

## The Education on Emergency Response and Disaster for Junior High School Students of Surakarta

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**Abstract:** Emergency is abnormal and dangerous situations that threaten or require quick action to control, fixed and restored it to the safety condition. Most parts of Indonesia territory are vulnerable to disasters, whether natural and non-natural disasters or social disaster. Catastrophic incident may cause an emergency situation that must be carried out prevention and control into a safe condition, especially in the city of Surakarta that have strong possibilities to have floods, fires, earthquakes and volcanic eruptions. Geographically Surakarta located in watersheds of Bengawan Solo that potentially to face emergencies situation and disasters. Floods is possible to occur due to Surakarta is surrounded by more than three large reservoirs i.e. Waduk Gajah Mungkur, Waduk Cengklik, Waduk Delingan, Waduk Lalung and Waduk Kedungombo. Surakarta is also located near to Mount Merapi, which its eruption in 2013 had covered Yogyakarta and Surakarta. Junior High School (SMP) students are aged between 13-15 years who psychologically are able to receive information properly and to follow an appropriate education and training. Education on emergency response and disasters has not been implemented adequately in Indonesia, especially in Surakarta. Through this kind education and training, junior high school students are able to well cope with the emergency response procedures including fire emergency response, evacuation of flood disasters, first aid to victims of disasters, and determine the line of communication and make a proper coordination during the disaster situation with Badan Nasional Penanggulangan Bencana, Police, Hospitals and Fire Fighter.

**Keywords:** *Education, Emergency Response of Disaster, Junior High School Students in Surakarta*

### 1. INTRODUCTION

Emergency is abnormal and dangerous situations that threaten or require quick action to control, fixed and restored it to the safety condition (OHSAS 18001, 2007). Most parts of Indonesia territory are vulnerable to disasters, whether natural and non-natural disasters or social disaster. Catastrophic incident may cause an emergency situation that must be carried out prevention and control into a safe condition, especially in the city of Surakarta that have strong possibilities to have floods, fires, earthquakes and volcanic eruptions (BNPB, 2010). Geographically, Surakarta is located between 110°45'15"–110°45'35" east longitude and 7°36'00" – 7°56'00" south longitude, with an area of approximately 4404.06 ha. Surakarta also located in the basin between two mountains, that is Merapi mount and Lawu mount in the east and bordered by Bengawan Solo River in the south (that potentially to face emergencies situation and disasters. Floods is possible to occur due to Surakarta is surrounded by more than three large reservoirs i.e. Waduk Gajah Mungkur, Waduk Cengklik, Waduk

Delingan, Waduk Lalung and Waduk Kedungombo. Surakarta is also located near to Mount Merapi, which its eruption in 18th November 2013 had covered Yogyakarta and Surakarta (Seach J, 2013)

Understanding how people interpret risks and choose actions based on their interpretations is vital to any strategy for disaster reduction (Eiser JR, 2012). In Japan especially in Kamaishi, the town that have strong possibilities to have earthquake and tsunami, the education of emergency response and disaster have implemented in elementary and junior high school students. The main education in Kamaishi is evacuation drills were conducted regularly that have main point driven home to the students in disasters education is to “save your own life by yourself”. Japan has focused on disaster education that organized by the national and local government. Drills are also conducted at many schools across Japan, when the school siren sound, the students all dive under their desk in unison, and after a while don hoods to protect their heads and evacuate. Disaster education has also been incorporated into the

official curriculum guidelines established by the Ministry of Education, Culture, Sport, Science and Technology (MET) (Osamu, 2012).

