment it was during rescue during a fire or an earthquake. All target groups understand that interventions require expert knowledge and skills, but that the equipment is not cheap which also indicates the importance of preventing the consequences of different disasters caused by fire or earthquake.

Photos



Citizen’s involvement during simulations and exercise

Citizen’s involvement during simulations and exercises has been insured during the READINESS 2018 exercise

Description of the event

The participation of citizens in the exercise was extremely important given the fact that he actively participated in a scenario that is elaborated in all of the emergency planning document in the Dubrovnik-Neretva Region. The scenario predicted a severe earthquake followed by a fire. By participating in the exercise as actors, people learned how to behave in case they get trapped in the ruins after an earthquake, what to do in the case event of a sudden fire, how to help others providing them psychosocial assistance and how to cooperate and work with the civil protection after disasters during rehabilitation of terrain hit by earthquake or fire.

Team description

The training team includes professionals with many years of experience who are members of the Dubrovnik-Neretva Region Fire Association. An indispensable member of each training team is the Commander of the Dubrovnik-Neretva Region Fire Association as well as members of the Regional Fire Command.

Recommended measures to be implemented

The organization exercise of this type which includes participation of citizens and representatives of all target groups is very useful given the fact that the general public was educated how to act in case of an earthquake and fire. Organization of the similar exercises has been recommended by all participants and target groups.

Photos

Cross border awareness day for children

Cross border awareness day for children was organized by all partners in their regions at the same time. The reason for the organization was the joint celebration of the International Day of Civil Protection

Description of the event

The event brought together preschool and school age children from all partnership. The importance of fire prevention and behaviors in the event of fire or earthquake were discussed by representatives of the civil protection operative forces as well as by representatives of the Ministry of the Interior. Children were provided with various dissemination materials like puzzles, color and picture books. Several videos on the topic of risk prevention were shown as well as an educational movie for children *Fire is not a joke* provided by the Public institution for the management of protected natural values in the Dubrovnik-Neretva Region.

Team description

The team consisted of civil protection representatives, members of the READINESS project team, the Ministry of Internal Affairs, the Public Institution for the Management of Protected Values in the Dubrovnik-Neretva Region and kindergarten educators as well as teachers.

Recommended measures to be implemented

The recommendation is to continue with all activities that can prepare children for better responses in the case of an earthquake, especially taking into consideration that the Dubrovnik-Neretva Region is one of the most vulnerable in this part of Europe. The organization of similar events depends on the financial resources and financial support for their organization should be included in the budget plans in the future.

Photos

WP 4 PILOT PROJECT DEPLOYMENT

A 4.3 – Awareness raise campaigns to improve citizen's promptness

Deliverable: Report on conducted awareness raise campaigns

Partner	Marche Region	
Number of events	4	Info days addressed to schoolchildren and students
	2	Exhibition of CP vehicles and equipment
	2	Citizen's involvement during simulations and exercise
	1	Cross border awareness day for children

Info days addressed to schoolchildren and students

Three Readiness info days for children took place the 16th and 26th July and the 27th of August 2018 in Ancona at the premises of regional civil protection, within visiting activities of the civil protection summer camps organized by civil protection volunteers' groups. Moreover, an Info-day for university students of environmental sciences and civil protection, electronic engineering and communications and civil engineering, was organized at the Marche Polytechnic University (UNIVPM) headquarter (Ancona) the 7th of December 2018.

Campaigns description

During the three info days for Children, civil protection, regional officers described natural risks, operative Centers activities and task. Thematic drawings on natural risks were realized by the young participants. Children and relative tutors (109 people in total) were involved from Fermignano, San Marcello and Trecastelli municipalities. During the info day at UNIVPM, the speakers presented and discussed the activities carried out and the results obtained both in technological development and in the monitoring of the structures. More than one hundred students joined the events. UNIVPM Headmaster of and the Director of regional Civil Protection Service opened and introduced the info day. Readiness brochure and dedicated Agenda were distributed to students.

Team description

16th of July 2018
4 officers of regional civil protection
6 tutors for children

28th of August 2018
3 officers of regional civil protection
3 tutors for children

26th of July 2018
4 officers of regional civil protection
6 tutors for children

7th of December 2018
7 lecturers
4 INGV external expertise
4 officers of regional civil protection

Photos

Children info day at Functional Centre – Regional Civil Protection Service (16/07/2018)

Children info day – example of drawing realized by the children (info day 16/07/2018)

Info day at Polytechnic University of Marche region: headmaster and manager of regional civil protection introducing the event

Info day at Polytechnic University of Marche region: INGV presentation

Info day at Polytechnic University of Marche region: official program

Exhibition of CP vehicles and equipment

Exhibition in Belforte del Chienti – 1st of March 2019

The 1st of March 2019 an exhibition of civil protection vehicles and equipment was organized for the students of Caldarola, Belforte, Urbisaglia, Colmurano and Loro Piceno (about 300 students of junior high school) in the main square of Belforte del Chienti, a village in the mountain part of the Marche region.

Description of the event

This territory faced a strong earthquake in August and October 2016 that caused victims and many damages.

