

# WATCH OUT! MOVE OBJECTS! SECURE YOUR FURNITURE!

## Good practices for seismic safety

Annalisa Persello Martina Piemonte



adapted from  
https://www.globe.it/  
benessere/la-terra/la-terra-  
5587/ogg-e-la-terra-occhi-  
antropici-naturali



## INTRODUCTION

Most of the Italian regions have a high seismic hazard. This is true also for Friuli Venezia Giulia, the region where the High School "Magrini Marchetti" is located and which was struck by a terrible earthquake in 1976. The students of class 5A1s decided to carry out a project about seismic prevention at home and at school and involved over 500 pupils aged 13-14 in a series of activities, to inform them about seismic risk factors and to encourage them to find mitigating measures. Earthquakes indeed often cause serious damages, the collapse of buildings and unfortunately also victims, which could be reduced by adopting seismic prevention measures.

### The aims of the project were:

- to make young people aware of the high seismic hazard of the territory where they live
- to promote good practices for seismic safety

### The actions taken to achieve these aims were:

- to provide information about earthquakes to over 500 pupils who live in the area
- to inform them about good practices for seismic safety
- to identify risk factors in their houses
- to identify risk factors in the school
- to collect data
- to assess the results
- to suggest solutions to mitigate the potential risks



## METHODS

### 1 DISSEMINATION OF GOOD PRACTICES FOR SEISMIC SAFETY

The 19 senior students of class 5A1s arranged to meet 561 pupils of the area and to spread good practices for seismic prevention to make the places where they live safer in an earthquake.

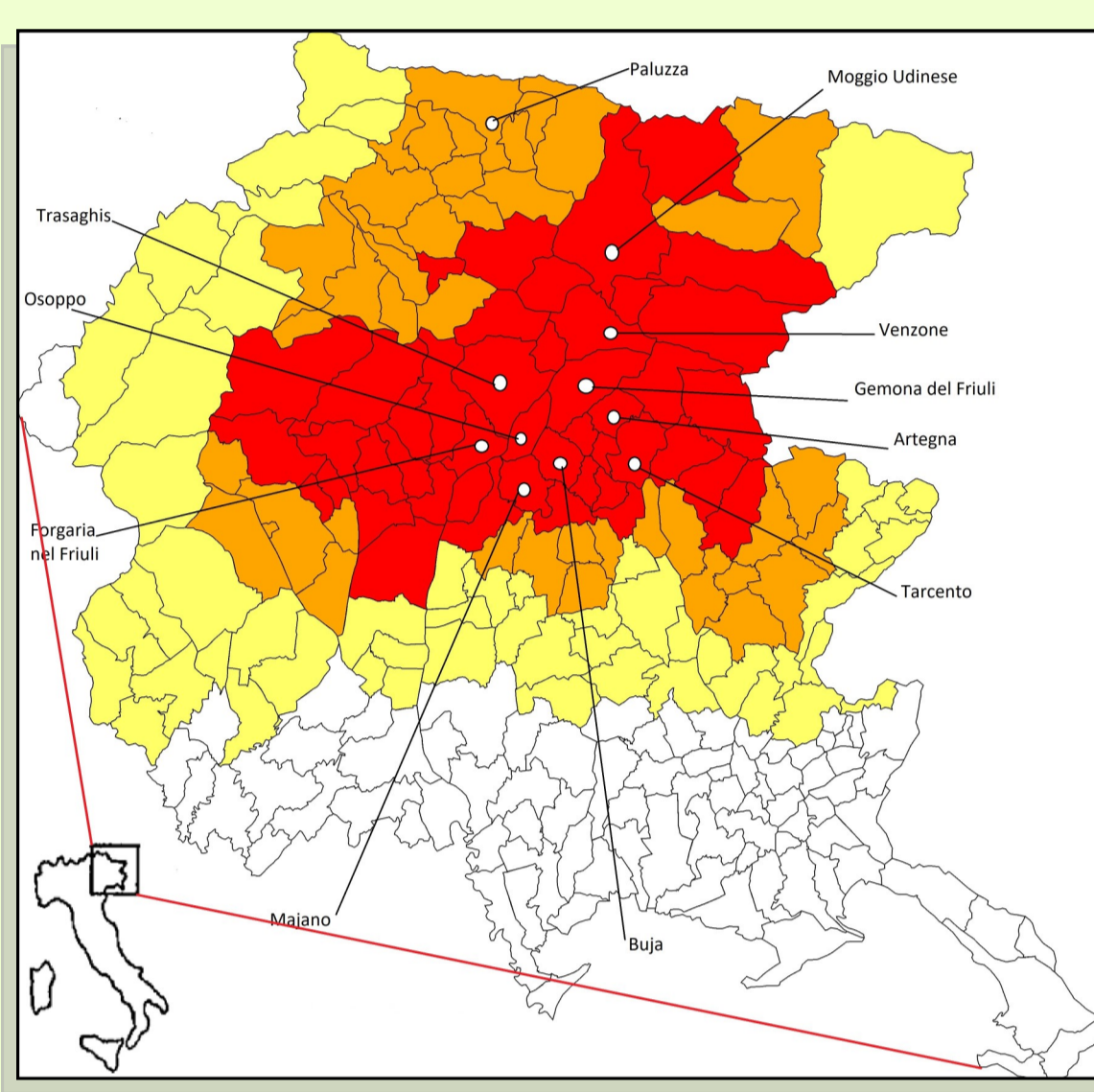
**WHERE:** in 11 middle schools in the northeastern Italy and in the first year classes of the High School "Magrini Marchetti"

