

# Damage to schools caused by great earthquakes and restoration of normal operation

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In the Great Hanshin-Awaji Earthquake and the Great East Japan Earthquake, the schools in the disaster-affected area suffered tremendous damage. While this damage to school buildings is relatively well-known due to the images posted to the Internet or from news reports, whether schools have been successful in resuming normal operation is less well understood outside the stricken areas. For the benefit of those who are to come, the local governments in these areas have recorded the damage inflicted on school facilities and the struggle that the schools and the education committees involved have faced in reconstructing the schools and resuming the provision of education. However, such invaluable materials rarely see the light of day because they are buried in a vast mountain of records covering various fields. We focus on the above two major disasters and discuss similarities and differences in the initiatives taken toward resuming school operations, and summarize the issues that teachers should be prepared to face in the event of a disaster.

Keywords: Resuming school operations, The Great Hanshin-Awaji Earthquake, The Great East Japan Earthquake

## Preliminary survey on university students' attitude towards natural disasters

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In the Great East Japan Earthquake that occurred on March 11, 2011, in addition to the damage caused by the main shock, many people were killed or injured due to tsunamis and repeated aftershocks. Because the damage was reported nationwide, there will be many people who remained in memory for six years since the earthquake. The purpose of this survey was to listen to experiences and opinions from people who were then elementary, junior high and high school students at the time and to clarify changes in thinking about the earthquake before and after the disaster. The target is a student born in 1997 from 1993.

The period during which hearing surveys were conducted ranged from December 2007 to February, 19, with 14 researchers (7 men, 7 females), and the place of residence at the time of the disaster was Mito (Ibaraki Pref.) 2, and Tsuchiura, Hitachinaka and Hitachi Ota (Ibaraki), Tomei (Miyagi), Date (Fukushima), Yamagata (Yamagata), Kiryu (Gunma), Kisarazu (Chiba), Kamo and Itoigawa (Niigata), Hokuto (Yamanashi), and Matsuyama (Ehime) each 1 person. 10 of whom were at school, 1 person at home, 3 others, when the earthquake occurs. The behavior style of the persons who were at school could be classified into the case of evacuating to the school garden or gymnasium. The way of going back to school was various, such as returning together collectively for each district where they live, and returning home after the parents came to pick up. There was a person in the situation that the person who was at home suppressed the thing which is going to collapse.

Regarding fear of earthquake and tsunami, most of the responses before the earthquake were "not at all scary" or "not scary", and at the time of the survey after the earthquake, they answered "scary" or "very scary". Also, I got the opinion that he became aware about earthquakes that occurred outside his residence.

In this survey, it was highlighted that the awareness of disaster prevention greatly changes by receiving large earthquake damage. From now on, it is a future task to think about constructing a way that can live without worrying about consciousness and feelings about disaster prevention against natural disasters in the future.

Keywords: natural disaster, the Great East Japan earthquake, university student, disaster prevention, interview

## Energy for restoration created by science education.

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Energy for restoration created by science education.

Keywords: Science education, Kumamoto earthquake, primary school, Fudagawa Fault, Accepting the Disaster, a course of study

# The things and story of the geo-/electrical power and its public perception after 3.11 disaster in Fukushima Hama-dori region, Japan

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In the case of the disaster mitigation, it is difficult to judge the important degree by size of the disaster-caused damages. However, in the size of the epicentral area, the number of missing and dead caused by the tsunami, a devastating accident by the nuclear power disaster, it will be sure that the Great East Japan Earthquake and disaster is noteworthy event and experience.

Therefore, six years passed from the disaster. The relay of the experience in the disaster should be performed in elementary curriculum. When such activity begins, our understanding and experience about the disaster have to be refreshed.

In this presentation, the author will introduce the fact of the understanding of children and students for the disaster and the highlights which are contents of out field excursion. Especially, in order to keep the memory of painful and study from experiences of the disaster in the Fukushima Dai-ichi Nuclear Power Station, I conduct study tour (field excursion). This presentation will introduce the must-see sights as the evidence of the disaster and historical transition of local industry, as follows;

- virtually empty town of the nuclear evacuation zones
- remains and outcrops of Joban mine (closed coal mines)
- electric line which connect the areas around Tokyo and local region, in other words, the exchange benefit and risk between the outlet and inlet.

Keywords: Fukushima nuclear power plant, experience of disaster, questionnaire, beneficiary area, geosite, study tour

## Toward development of disaster prevention training method for employee based on images of security camera at earthquake

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Efforts to utilize various sensor groups around us for disaster prevention have begun. Based on this trend, we propose a method of updating disaster prevention education for employees by manual training and so on conventionally done at attracting facilities, to disaster prevention education / training using the security camera image archive at the time of earthquake.