Main civil protection actors showed equipment to students and simulated technical intervention (dog rescue, first aid to injured people, firefighting interventions after an earthquake…..). A Readiness stand was organized to to disseminate projects, goals and outputs.

Caldarola and Belforte mayors introduced the events, with the regional councilor for civil protection, the Prefetto of Macerata, civil protection officers, school manager and civil protection volunteers regional and local contact persons. Regional and local main mass media recorded and disseminated the event.

Team description

- Red cross team
- Firefighter team
- National alpine and speleology aid team
- Dog rescue team
- Anti-narcotics team (Guardia di Finanza – Tenenza di Camerino and Compagnia Civitanova Marche)
- Telecommunication team for emergency situations (Associazione CB Club Maceratese)
- Forest policemen (carabinieri forestali nucleo Camerino)
- Policemen Carabinieri team (stazione di Belforte del Chienti, Tolentino e Caldarola)

- Policemen (Polizia di Stato) team
- 6 Local civil protection volunteers groups (Caldarola, Belforte, Cessapalombo, Camporotondo di Fiastrone, Loro Piceno, Urbisaglia)
- 4 National Institute of Geophysics and Volcanology
- 8 Regional Civil protection officers

Critical faced issues and envisaged changes

The program was really dense of activities. Students had few times to see all the performances/emergency simulations and visit all civil protection forces stands. A longer period should have been planned. Short time was also dedicated to visiting Readiness stand and distribute dissemination materials.

Photos

Belforte del Chienti main square: Readiness stand – exhibition of Readiness results – mayor and civil protection officers introduction to the event

Vehicles and equipment exhibitions in Belforte del Chienti main square: welcome to the event

Vehicles and equipment exhibitions in Belforte del Chienti main square: firefighter and red cross intervention after an earthquake simulation

Vehicles and equipment exhibitions in Belforte del Chienti main square: firefighter and red cross intervention after an earthquake simulation

Vehicles and equipment exhibitions in Belforte del Chienti main square: Red Cross intervention after an earthquake simulation

Vehicles and equipment exhibitions in Belforte del Chienti main square: national alpine and speleology aid team

Vehicles and equipment exhibitions in Belforte del Chienti main square: national alpine and speleology aid and firefighter equipment

Vehicles and equipment exhibitions in Belforte del Chienti main square: dog rescue team and telecommunication equipment

Vehicles and equipment exhibitions in Belforte del Chienti main square: Carabinieri forestali (forest policemen) equipment

Vehicles and equipment exhibitions in Belforte del Chienti main square: Anti-narcotics dog performance

Vehicles and equipment exhibitions in Belforte del Chienti main square: Belforte del Chienti mayor thanking all civil protection forces that participated in the event

Vehicles and equipment exhibitions in Belforte del Chienti main square: Belforte del Chienti mayor consigning the certificate of attendance to all civil protection forces that participated in the event.

Vehicles and equipment exhibitions in Belforte del Chienti main square: regional councilor for civil protection interview

Exhibition of CP vehicles and equipment

Prevention and Security 2019 – Jesi – 18th of May 2019

Description of the event

The 18th of May Readiness sponsored the event "Prevention and Security 2019" in Jesi. More than 560 students in primary and junior schools from Federico Conti and Federico II Institutes participated in the event. More than 3000 persons attended the exhibitions. 300 volunteers of civil protection and 220 officers from the civil protection system joined the event with dedicated stands. Students had the opportunity to visit the exhibition stands where short presentations from each team were done. A dedicated Readiness stand was organized where project activities, earthquake theory and seismic stations operating were described and real shakes recorded in real time. Readiness gadgets and dissemination materials were distributed to the populations and students. 245 Students visited Readiness stand. A final emergency simulation after a strong earthquake was performed for the public at the end of the day.

Team description

- Civil protection volunteers from different municipality groups and associations
- Red cross team
- Fire Brigade
- National alpine and speleology aid team
- Dog rescue team
- Anti-narcotics team
- Forest policemen
- Carabinieri Police
- National and Local Police
- National Institute of Geophysics and Volcanology
- Regional Civil Protection
- Legambiente

- Air Force
- Port Authority
- Financial Police

Critical faced issues and envisaged changes

Smaller groups of children could be organized in order to better involve students during stand exhibition presentations.

Photos

Readiness Exhibition Stand in collaboration with the National Institute of Geophysics and Volcanology

Readiness Exhibition Stand: gadget and dissemination materials

Readiness Exhibition Stand: National Institute of Geophysics and Volcanology presentation on earthquakes – shake simulation by students and real time recording

Final earthquake simulation at the end of the morning

Civil Protection and National Forces involved

Official poster of the event

Citizen's involvement during simulations and exercise

The 1st of March two school evacuations were organized for the junior high school of Belforte del Chienti and Caldarola, before the CP vehicles and team exhibition.

Description of the event

Children and teachers performed, the school evacuation after a strong seismic event and test official procedures. A questionnaire, some weeks before the simulation, was distributed to the family of the students involved in order to evaluate the knowledge and sensibility of the citizens on earthquake issue.