**WHEN:** from September 2017 to March 2018 (meetings in the schools from November 7th, 2017 to January 18th, 2018)

**WHO:** to 561 pupils aged 13-14 (426 from middle schools and 135 from high school)

**HOW:** through 32 one-hour long lessons

- interactive: activities based on worksheets
- addressed to small groups
- guided by a pair of senior students
- based on the *peer education* approach



Seismic map of the region Friuli Venezia Giulia (Zone I, in red, is the most damaged area by the 1976 earthquake), adapted from Spagnola, 1996.

### DISSEMINATION IN THE SCHOOLS

SCHOOLS INVOLVED IN THE PROJECT	groups	pupils	age
Middle Schools of the area, eighth grade	23	426	13
High School "Magrini Marchetti", Gemona del Friuli, ninth grade	9	135	14
<b>TOTAL</b>	<b>32</b>	<b>561</b>	

### 2 THE SURVEY: SEISMIC RISK FACTORS AT HOME

After listening to the explanatory lesson, the pupils were given anonymous worksheets in which they had to identify the seismic risk factors in their houses. They were also asked to specify in which rooms these risk factors were located (kitchens, dining rooms, bedrooms, etc.) and to suggest some possible solutions.

### 3 THE SURVEY: SEISMIC RISK FACTORS AT SCHOOL

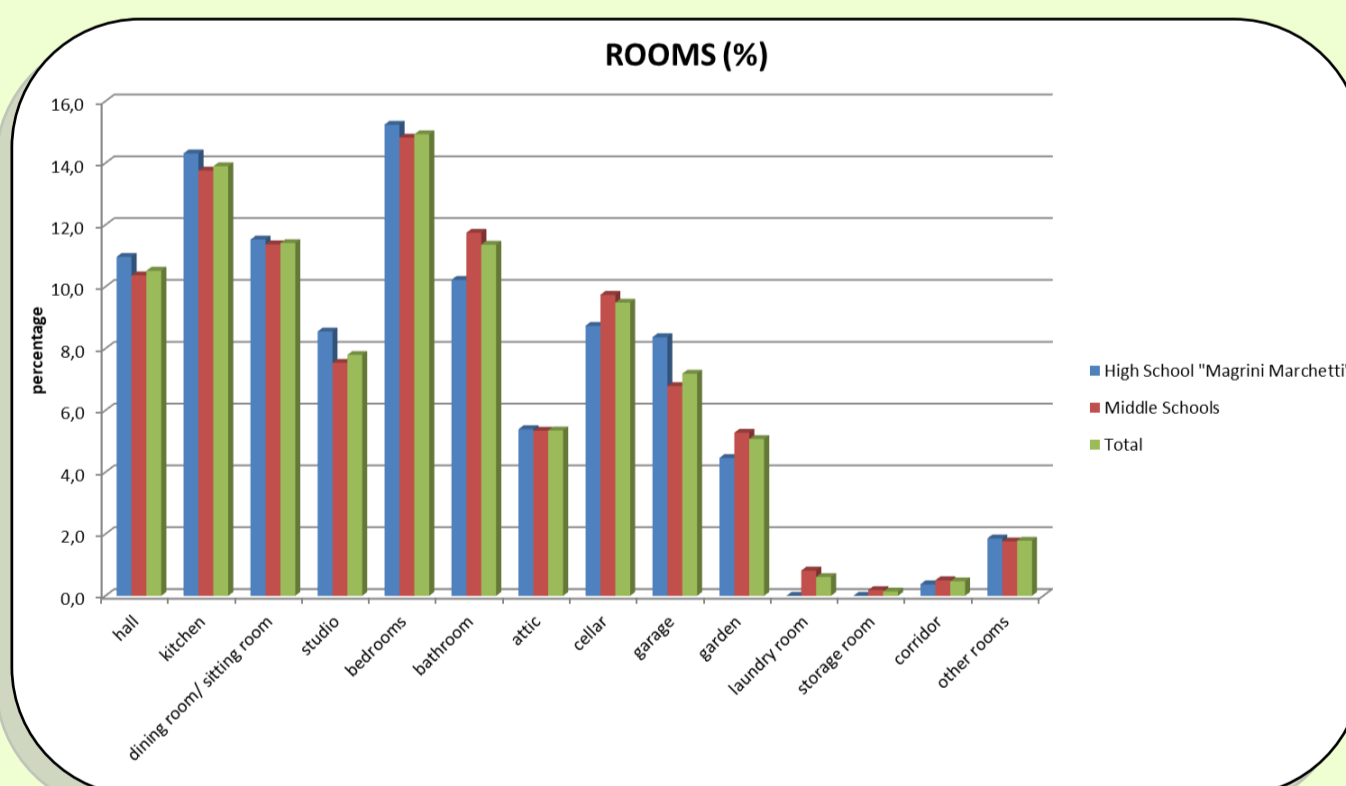
The project was extended to the over 100 rooms of the High School "Magrini Marchetti": classrooms, offices, laboratories, corridors, toilets, etc., were surveyed to identify possible risk factors.