All the stakeholders who are likely to engage with disaster situations have a responsibility to develop their capacity to prepare, mitigate, respond and recover (Thayaparana M, Malalgodaa C, Keraminiyagea K, Amaratunga D, 2014). Occupational safety education has become common and serves an important role in preparing students for entry into the workforce. However, the practices and perspectives of teachers have received limited attention (Pisanielloa DL, Stewart SK, Jahana N, Pisaniello SL, Winefieldb H, Mayer AB, 2013). Reducing the impact of disasters, minimizing the experienced spiritual and material losses is primarily made possible by the education of each and every individual in society. It is a well-known fact that good quality education will bring success in the fight against disaster (Ozkazanca H, Yuksela UD, 2015). Indonesian Ministry of Education and Culture have 3 program to overcome the emergency situation and disaster i.e emergency response procedure, recovery facilities and infrastructure rehabilitation, and disaster awareness education to students. Through this kind education and training, especially junior high school students are able to well cope with the emergency response procedures including fire emergency response, evacuation of flood disasters, first aid to victims of disasters, and determine the line of communication and make a proper coordination during the disaster situation with Badan Nasional Penanggulangan Bencana, Police, Hospitals and Fire Fighter. The 24 researched primary schools which are located in Merapi volcano in Yogyakarta area and prone to natural disasters have already implemented the disaster prevention education curriculum as required by the government (Tuswadi, H Takehiro, 2013), Therefore, the real problem from this programs is education on emergency response and disasters has not been implemented adequately in Indonesia, especially for Junior High School Student in Surakarta.

## 2. DEFINITION AND TYPE OF DISASTER

### 2.1 Definition

Disaster is a situation that threaten and disrupt the lives and livelihoods caused by both natural factors or non-natural factors and human factors that resulted in the emergence of human fatalities, environmental damage, loss of property, and psychological impact. Natural disasters is a disaster caused by the event or sequence of events caused by nature i.e. earthquakes, tsunami, volcanic eruptions, floods, droughts, hurricanes, and landslides. Non-natural disaster is a disaster caused by non-natural event or sequence of events which include the technology failed, failed modernization, epidemics and disease transmission. Social disaster is a disaster caused by the event or series of events caused by man which include social conflicts between groups or communities of society, and terror. (Indonesian Law of Disaster Prevention No 24, 2007). Education is a conscious and planned effort to create an condition of learning and the process of learning for the students to developing their activity and their potentially to have a spiritual power of religion, self-control, personality, intelligence, good character, and skills for their people and their nation (Indonesian Law of The National Education System No 20, 2003).

### 2.2 Type of Disaster

#### 2.2.1 Earthquakes

Earthquakes are the result of forces deep within the earth's interior. Sudden break within the upper layers of the earth, sometimes breaking the surface, resulting in the vibration of the ground, which were strong enough will cause the collapse of buildings and destruction of life and property (International Federation of Red Cross and Red Crescent Societies, 2015)

#### 2.2.2 Volcanic eruptions

Volcanic eruptions happen when lava and gas are discharged from a volcanic vent. The most common consequences of this are population movements as large numbers of people are often forced to flee the moving lava flow. Volcanic eruptions often cause temporary food shortages and volcanic ash landslides called Lahar (International Federation of Red Cross and Red Crescent Societies, 2015)

### 2.2.3 Tsunami

A tsunami is a series of waves caused by a rapid displacement of a body of water (ocean, lake). The waves are characterized by a very long wavelength and their amplitude is much smaller offshore. The impact in coastal areas can be very destructive as the waves advance inland and can extend over thousands of kilometers. Triggers of a tsunami can be: earthquakes, volcanic eruptions, mass movements, meteorite impacts or underwater explosions (International Federation of Red Cross and Red Crescent Societies, 2015)

### 2.2.4 Landslides

A landslide is the movement of soil or rock controlled by gravity and the speed of the movement usually ranges between slow and rapid, but not very slow. It can be superficial or deep, but the materials have to make up a mass that is a portion of the slope or the slope itself. The movement has to be downward and outward with a free face. (International Federation of Red Cross and Red Crescent Societies, 2015)

### 2.2.5 Floods

General floods can be predicted in advance, except in the case of flash floods. The impact of flooding can include destruction of housing, crops, cattle and people (International Federation of Red Cross and Red Crescent Societies, 2015)