Team description

About 150 students with related teachers participated in the simulation. 7 civil protection officers participated as observers, 4 external expertise (INGV) participated as observers, 4 civil protection volunteers participated as observers.

Critical faced issues and envisaged changes

Some teachers had uncertainties about the right exit and students not always maintained a correct behavior, getting out of the building at before school. Official procedure must be reviewed and new teachers must be better informed about that. To many observers, journalists and photographers participated as observers. This distracted and distorted the simulation. The evaluated questionnaires showed that awareness and knowledge of seismic event must be improved.

Photos

Caldarola school evacuation: students' performance

Belforte school evacuation: students' performance

Belforte school evacuation: students' performance

Belforte school evacuation: students' performance (by Unmanned Aerial Vehicle)

Analisi delle risposte al questionario per la popolazione (Belforte del Chienti, Caldarola, Camporotondo di Fiastrone e Serrapetrona)

Elenco delle domande

1) Da cosa sono prodotti la maggior parte dei terremoti ?

2) Cosa sono le faglie ?

3) Che cosa misura la magnitudo ?

4) I valori d'intensità di un terremoto si ottengono ?

5) A quale grado della scala Richter appartiene il seguente scenario di danno ?

6) Tra questi terremoti storici dell'area umbro-marchigiana qual è il più forte ?

7) L'energia liberata da un terremoto di magnitudo 6 quante volte è più grande di quella di un terremoto di magnitudo 4 ?

8) Quali sono le zone del territorio umbro-marchigiano dove ci sono stati i terremoti più forti nel passato ?

9) Nell'area umbro-marchigiana ogni quanti anni avvengono scosse di terremoto che possono fare danni anche deboli ?

10) Che cos'è la pericolosità sismica ?

11) Che cos'è il rischio sismico ?

12) Statisticamente quale di queste cose è più probabile che ti capiti entro un anno?

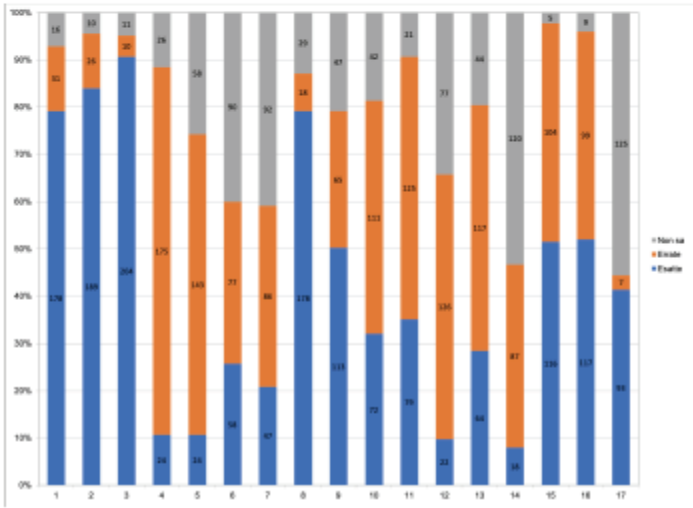
13) Se a Belforte del Chienti ci fosse un terremoto di magnitudo 6,5 i danni sarebbero gravi come quelli che ci sono stati a Pescara del Tronto nel 2016 ?

14) Si stima che entro i prossimi 50 anni Pesaro e Belforte del Chienti possano subire uno scuotimento del terreno della stessa forza. Anche il loro rischio sismico sarà lo stesso ?

15) Quale di queste frasi è vera ?

16) Quale di queste affermazioni ti sembra corretta ?

17) Nel tuo comune esiste un piano di emergenza per il rischio sismico ?



The results of the questionnaires filled by students' parents before the evacuation at Belforte and Caldarola junior high schools.

Cross border awareness day for children

The 1st of March the croosborder awareness day was organized at Belforte del Chienti, involving the students of the comprehensive institute Simone de Magistris.

Description of the event

Several meetings and call were organized in order to plan and set up the educational initiative for the 3rd grade students of the Belforte del Chienti and Caldarola comprehensive school. The project was designed on demand by the local voluntary associations, municipality and school, and its final goal is to raise popular awareness about earthquake, being one of the recurring natural hazards of this territory.

The students were helped to rediscover the seismic history of their hometowns by participating to: (1) a "urban trekking" through the material traces of historical earthquakes that affected them, and (2) an "oral history" investigation during which they collected information on the last major local earthquake of the 20th century (1951) by looking for eyewitnesses among their near relatives and asking them to describe their direct experiences. The initiatives included several meetings with the students and their tutors, in January and February.

The 1st of March, after school evacuation of Belforte and Caldarola, a narration for the school students was performed by an actor (Simone Maretti) on seismic topic. The Awareness day included an exhibition of the results of the urban trekking previously realized by students. A dedicated Readiness stand, in the main square of Belforte del Chienti, showed the historical research organized on a google map and database.