Data about the position of desks, the adequacy of light fixtures, of roof panels and of coat racks, about the presence of emergency exit indications etc. were recorded and reported on some charts.

## RESULTS

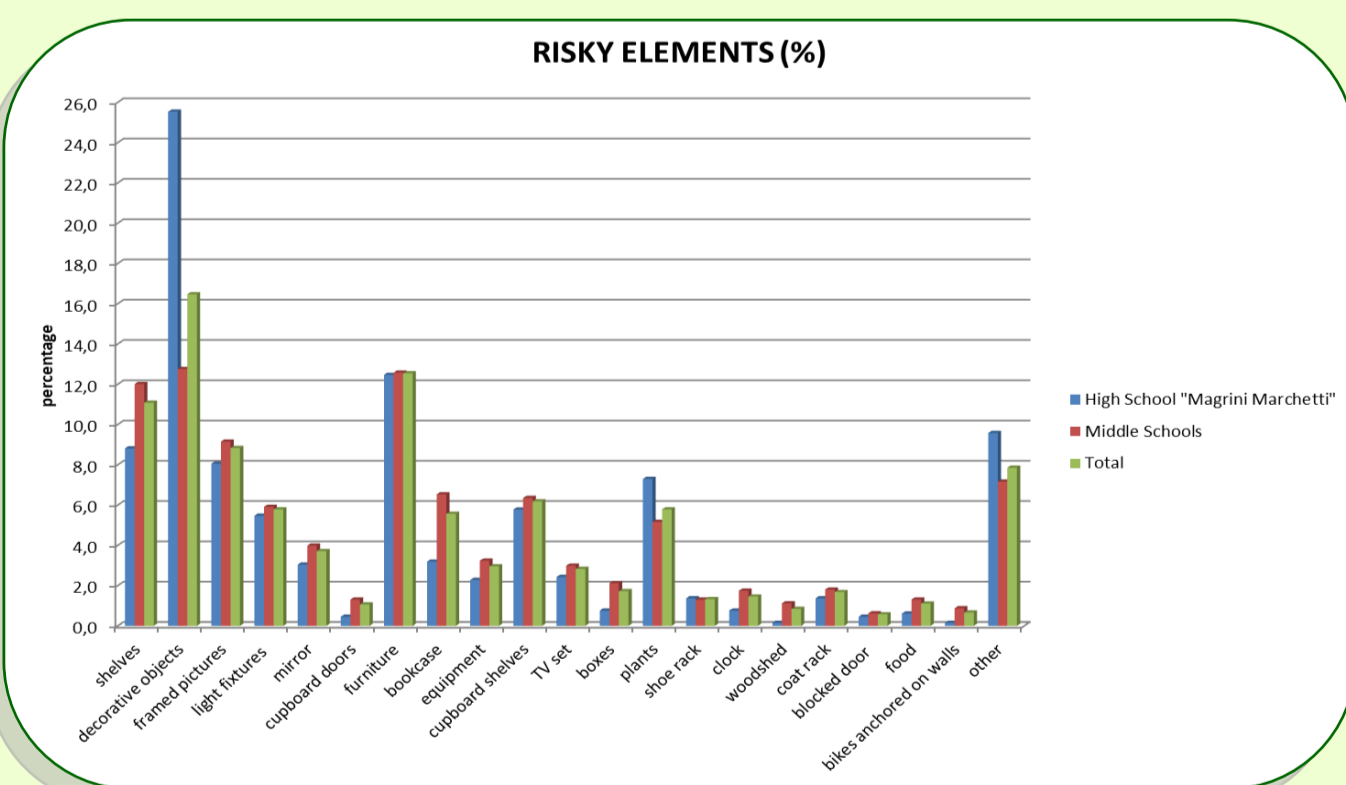
### ANALYSIS OF THE WORKSHEETS

Only 256 out of 426 pupils from the middle schools handed back the anonymous worksheets, filling the data required. The percentage of answers, 62.2%, was lower than expected: this showed that a considerable number of pupils did not take the assignment seriously, underestimating the importance to seismic prevention. Teenagers in the first year at the High School "Magrini Marchetti" answered in 69.6%.



