



Places and Technologies 2015

# KEEPING UP WITH TECHNOLOGIES TO MAKE HEALTHY PLACES

Nova Gorica, Slovenia, 18.–19.6.2015

# PT 2015

## BOOK OF CONFERENCE PROCEEDINGS

*A healthy city is one that is continually creating and improving those physical and social environments and expanding those community resources which enable people to mutually support each other in performing all the functions of life and developing to their maximum potential.*  
*Health Promotion Glossary (1998)*



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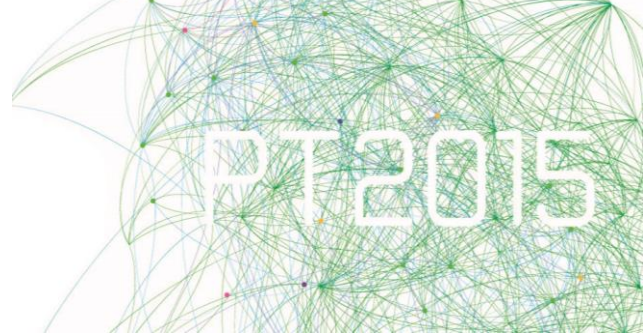
**KEEPING UP WITH  
TECHNOLOGIES TO MAKE HEALTHY PLACES**

BOOK OF CONFERENCE PROCEEDINGS

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## KEY POINTS OF HUMAN AWARENESS AND EMERGENCY PLANNING. SCHOOLS AS A CASE STUDY

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### ABSTRACT

*Environmental, architectural and organizational issues may support or hinder planned emergency measures. Existing laws define a set of parameters that have to be implemented within the framework for disaster, in order to ensure the health and safety both for workers and guests. A recent study has been developed to test the response of individuals and the efficiency of emergency plans, analysing the response of people just after an earthquake. Educational institutions have been chosen as field of application, because these buildings represent a mix of staff, employees, students and families, anyone with different knowledge, behaviours and roles of emergency procedures as planned. The study of the emergency and post-emergency stages, as perceived by the 1,300 individuals who took part in the survey, have highlighted a preferred list of key points used later by educational teams, municipality offices and civil protection to strengthen the existing procedures. The scope is to organize a feasible defence in case of danger, based on a better building and urban evaluation, training people within a broader “civil based” emergency instruction.*

**Keywords:** *emergency, earthquake, job safety, health, schools.*

### INTRODUCTION

On May 2012, a large area of the Northeast side of Italy was shaken by an earthquake that destroyed heritage buildings as well as homes, factories and schools. This event had a considerable affect on the resident’s perception of the surrounding environment, commonly considered as little prone to quake. A group made of firefighters, researchers, school and safety managers decided to analyse the actions done during and after the emergency, in particular the 29 May when a severe quake occurred at daytime (9 a.m.). The main goal was to suggest possible improvements, both at the organizational, building and urban scale. The survey has been focused on schools because they represent a job activity (therefore supposed to have an existing emergency plan), with a large number of different users/employees and with strong relationship with families/citizens. Eighteen pilot educational activities were grouped into six categories (from nurseries to university



departments), selecting them according to building type and educational organization, this to have a wide list of parameters (i.e. construction method, age of the school, number of floors or of classes, school location, etc). Between March and June 2013, 1,324 questionnaires have been collected, later entered into a database in order to compare similar situations in different contexts. Each set of queries (totalling 56, including multiple and short answer questions) was used in all schools but adapted to the organization, role and age of the participants (with the help of the Educational Office). The results have been discussed with the staff of the pilot schools (to assess the element of crisis as well as best practices), with the office for Public Works (for building improvements) and with members of the Civil Protection system (to plan communication and training activities). Further training activities have been later arranged for teachers, operators and professional safety managers.