(https://www.google.com/maps/d/viewer?mid=1aJq9-E3SA7jabksd2EDWFMTXmkZw3g44&ll=43.15037138744197%2C13.230894179413895&z=13)

Finally, students, professors and mayors of Belforte del Chienti and Caldarola participated to the video-conference with Readiness partners, briefly4 illustrating the research and singing some traditional songs.

Edurisk project materials (www.edurisk.it) are updated in Readiness project, through a collaboration with INGV technical expertise, and was used for training and dissemination

activities. Five books (What if there's an earthquake? -115 copies, earthquake lesson -116 copies, Earthquakes how and why -131 copies, 2 teacher guides for primary and junior high schools – 82 copies), focused on different age targets, were stamped and distributed to the students of Belforte, with the Readiness logo before the event by local civil protection volunteers. During the Awareness day Readiness brochure and the updated Special Marche were handed out during the Awareness day to the students of comprehensive institute of Colmurano (about 150 students) and Simone de Magistris junior high schools (about 150 students).

Team description

3 INGV external expertise
4 officers of regional civil protection
6 civil protection volunteers

Critical faced issues and envisaged changes

Time to prepare and illustrate the urban trekking was too short. A longer period of mentoring should have been planned in order to help the high school professor in involving students and populations. The topics of the storytelling performed by the actor should have been better shared by school manager. It was resulted too tough for students already affected by recent seismic trauma.

Photos

Crossborder awareness day in Belforte del Chienti

Crossborder awareness day in Belforte del Chienti: Readiness stand – roll up

Crossborder awareness day in Belforte del Chienti: Readiness stand – urban trekking results to find the seismic sign over close territories

Crossborder awareness day in Belforte del Chienti: Readiness stand – dissemination materials distribution (300 readiness brochures and Speciale Marche booklet)

Crossborder awareness day in Belforte del Chienti: Readiness stand – facebook project page dissemination

Crossborder awareness day in Belforte del Chienti: Readiness stand – video conference with partners

Crossborder awareness day in Belforte del Chienti: Readiness stand – video conference with partners

Crossborder awareness day in Belforte del Chienti: story-teller on seismic event and topics

Edurisk books distributed to the students by civil protection volunteers

WP 4 PILOT PROJECT DEPLOYMENT

A 4.3 – Awareness raise campaigns to improve citizen's promptness

Deliverable: Report on conducted awareness raising campaigns

Partner	Split-Dalmatia County	
Number of events	1	Info days addressed to schoolchildren and students
	2	Exhibition of CP vehicles and equipment
	2	Citizen's involvement during simulations and exercise
	1	Cross border awareness day for children

Info days addressed to schoolchildren and students

Combined wildfire & seismic drill – Makarska

Campaigns description

The training scenario is designed to test the local community's disaster response. Due to the earthquake, a fire broke out in Stjepan Ivičević's elementary school, and students are in need of emergency evacuation. Fire blocking the access needs to be extinguished, allowing access to the injured that are trapped in the earthquake demolished area.

Team description

A round table on the subject of "Civil Protection System Today and Tomorrow in the Republic of Croatia" was organized, attended by Ante Sanader, President of the Croatian Fire Fighting Association; Stjepan Huzjak, Deputy Director of the State Protection and Rescue Directorate; Vinko Prizmic, head of the Croatian Mountain Rescue Service, Pavle Kalinić, Head of Zagreb City Emergency Management Office and Marijan Vundać, President of the Croatian Counties and Cities Platform for Disaster Risk mitigation.

Guests were welcomed by County deputy prefect Mr. Brčić and the Mayor of Makarska, Mr. Brkan, with the presence of other members of the operational forces of the Civil Protection System, the Commander of the Split-Dalmatia County Fire Department, Mr. Glavina, the Red Cross Society of the Split-Dalmatia County, Mr. Grubisic and the head of the County joint affairs department, Mr Gabrić. Observing the training around 500 civilians were present and all the forces of the civil protection system were involved in the exercise: Firefighters, HGSS, Red Cross, Split-Dalmatian County special civil protection rescue unit and other emergency services with 80 personnel and 20 rescue vehicles.

Recommended measures to be implemented

Preschool & School children are always sensitive to any type of danger, especially considering they mostly don't have any experience in dealing with disastrous situations. These actions have proven to significantly improve survival rates in case of disastrous situations. Taking that into consideration, there should be more exercises planned to mainly inform the children on how to act accordingly in case of seismic or fire hazards. Info Days like these should be compulsory in every school distributing simple booklets and info leaflets on how to protect and deal in case of earthquake and fire hazardous situations.

Photos




Exhibition of CP vehicles and equipment

1. Combined wilfire & seismic drill – Makarska
2. Cross border awareness day - Split

Description of the event

Makarska combined drill

The training scenario is designed to test the local community's disaster response. Due to the earthquake, a fire broke out in Stjepan Ivičević's elementary school, and students are in need of emergency evacuation. Fire blocking the access needs to be extinguished, allowing access to the injured that are trapped in the earthquake demolished area. After the training, a technical assembly was held, and all present were able to see the vehicles and equipment used in the exercise. The biggest attention was attracted by the Mobile Command Center of the Split-Dalmatia County Fire Department, the only such in Croatia. Observing the training around 500 civilians were present and all the forces of the civil protection system were involved in the exercise: Firefighters, HGSS, Red Cross, Split-Dalmatian County special civil protection rescue unit and other emergency services with 80 personnel and 20 rescue vehicles.