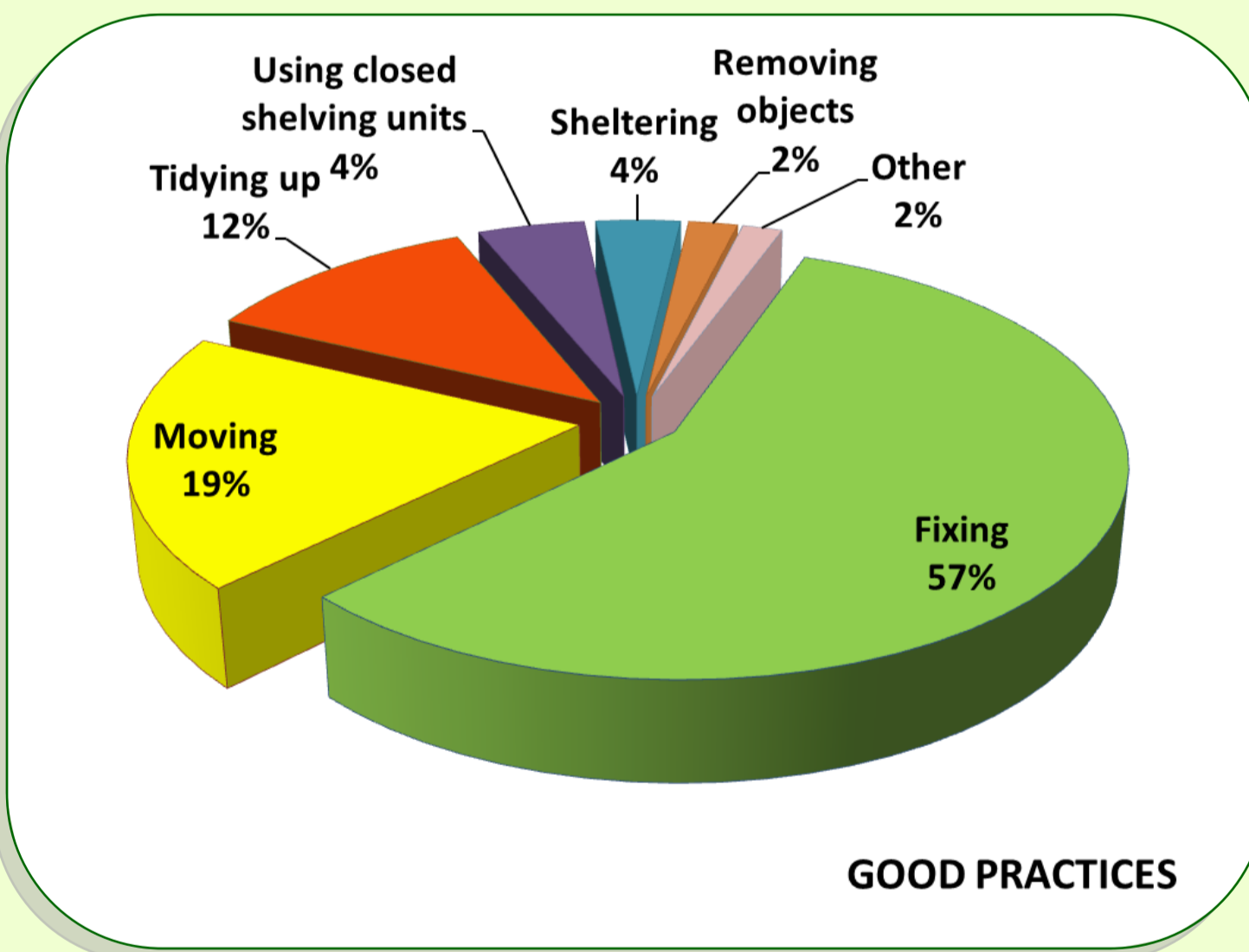
### RISKY ROOMS

**Bedrooms, kitchens and living rooms** were identified by the pupils as the rooms in their houses with the highest numbers of seismic risk factors. There were no relevant differences between the answers given by the middle school pupils and those of the high school pupils.



### RISK FACTORS AT HOME

The main risk factors identified by the pupils in their houses were **decorative objects, pieces of furniture, and shelves**. The ninth grade students indicated decorative objects as risk factors more frequently than the eighth grade pupils (25.5% compared to 12.8%, with  $p < 0,05$  chi-square test).



### GOOD PRACTICES SUGGESTED

The mitigating measures suggested by the pupils in order to reduce seismic risk were: firmly securing items of furniture, cabinets and shelves, mounting framed pictures securely, moving heavy or fragile objects to lower shelves, and tidying up. To get prepared for an earthquake you must learn how to behave correctly ("drop, cover, and hold-on") but you must also **watch, move** and **fix**. Making your house safer by applying good practices means implementing seismic safety every day.

### SURVEY AT SCHOOL

The survey of the high school, conducted on more than 100 spaces of the building, showed that the position of desks was adequate, the writing boards were correctly mounted and the furniture was suitably set up. However, small cracks were noticed in some panels of the suspended ceilings and 29 out of 600 light fixtures had no safe cover. These faults were notified to the person in charge of safety at school.

- Position of desks and tables
- Writing boards
- Pieces of furniture
- Coat racks: protruding hooks. They could be a factor of accidental risk, in any emergency. The racks have the CE label.
- Floors
- Suspended ceilings: some panels (about 90) are faulty and have traces of water infiltration
- Light fixtures: some of them have no safe cover