### 2.2.6 Fire

Fire is a situation where a building in a place like home / residential, factories, markets, building and others hit by fire, causing casualties and / or damage (Indonesian Law of Disaster Management, 2007)

### 2.2.7 Forest and land fires

Forest and land fires is a condition in which the fire-stricken forests and land, causing deforestation and land causing economic loss or environmental value. Forest and land fire smoke often cause disasters that can disrupt the activity and the health of surrounding communities (Indonesian Law of Disaster Management, 2007)

### 2.2.8 Tornado

Tornado is a strong wind that comes suddenly, has a center, moving in a circle resembling a spiral at a speed of 40-50 km / h to reach the Earth's surface and will disappear in a short time (3-5 minutes). (Indonesian Law of Disaster Management, 2007)

### 2.2.9 Industrial accidents

Industrial accidents are accidents caused by two factors, one is the dangerous work behavior (unsafe human act) and second is hazardous conditions (unsafe conditions). The types of accidents that occur very dependent on the type of industry, for example, materials used and work

equipment, work processes, workplace conditions, even the workers who are involved in it. (Indonesian Law of Disaster Management, 2007)

## 3. THE EDUCATION ON EMERGENCY RESPONSE AND DISASTER

Emergency response and disaster education in schools can be implemented by providing training and simulation to cope with various types of emergencies. Training and simulation can be implemented in the extracurricular activities or local content courses at junior high school students.

### 3.1. Fire Fighting Techniques

When the fire is confined to a small area at the school, the techniques that can be effective to extinguish the fire is use a portable fire extinguisher (APAR). To operate a fire extinguisher, the students can remember the word **PASS**: (NFPA, 2012)

1. Pull the pin. (Hold the extinguisher with the nozzle pointing away from you, and release the locking mechanism)
2. Aim low (Point the extinguisher at the base of the fire)
3. Squeeze the lever slowly and evenly
4. Sweep the nozzle from side-to-side

A portable fire extinguisher can save lives and property by putting out a small fire or containing it until the fire department arrives; but portable extinguishers have limitations. Because fire grows and spreads so rapidly, the number one priority for residents is to get out safely (NFPA, 2012)

In dealing with emergencies, the leader must prepare for their response to emergencies by identifying foreseeable situations, understanding their cause and effects, and devising emergency response plans and procedures (emergency plan implementing procedures) ahead of time. Using these plans, well-trained groups of volunteer employees are organized into emergency response teams (ERTs) whose purpose is to stabilize the effects of an emergency or, on a limited basis, act as the primary response to emergencies if the response by governmental agencies such as fire or medical services is delayed for extended periods of time (Tucker E, 2015). In school we can recruit the ERTs team representatives from

teachers and students, they have job task to coordinate if emergencies happen.

### 3.1.1. Volcanic Eruption

Volcanoes can produce ash, toxic gases, flashfloods of hot water and debris called lahars, lava flows, and fast-moving flows of hot gases and debris called pyroclastic flows. Some dangers from volcanoes can be predicted ahead of time while others may occur with little or no notice after an eruption (Center for Disease Control and Prevention, 2014). Based on research, educating the local community about the importance of early evacuation during a disaster of volcanic eruption is the weakness point of the local government in Yogyakarta (Binta A, 2012). In Surakarta, the effect of volcanic eruption is volcanic ash that covered area of Surakarta. To face this emergencies of volcanic eruption, the school can implemented the tips from BNPB Yogyakarta and International Volcanic Health Hazard Network. (Horwell C. 2015)