Cross border awareness day – Split

This training scenario is designed to test the local community's disaster response and educate children how to behave in dangerous situations.

Due to the chemical spill, a fire broke out on a playground, and 50 children are in need of emergency evacuation. Specialist forces are rushing to the site to help the endangered.

The children found the exercise intriguing and were happy to participate. There was a fire extinguishing contest organized where the little ones had to work together pumping water and maneuvering hoses to extinguish the stimulated fire targets. Present were emergency service with 30 personnel and dozens of rescue vehicles.

Team description

A round table on the subject of "Civil Protection System Today and Tomorrow in the Republic of Croatia" was organized, attended by Ante Sanader, President of the Croatian Fire Fighting Association; Stjepan Huzjak, Deputy Director of the State Protection and Rescue Directorate; Vinko Prizmic, head of the Croatian Mountain Rescue Service, Pavle Kalinić, Head of Zagreb City Emergency Management Office and Marijan Vundać, President of the Croatian Counties and Cities Platform for Disaster Risk mitigation.

Guests were welcomed by County deputy prefect Mr. Brčić and the Mayor of Makarska, Mr. Brkan, with the presence of other members of the operational forces of the Civil Protection System, the Commander of the Split-Dalmatia County Fire Department, Mr. Glavina, the Red Cross Society of the Split-Dalmatia County, Mr. Grubisic and the head of the County joint affairs department, Mr Gabrić.

Critical faced issues and envisaged changes

Regular training courses and drills are obligatory for every rescue unit. However, there is a notion that not enough effort is made to keep the forces on high alert. It is of utmost importance to enable the unit's regular training with the adequate equipment because in the case of a disaster they are the only ones that are professionally trained to save lives.

Photos

Cross border awareness day for children

Cross-border simulation drill / awareness day in Split

Description of the event

Cross-border live conference between 6 project partners with demonstrative-educational combined exercise of the Civil Protection System of the Split-Dalmatia County under project READINESS. Preschool children are always sensitive to any type of danger, especially considering they mostly don't have any experience in dealing with disastrous situations. Taking that into consideration the exercise was planned to mainly inform the children on how to act accordingly in case of seismic or fire hazards. There was a special team of firefighters that demonstrated extinguishing fire caused by a chemical spill, which children found intriguing and informative. Each child received the package of info simple booklets and info leaflets on how to protect and deal in case of earthquake and fire hazardous situations.

Team description

50 pre-school children, 30 civil protection units & 20 Civilians

Critical faced issues and envisaged changes

This type of educational training does exceptionally well with children, who love to see their favorite "heroes" fireman in action. This is why it is important to expose the children to real and live drills and exercises because only then they immerse into the experience and remember what they learn from the rest of their lives. Regular training courses and drills are obligatory for every rescue unit. However, there is a notion that not enough effort is made to keep the forces on high alert. It is of utmost importance to enable the units regular training with the adequate equipment because in the case of a disaster they are the only ones that are professionally trained to save lives.

Photos

WP 4 PILOT PROJECT DEPLOYMENT

A 4.3 – Awareness raise campaigns to improve citizen's promptness

Deliverable: Report on conducted awareness raise campaigns

Partner	FVG Civil Protection	
Number of events	2	Info days addressed to students
	1	Cross border awareness day for children

Info days addressed to schoolchildren and students

09/02/2019 and 02/03/2019 I.T.I. Kennedy (PN)

The technical presentation of the main aspects of Civil Protection activities to face seismic and fire risks and also how the population is alerted in case of emergencies.

Campaigns description

Training and awareness-raising intervention on the subject of civil protection aimed at the first classes. The intervention was approximately 110 minutes long (1.50 h) and has been divided into four parts:

1. General and introductory part of civil protection, of about 20 minutes;
2. Part about volunteering, 50 minutes and was taken care of by volunteers;
3. 30-minute scientific part (alert system, procedures for forecasting, environmental risks, etc.), with C.P. officials;
4. Questions and curiosities, 10 minutes.

The first classes of Kennedy are 17, with about 25 boys per class. The meeting was divided into 2 days

Saturday, 9 February 2019

- First round from 09.10 to 11.00 (4 classes) 100 students
- Second round from 11.10 am to 1.00 pm (4 classes); another 100 students

Saturday, 2 March 2019

- First round from 09.10 to 11.00 (4 classes); 100 students
- Second round from 11.10 am to 1.00 pm (5 classes) other 125 students

Total 15 – 17 years old (almost) 425 students

Team description

At the meeting take part 3 C.P. operators who deal with different aspect as assessment of weather, alert scenarios for the population, organizational and logistical aspects resulting from the issuing of an alert, seismic , fire and emergency communication strategy. 5 Volunteers.