Keywords: Earthquake, Security camera video, Disaster prevention education

## 3D modelling for digital preservation repositories of stone monuments that records historical earthquakes at Shikoku region

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Earthquake stone monuments (slab) related to historical tsunami earthquakes are built in coastal areas at Shikoku Island, Japan. These monuments have functions to remain the record about ancient natural disasters, and transmit records to posterity, and offer for the dead. Several stone markers describe warning messages and indicate maximum tsunami inundation height for past earthquakes. Therefore, these stone slabs could be used in school education programs for disaster prevention, though most of monuments are simply ignored. The reason for the ignorance or forget of monuments is difficulty to access for public people the information about stone monuments and related documents, to read the old characters, and to learn future disastrous earthquakes from the monuments. Most monuments are built outside near coast, therefore the stone would be damaged by weathering by wind and rain, or be lost by future tsunamis.

Therefore, in this study, we constructed a database of the stone monuments for historical earthquakes in Shikoku Island, Japan, by integrating the 3D digital archive models, descriptive contents, rock physical and chemical properties, and location-based information.

We have built more thirty than 3D models so far, and organized information of the earthquake monuments in Kochi Prefecture, Japan. We used the commercial software (PhotoScan, Agisoft Company) to reconstruct 3D models from digital photo images. Photos were taken by compact digital camera (GR, RICOH imaging company) and edited the photo image by using Photoshop software (Adobe Systems Incorporated) with exposure adjustment and white balance fixing to enhance the engraved characters. 3D data were uploaded on the existing platform (Sketchfab, <https://sketchfab.com/>) so that anyone can observe the 3D models through web browser based on the WebGL technology. 3D pdf format files were also prepared to view 3D models on your own PC for offline use. Both Sketchfab and 3Dpdf have the annotation tools that small notes can be stuck on the model. Therefore, we added the information of contents and interpretation on the 3D models using the annotation tools. Rock type and rock physical and chemical properties of stone materials can help for provenance study. Therefore we added these information (rock magnetic susceptibility and color) in database. We used “e-community platform (<http://ecom-plat.jp/>)” web system which was developed by National Research Institute for Earth Science and Disaster Prevention in Japan to introduce the position of the monument through map. We categorize the stone monuments according to the associated earthquake events and locations. We plan to overlay the tsunami hazard map published by public institutes to confirm the relationship between tsunami inundation distribution and the location of monument.

3D reproduction made by 3D printer could be used for teaching materials and exhibitions in historical museums. We plan to launch the web database soon after completing the dataset of stone monuments at Kochi prefecture.

Keywords: Nankai Earthquake, digital archive, earthquake monuments, PhotoScan, sketchfab

## Active Learning Lesson for Disaster Preparedness Education using Tablet and Cloud Computing Services

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Japan is a country of frequent natural disasters, such as earthquakes, floods, landslides, volcanic eruptions, and so on. The disaster emergency evacuation drill has been conducted at all schools in Japan for several decades therefore. However, natural disaster could happen at any time. 1995 Kobe earthquake, for example, occurred at 5.46 am and 6,400 people were killed at least in total. Hence disaster prevention education has to be more promoted to enable students to think and act on their own about safety of the local circumstances. This study shows an example of how active learning can be used for disaster preparedness education using tablet and cloud computing services. It consists of a classroom session and fieldwork session. The first session is for raising awareness of natural disasters and evacuation signs. In this session, students use tablets for filling out the questionnaires by Google forms. After increasing students' interest in disaster prevention, students attend fieldwork education with using Google Maps, Runtastic, and several web services. The students could actively take photos of evacuation signs and upload to their own local map of their familiar campus environments. This lesson can possibly increase chances to learn appropriate knowledge and skills for disaster management.

Keywords: School Disaster Education, cloud computing services, active learning

## Disaster prevention education through the landslide hazard mapping in a development country -A case study in Tegucigalpa, Honduras-

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Tegucigalpa, capital city of Honduras in Central America, is located on the basin and many landslide landforms are well developed on the surrounding slopes. In 1998, large-scale landslides occurred in the city induced by the heavy rain of the Hurricane Mitch and serious damages of the human sufferings and property were caused by the landslide activates. In response to this disaster, Japan International Cooperation Agency (JICA) decided the plan of “The project for landslide prevention in Tegucigalpa Metropolitan Area” and constructed the structural measure facilities as typified by the catchment wells. In non-structural measures, the 1:50,000 scale multi hazard map were published by the local government supported by United Nations Development Programme (UNDP). Although, the landslide landforms which were shown in this map were only interpreted large-scale landslides. Additionally, the biggest problem is that map was made by the abroad consulting company and technical transfer of mapping was not conducted for local government. Against this background, JICA had been conducted the disaster prevention education through the mapping of the detailed-landslide hazard (susceptibility) mapping in a development country in not only the disaster prevention division of local government but also the universities. The reason for choosing universities, geomorphological and engineering geological education has not conducted well. It is necessary that education for continues cultivate human resource of the person for disaster management. In our presentation, we show about practice activities as JICA experts.

Keywords: Developing countries, Disaster prevention education, Landslide