- Emergency lights
- Indications of exit ways
- Adequacy of evacuation plan
- Possible impediments/obstacles

### SURVEY AT SCHOOL

**RISKY ELEMENTS**  
**ADEQUATE ELEMENTS**

### REFERENCES

- C. Barnaba, E. Confesi, M.B. Girardi (Editori), PRESSAD - PREvenzione Sismica nelle Scuole e 40 anni dal terremoto del Friuli. Risultati di un'esperienza sismologica, Gaspari, Udine, Italy, 2017. ISBN: 978-88-7541-547-1.
- E. Boschi (Editor), Il Rischio Sismico, Le Scienze Quaderni, n°59, aprile 1991, Milano, Italy.
- L. Perinza, A. Sarac, C. Barnaba, P.L. Bragato, A. Dusi, S. Grima, P. Malisan, M. Muccicelli, D. Zullani, C. Cravio, T. Cecchi & Leon seismic safety at high school: the SSIF project, Boll. Geof. Teor. Appl., 57, 129-146, 2016.
- E. Sagnoli, Terre e Nordest-Friuli Venezia Giulia 1996 a vent'anni dal terremoto. I. Zaveri (Ed.), CEM - Centro di ricerca e di archiviazione della Fotografia di Spilimbergo, Aviano, Nordovest, Italy, 1996.
- http://www.crs.it/mgs-R/ (last accessed March 2018)
- http://www.protezionecivile.it/ (last accessed March 2018)
- http://www.shakeout.org (last accessed March 2018)



## CONCLUSIONS

This project allowed the pupils to be aware of living in an area with a high seismic hazard, to learn about earthquakes in general and about the 1976 earthquake and its consequences, to be aware, above all, of the importance of prevention. The importance of prevention can be looked more carefully in the area around the "see" the possible risk factors in their everyday life. As the occurrence of an earthquake cannot be predicted, prevention is the best strategy. This survey might be extended to the schools of other areas with a high seismic hazard - both in Italy and also in countries with limited resources - in order to promote prevention and to suggest the **simple and economic good practices** that give the title to the project: **watch out, move objects and secure your furniture!**