Photos

Fig. 1 - 2 ITI Kennedy students involved in meeting on Civil Protection activities

Fig.2 – ITI Kennedy second day meeting on seismic risk

Cross border awareness day for children

Cross border awareness has been organized along with the other partners on the occasion of the International Civil Protection Day.

Description of the event

The day dedicated to the awareness of natural risks was held at the Palmanova site and simultaneously in the Italian and Croatian regions of the project. At the Palmanova civil protection headquarters, we hosted young students from the schools of the Comprehensive Institutes of Paluzza, Timau-Cleulis, Majano and Forgaria with their teachers.

Children and their teachers can visit the headquarters and the operating rooms of emergency number 112 and civil protection. Pupils realized, with the help of their teachers and at the end of a training course on civil protection, colorful billboards that reported the summary of risks and actions to be implemented for their own and others' safety.

Real projects for resilience and safety in the event of a seismic and fire emergency. At the end of the morning, during the video-conference connection with the project partner cities: Zara, Spalato, Dubrovnik, Ancona and Campobasso, the children presented their work for the cross-border sharing of experiences and activities. Total: almost 80, 10 years old students

A lesson about Civil Protection organization and activities about risk management; Technical equipment, presentation, visit to Operational rooms to participate in Readiness Skype conferences and school activities presentation. The brief description of the event on the home page of the C.P. is accompanied by the images and video shot on the occasion of the day.

Photos: http://www.protezionecivile.fvg.it/it/gallery/readiness

Video: https://bit.ly/2HgI4hX

Image – published tweet about the event, taken from the C.P. site

Team description

10 CP Operators involved in the presentation

Critical faced issues and envisaged changes

No critical faced issues, student and teachers appreciated the event, especially in the international approach that allowed also a preparatory work with foreign language teachers.

Photos


Progetto READINESS
- Resilience Enhancement of Adriatic basiN from fiRE and SeiSmic hazard –
CROSSBORDER AWARENESS DAY
Giornata transfrontaliera sulla
consapevolezza dei rischi naturali
1 MARZO 2019 - Giornata europea della Protezione civile
ore 10.00 – 13.00
Palmanova – sede Protezione civile della Regione
Programma generale

Presentation about CP activities, indoor and outside

Citizen’s involvement during simulations and exercise

Seismic alarm, school evacuation and activation of 2 Municipal Operating Centers of Bordano and Osoppo.

Description of the event

During the exercise, the evacuation of some schools and the grouping of the population in the "waiting areas" was also simulated.

These activities were managed with the activation of the municipal structures - Municipal Operative Center C.O.C. of Bordano and Osoppo, which are in charge of emergency management.

Team description

20 volunteers were involved in checking the municipal meeting points of Osoppo and Bordano villages after the evacuation of schools at the beginning of READINESS SERMex-2019 Exercise, in support of safety responsible personnel of schools involved.

Critical faced issues and envisaged changes

Active involvement of the population and schoolchildren make raise interest in emergency procedures and better knowledge of CP systems.

Photos



Photos of some moments of student's involvement

WP 4 PILOT PROJECT DEPLOYMENT

A 4.3 – Awareness raise campaigns to improve citizen's promptness

Deliverable: Report on conducted awareness raise campaigns

Partner	Zadar County	
Number of events	1	Info days addressed to schoolchildren and students
	1	Exhibition of CP vehicles and equipment
	1	Citizen's involvement during simulations and exercise
	1	Cross border awareness day for children

Exhibition of children's art works named „Protection and Rescue”

- Location of the exhibition: City Lodge Zadar
- Date and time of the exhibition: March 1st 2019, at 11.30
- Number of participants: 80 children at age 4 to 7 from kindergartens „Golubica“and „Radost“ and primary school „Petra Preradovića“.

Mr. Šime Vicković, Deputy County Prefect of the Zadar county and the Chief of Civil Protection Headquarter of Zadar County, pointed out the importance of 1st March.

With this exhibition the goal was to include the children in the celebration, with the aim of getting the importance of civil protection through play and socializing, and also through literary works. Mr. Siniša Filipović, Ministry of the Interior RC (Civil Protection Directorate, Unit Zadar) talked about the importance of the system of civil protection and the importance of its functioning. Ms. Petra Dominis Žura, a senior associate in the Department of Economy, Tourism, Infrastructure and EU Funds - read to the children a part of the picture book „What to do in the case of earthquake “that was given to them. The picture book was prepared within the project READINESS. The goal was to interestingly illustrate them actions to be taken in case of earthquakes in order for children to learn the proper behavior in the case of earthquake. There was an international Skype conference in which all the partners participated in a way that children from all countries and cities prepared an act on the subject of civil protection. Also, children from Zadar sang the song ***"When you are happy"*** and through this way sent a message of happiness and joy from Zadar to their little friends from the neighboring counties and neighboring Italy.

Team description

The team consisted of the narrator and project team members that organized the event.