### **AWARENESS OF RISK AND EMERGENCY PLANNING PROCEDURES**

Before of the emergency, just two schools of eighteen considered the quake as a real possible risk, therefore some procedures have been proposed (and not always tested) just between the first and second quake (9 days: 20-29 May). The emergency measures (usually just the fire safety ones) were known to around the 95% of people on primary and middle schools, decreasing to 85/90% in kindergartens and high schools and falling to the 73% in nurseries. Within the university departments, just the 30% of employees declared to know the emergency plan (sometime unavailable) and the 63% of students acted according to their existing knowledge (from previous education). Around the 80% of employees and the 30% of students tried to help or to calm their colleagues after the earthquake and the 20% of them used this job also to keep busy. The 40% of students declared to have no idea of what they could do to be helpful and this is a great training gap, a priority for the future. Students must have a core function in the Plan, since their improvement of managing the unknown has a direct relation with the knowledge they may brings to their family, future employment, recreational activities and to society in general. This can foster a natural spread of information from students to people normally less informed (friends, elderly, foreign families, etc.). The Italian Ministry for Education, analysing the rules for school safety (MIUR n. 119/1999), underlined how "*job safety regulations are, even more than a legal obligation, an opportunity to promote a culture security, to enhance its content with the involvement and earnest participation of all school members, in a process of collective growth*". The level of information, training and management of responsibilities (now generally poor) should be shaped to the age and competence of students. The simple representation of the three stages for earthquake protection (drop, cover, hold on) has the sole purpose to represent the action required to save people during an earthquake (US FEMA, 2013). This was either ignored or not tested before the quake or was not easily applied if the facility did not have school desks. Staff members and students must learn to be quick in choosing and enabling protective measures, also being able to adapt them according to their purpose





(Blaich, 2008). The survey highlighted many doubts, mainly for teachers, about the implementation of measures not included into the Plan or not foreseen during the school drills. Primary schools largely applied protective measures (the 85% of students and 100% of teachers); this value decreases at the 83% of students and 78% of teachers at middle school and it falls down to the 59% and 35% at the high school. Within university students and employees, the most part of people was motionless (63%) and the 20% run to the exit. The position of students in large classrooms with fixed seats or in laboratories was a strong barrier to the fast identification and put into practice of protective measures. In nursery and kindergarten, the evacuation stage generally started without a protection stage, because of the fear for babies, not self-sufficient. Afterwards, schools promoted specific training activities in order to improve this phase, playing with children to train them about to protective reaction (i.e. reaching the stars or little hands painted on the bearing wall or going under the coloured table). A further improvement has been done to the buildings, adding walkways from the exit toward safe places, because the wheels of cots, used to move babies, had problems to roll on grass or gravel (Figure 1).



**Figure 1: Booklet about emergency procedures in kindergartens (designed with the Municipality and Fire-fighters, 2014) and picture of a baby cot used for emergency drills.**

The stress management highlighted many gaps, both for teachers and students (especially the elder ones). It was reported that some teachers had walked out without accompanying their class, many people were in shock or not able to provide information; students were on the run, weeping or ignoring school instructions. In some cases (more than a dozen), teachers attempted or continued to work after the earthquake, mainly in high school and university depts. Therefore, the assistance of a professional is suggested during the training stages (psychologist, expert in emergencies, etc.) to explain the possible reactions of individuals under stress and how to react to it. Some preferred exercises have been



suggested: testing the class without a teacher (to assess if students would be able to follow the procedures when alone), checking how to supervise more than a class (i.e. a colleague appointee of other activities or panicking or outside his class for any reason) and managing the defence in place instead of the evacuation.

The ambiguity of how to trigger alarms was one of the main fields of misunderstanding or concern amongst employees. In many schools, the alarm was given “during” the quake (following the fire procedure), sometimes immediately after in other cases repeatedly, until the complete evacuation; several schools used more than a tool (bell, siren, horns). Statistics showed that, after a year, very few people kept in mind the alarm (remembering similar percentage for school bell, emergency siren, indications given by the staff, any warning, etc). In the case of fire, the meaning of the siren is clear, for earthquakes or other environmental risks the alarm must be linked with scheduled actions, for example: verify the soundness of corridors and staircases, start the evacuation of classes, etc. Many Countries (including Italy) need an alarm system with voice speakers in large public buildings (as school, healthcare facilities, shopping centres, etc.), providing specific information about the event in progress and the actions to be played (Zuliani, 2013). Out of the eighteen pilot schools, twelve required such an alarm; however, it was installed in only two of them, sadly with one functioning. In the case of the school with a voice system working (used by trained personnel), the evacuation procedures caused lower levels of stress in both staff and students, when compared to other schools. The warning system has to describe when to verify the building safety (with or without evacuation), how to communicate the end of the emergency to people and how to change the procedures (because evacuating without a suitable reason could be not exactly efficient). Starting from these results, it is planned a wider study to develop planning guidelines to properly locate and use vocal alarm inside public buildings (schools, museums and shopping centres).