- 1 All students do not panic, keep calm
- 2 Remain to the school indoors, If students are in outdoors, seek shelter, eg buildings and cars
- 3 Use a mask, handkerchief or your clothes for cover mouth and nose
4. If the volcanic ash warnings broadcast before ash, the students suggest go to their home
5. Prioritize the use of your phone to call if any emergencies or accident
6. Do not use contact lenses because it would lead to corneal damage
7. If there are ashes in the water, let it settle first.
8. Use water that is clean and not muddy.
9. If there is a lot of ash in the tendon of water, do not use this water for a washing machine or foods
10. Water contaminated with volcanic ash can cause health risks, so beware on it

### 3.1.2. Floods

There are 2 steps that should be implemented to face the floods in junior high school of Surakarta

#### 1. Early warning

This step is necessary to alert the students about the disaster that would occur before the flood event came to their schools. Early warning is communicated to all prospective victims, especially to the students that have potentially affected by the floods. The tools that can be applied in early warning of floods are mosque toa, gong or school alarm that can be the first warning the flood was coming

### 2. When disasters comes

To face the floods, the students must be trained and simulated in technique of evacuation. After the bell ringing, the students must go to safe place or called assembly point until the aider comes to rescue the student, the ERTs call police department, hospital, fire department, national board of disaster to ask help for evacuation and medication. Before that, the teacher must providing the buoys or tires that can be used to help the students that snared in school when flood was coming. The number that can be dialed is 110/112 for police department, ambulance and rescue at 118, fire department 113, medical emergencies 119, 115 for SAR and evacuation (Angloinfo, 2015)

### 3.1.3. Earthquake

#### 1. Practice Drills

Although earthquakes are mainly concentrated in zones close to boundaries of tectonic plates of the Earth's lithosphere, infrequent events away from the main seismic regions can cause major disasters. The major cause of damage and injury following earthquakes is elastic vibration, rather than fault displacement. This vibration at a particular site will depend not only on the size and distance of the earthquake but also on the local soil conditions (R.D. Adams, 1990). By planning and practicing what to do if an earthquake strikes, the students can learn to react correctly and automatically when the shaking begins. During an earthquake, most deaths and injuries are caused by collapsing building materials and heavy falling objects, such as bookcases, cabinets, and heating units. Learn the safe spots in each room in schools. Participating in an earthquake drill will help the students understand what to do in case you are not with them during an earthquake (Center for Disease Control and Prevention, 2014). The main point if earthquake happen is not try to move but immediately protect yourself as best as possible where you are in school building. Earthquakes occur without any warning and may be so violent that the students cannot run or crawl. The technique that can implemented is Drop, Cover, and Hold On immediately (Earthquake Country Alliance, 2015)

2. **DROP to the ground.** During a large earthquake, the ground might jerk strongly and knock you down
3. **Take COVER** under a table or something sturdy and move away from windows or other hazards
4. **HOLD ON until** the shaking stops. If you cannot get under something, stay low. Protect your head and neck using your arms, a book or anything else within reach.

### 3.1.4. Evacuation Plan

If an earthquake occurs, the students may need to evacuate a damaged area afterward. By planning and practicing for evacuation, they will be better prepared to respond appropriately and efficiently to signs of danger or to directions by civil authorities (Center for Disease Control and Prevention, 2014).

1. Take a few minutes with teachers and the students to discuss a school evacuation plan. Sketch a floor plan at the school; walk through each school room and discuss evacuation details.
2. Plan a second way to exit from each room or area in schools, if possible. If you need special equipment, such as a rope ladder, mark where it is located.
3. Mark where your emergency first aid kits, and fire extinguishers are located.
4. Mark where the utility switches or valves are located so that they can be turned off, if possible.
5. Indicate the location of school emergency outdoor meeting place.

## 4. CONCLUSIONS

Each of hazard or disaster can be determinate and control to reduce the risk of the consequences, one way to do determinate it is education and training on emergency response program. This program can be effective if it's implemented properly into the school curriculum, especially secondary school in Surakarta, because it's prone to disasters of floods, fires, volcanic eruption and earthquakes. Education on emergency response can be implemented with socialization emergency response and disaster, evacuation training, and simulation to face the emergency situation.

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