Critical faced issues and envisaged changes

The biggest issue was to inform the wider public on the topic of natural disasters with the accent on earthquake and what to do if an earthquake strike. The attendants of the event where children aged 6-8 years that prepared the artwork for the Exhibition. Also, a booklet was prepared and

printed with the title “What if an earthquake comes?” The booklet was handed out to the children and narrated through a story so the children learnt how to behave. That is the first education of small children of this kind in the Zadar County and wider. Also, all the media attended the event, and a TV report was made.

Photos

WP 4 pilot projects deployment assessment

Activity 4.1 – Advanced trainings for civil protection

Evaluation of the achieved results and recommendations

The partner projects fully accomplished all the tasks set out in the activity 4.1. The Application form envisaged the implementation of 12 advanced courses for civil protection members, 5 open space firefighting exercises and 3 earthquake intervention exercises. Two project partners held joint cross-border exercises. Some of the READINESS project partners agreed to hold joint exercises, which included interventions in the case of earthquakes and wildfires, as in the case of Zadar County and Dubrovnik-Neretva Region. This practice proved to be extremely useful taking into consideration the fact that at the same cost, two training exercises were conducted for members of the civil protection operative forces at the same time. This practice has also been confirmed since an earthquake always accompanies a fire.

Volunteer and professional members of civil protection were trained during the exercises in all the regions participating in the project. During the exercises, equipment acquired from previous European projects was used, and new technologies in the earthquake and fire interventions were presented. However, with the implementation of the READINESS project, new equipment was also purchased for civilian protection members, which was used in the exercises and trainings held.

During the assessment, all project partners concluded that open fire and earthquake drills were also needed in the forthcoming period to increase the safety of residents in the participating regions. It is recommended by all participants and evaluators to continue similar education since they lead to an increase in the individual and group preparedness of the members of the voluntary and professional civil protection forces. The recommendation specifically addresses civil protection members in border areas. The READINESS training sessions were complementary to each other and they managed to strengthen the chain of command during the interventions.

Critical issues faced during the implementation of the 4.1. activity

There were no significant critical issues shown during the exercises organized within the 4.1 activity. The partners made several general recommendations concerning the improvement of interventions in certain follow-ups, mainly by streamlining or redefining the prescribed procedures. One of the recommendations referring to the possibility that the intervention procedures might by unified for all of the participating regions.

Activity 4.2 – Pilot implementation of SPB's seismic monitoring innovative procedure

Evaluation of the achieved results and recommendations

During the implementation of this activity, differences were observed between the legislation of Croatian and Italian regions. In Italy, public interest buildings are defined by law. In Croatia, no law specifies which buildings are strategic ones. Buildings of public interest have been designated by the regions participating in the project, taking into account relevant European regulations pertaining to this area. The criteria used for selection of buildings for dimensional and visual screening were the following: selected SPBs are defined as buildings of importance class III and IV, as classified by Eurocode 8.

Screening was performed for selected SPBs of different type of occupancy: schools, student dorms, health care centers, nursing home, fire station and municipalities. Additionally, preliminary damage assessment according to EMS-98 damage scale was done for SPBs based on the available information. Both continuous and characterization investigations are non-invasive and therefore sustainable. There was interest from the territory in the activities carried out.

However, a greater communication effort is needed to illustrate the aims of the findings and in particular their practical use. Continuous monitoring was carried out by installing a cost-effective strong-motion accelerometer designed for monitoring the effects of strong-vibrations.

The dynamic seismic characterization of the buildings was performed with velocimeters with adjustable dynamic range and ultra-high sensitivity for seismic ambient noise recordings and lower sensitivity but higher dynamics for strong anthropic vibration. Developing an enhanced monitoring procedure combining the low cost and non-invasive instrumental seismic measurements. The possible interaction of the structures with the soil during earthquakes, passive measurements of construction parameters and soil using microtremors and accelerations.

The READINESS project outputs will be taken into consideration during the production of different emergency plans in the future and will be incorporated in future risk assessment documents.

Regarding the implementation of the activity in Italy detailed seismic analysis was made based on continuous instrumental measurements performed using seismometer installed at the highest possible floor in order to monitor its structural integrity and response to ground shaking induced by an earthquakes and operational modal analysis (OMA) performed in order to provide fundamental modal shapes together with corresponding natural frequencies and damping coefficient determined by the methods of Frequency Domain Decomposition (FDD) which is based on singular value decomposition (SVD) of power spectral density (PSD) matrix of the measured responses. This was then used for calibration of the initial three-dimensional finite element numerical model constructed on the basis of the collected building data and field surveys. Seismic analysis was carried out using initial and detailed three-dimensional finite elements numerical models, which included geometric and material non-linearities. Finally, the response of this SPB to representative earthquake scenarios was determined, in order to assess its seismic vulnerability and to propose strengthening measures. The representative ground surface, shaking on the location caused by an earthquake was estimated on the basis of synthetic accelerograms (several different scenarios). The seismic vulnerability assessment was made on the basis of the obtained results, including the building collapse mechanism and identification of critical structural elements.

Strengthening procedures were proposed for structural and non-structural building components and recommendations to limit reconstruction. In addition, optimal evacuation alternatives were recommended in the form of safest and most efficient routes.