### **EMERGENCY PLANNING TAKING CARE OF THE CONTEXT**

There are many possible emergencies and the building location affects unavoidably on the margin of intervention; this creates a large set of scenarios, with crossed risks and duties. To work on a wide list of instructions for all possible circumstances (Philippot, 2010) it may be difficult to learn, in particular if taking care of the variables due to the context. Post-earthquake, several schools showed little evidence of structural failure but they faced with falling roof tiles or gutters, even the risk of collapsing of neighbouring buildings. Evacuation may be dangerous if addressed towards derelict structures, buildings or historical artefacts (statues, decorations, etc.), temporary structures or fittings (downspouts, gutters, tiles, cables, pipes, etc.). A "seismic-resistant" school can be an important facility to accommodate citizen during an emergency and its Plan should not only focus on building evacuation. On the other hand, many people came back inside evacuated schools just after the quake: to collect objects, to use the toilet (because not available outside), to prepare meals (in nurseries and kindergartens), to make phone



calls (to parents, to the school administration, etc.). In the aftermath of an evacuation, it is inappropriate to allow staff or users to come back. Many risks have to be faced through "defence in place" and not with the mere evacuation, because the danger should be outside the building (such as a flood) or because the panic reactions may be dangerous. Many other environmental features have a great impact on emergency management, for example the arrival of rescue vehicles, the chance of people assembly or rapid departure (mainly for the historical city centres). In the case of assembly areas, shared by public or other activities, the spaces must be delimited and shaped, in order to accommodate and control people, possible without overcrowding. With difficulties accessing the building, quarrels between parents or tensions with the school staff have been reported. These risks are typical of emergency planning when focused only on the danger of fire (localized) and not on a wider set of hazards (involving larger groups). The Emergency Plan generally analyses job activities as closed and independent cells, with poor or no evidence of outdoor spaces or access routes; the procedures are usually taken out of context. The environmental framework should be part of the Inter-Municipal Plan of Emergency; any danger that is beyond an individual understanding may be organized by the local Civil Protection System, appointed to support the safe assistance of citizens and their properties (Figure 2).



**Figure 2: Booklet about emergency procedures and evacuation areas and example of the sign now marking the Evacuation Areas (designed together with the Civil Protection, 2014-15).**

The Emergency Plans of schools, as well as of other activities, should not miss their link with the Civil Protection Plan, explaining how to do in the event of a





environmental hazard. The Municipality of Ferrara made this Plan before the earthquake, but this field test revealed that many aspects were little known by citizens, asking for more simple and reliable information (before, during and after the emergency). The website [www.cronacacomune.it](http://www.cronacacomune.it), together with its related Facebook and Twitter addresses, were already used by the Municipality to spread operative information to citizens (i.e. road works, meetings, etc). During the earthquake, they have been used to inform people about how and where receiving help, then later institutionalized for this purpose. The Civic Protection Plan is focused on the organization of rescuers; a booklet for citizens summarise its content, including a set of maps with pictures (downloadable from the city website and printed for schools). These tools explained how to manage a possible evacuation and the role of Evacuation Areas, selected because safe and accessible for rescuers and now marked with special urban signs.

## CONCLUSIONS

Each organization has to evaluate and reduce any possible risk, coordinating citizens quickly during an alarm and providing them with support, throughout the duration of the emergency. The risk is related with people, building and context, therefore all these fields have to be analysed by the Safety assessment, organizing training activities, planning installations and emergency measures not just for single activities (i.e. schools) but also as a community. The role of the Civil Protection System is pivotal, safety managers have to take into account the environmental risk as well as the need to face not just an evacuation but also a defence in place or a post-emergency stage. The development of the Emergency Plan should be pragmatic, assessing the possible and predictable events but relying on the “in-house” capabilities and the sharing of responsibility with all those involved, giving to younger a growing role, from acting to designing the emergency procedures.

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