Critical issues faced during the implementation of the 4.2. activity

This part of the report covers the problems encountered by experts in the Croatian and Italian regions during the implementation of tasks set by 4.2. terms of reference.
Incomplete or even missing original documentation and information about the building, foundation system and soil type. Not well documented certain design modifications, reconstructions and interventions on structural and non-structural elements, due to which as-built state sometimes do not correspond to the designed one.
It is needed to stress out that the resonance approach does not provide information on the quality of the building's construction and design and cannot be used to estimate the level of damage caused by earthquakes. Such information can only be obtained by performing a detailed case study of the selected building. This includes more details: visual survey of the building, detailed inspection of the building project documentation and drawings, numerical modeling of the building, instrumental measurement of its dynamic parameters, investigation and classification of the ground type, detailed seismic analysis etc. Nevertheless, the resonance approach can reveal buildings that are expected to be seismically more vulnerable than others. These, most endangered buildings, can then be seismically reinforced and retrofitted to reduce their vulnerability. This type of investigations therefore presents a valuable prevention activity in reducing the seismic risk.
The critical question is determining exactly the year the buildings were built and whether the buildings were once renovated and how. Changes are planned for all buildings in the form of reconstruction and renovation. Unfortunately, the exact time when the buildings will be reconstructed and renovated is unfortunately not possible to define exactly.

It is strongly advisable to perform these measurements after strong earthquake shaking since they enable estimation of structural damage after earthquakes and consequent insight in the serviceability status of the building.

All results clearly point out that the seismic performance of similarly important and complex buildings cannot be assessed by simplifying procedures used for assessments of building stock at an urban scale. Within this study, seismic assessment was performed using numerical and experimental analysis, with numerous useful observations for facilitating future decisions.

Detailed construction plans and bill of quantities were missing from the available documentation, so built-in reinforcement and detailing, necessary for calculation of structural load-bearing capacity and ductility, had to be inspected on site. Reinforcement check was partially performed, using the device for ultrasonic testing of the reinforcement. Reinforcement spacing was identified for particular structural elements, but the rebar diameter and built-in reinforcement in some of the beams could not have been reliably detected. Reconstruction data and modifications to the original design have only partially been identified. Structural details were assumed according to construction practices applied at that time.

Reliability of the presented results depends primarily on the accuracy of input data, such as variations of the material quality, assumptions related to structural detailing, as-built reinforcement, existing structural damage, soil conditions, etc.

Exhaustive non-destructive experimental measurements were performed and numerical models of various levels of complexity (from the simplest to the most complex ones) were created in order to achieve the best possible accuracy without performing destructive testing which would disrupt the functioning of the hospital.

For more precise assessment (based on reliable input data), comprehensive experimental testing, including destructive methods for obtaining material properties are necessary.

Regarding critical issues Region Marche is stating developing an enhanced monitoring procedure combining the low cost and non-invasive instrumental seismic measurements. The possible interaction of the structures with the soil during earthquakes, passive measurements of construction parameters and soil using microtremors and accelerations has also been mentioned.

Activity 4.3 – Awareness raise campaigns to improve citizen's promptness

Evaluation of the achieved results and recommendations

All project partners have achieved exceptionally good results during the realization of this activity. The projected results were significantly exceeded, which had an even better and more justified effect. In the regions where the project was implemented, the public was continually informed of the need for joint action in the prevention of fires and the harmful effects of earthquakes. Part of the activity that was dedicated to children was especially interesting when we jointly organized a day of cross-border awareness day for children because they realized that children in other places were also involved in a similar type of the education. Citizens' participation in the organization of exercises was extremely helpful given the fact that they got acquainted with the various intervention plans, as well as understood what to do to make interventions of the operational forces and emergency services as effective as possible. Number of people reached by the initiatives for increasing awareness in general are reached.

PP	*Target*	*Carried out*	***Total carried out***
LP (MolR)	1500	1500	**9200**
PP 1 (DNR)	900	1200	
PP 2 (MarR)	1100	2900	
PP 3 (SDC)	1200	1200	
PP 5 (FVG)	1600	1600	
PP (ZC)	700	800	
Indicator value		**7000**	

Critical issues faced during the implementation of the 4.3 activity

There were no particular critical issues mentioned.

Other notifications

The assessment of the pilot project deployment has been edited by the PP 1 (Dubrovnik-Neretva Region). The READINESS project partners contributed by their reports and remarks. The evaluation groups followed those which have already been appointed with in WP3.

TF 1

1. Antonio Cardilo
2. Stjepan Simović
3. Damir Gabrić
4. Riccardo Ravalli

TF 2

1. Antonio Cardillo
2. Mato Tomljanović
3. Chiara Ladina
4. Ognjen Ćavar
5. Gabriele Peressi
6. Nikolina Miočić

TF 3

1. Luca Coromano
2. Mato Tomljanović
3. Mate Franetović
4. Barbara Zar
5. Nena Ivanov

This document represents one of the project's deliverables and in any way does not represent the official position of the European Commission or the official bodies of the INTERREG Italy-Croatia cross-border cooperation program.