The Chernobyl Disaster (1986)

Disaster Mitigation

The Chernobyl Nuclear Reactor used a graphite reactor, called a positive void effect, that produced extremely unpredictable and uncontrollable spikes in power production. The positive void reactor commonly produced large steam bubbles, referred to as “voids” in this system, within the reactor core which were identified as the cause of the large power surges. The team operating the plant identified the reactor’s design which produced these large steam bubbles as a hazard. The Chernobyl reactor, however, remained operational until its explosion in 1986 due to the very steam bubbles identified as a possible threat (along with the team decision to disable the automatic shutdown features of the plant) with no new precautions taken post-identification of the design flaws. It should be noted that with the Chernobyl disaster humanity learned that safety in the realm of nuclear power would have to take the top priority in both the design and operation of nuclear power plants.

Disaster Preparedness

While it there might not be many precautions individuals can take in case of a nuclear disaster, an area can develop emergency plans that would be executed if said disaster were to occur. Planning a large-scale evacuation would obviously be crucial since radiation can spread extremely quickly and cause areas to be uninhabitable. Nowadays after learning from the incident, modern nuclear reactors are fitted with teams who work closely with neighboring populations regularly to prepare for speedy and orderly evacuations. Further reducing the likeliness of similar incident occurring, current reactors are designed with more efficient internal structures. One of the main issues of the Chernobyl reactors was that the power output could greatly increase if cooling water was lost or converted to steam, leading to
power surges. Today, reactors are equipped with modified control rods that include neutron absorbers which help create a more stable reactor. Along with internal design changes, automatic shut-down mechanisms have also made advancements to operate much faster and more efficiently.

**Disaster Response**

Immediately following the explosion of reactor four, firefighting crews attempted to put out the fire and limit the amount of radioactive material entering the environment. The attempt to put out the fire with cooling water was abandoned within ten hours. Almost a day later Russian Military helicopters were used to dump 2400 tonnes of lead and 1800 tonnes of sand onto the reactor which ultimately did not stop the fire and radiation leakage, but also contributed to the overall difficulty in controlling the situation in the days following. The sand and lead ironically increased the heat and thus amount of radiation produced by the fire. It was not until ten days after the initial explosion that the fire was put out by nitrogen. As for the evacuation, the surrounding civilian population living in 76 different villages and the city of Pripyat was not notified of the accident until 36 hours after the explosion. They were given iodine pills to combat radiation poisoning (given far too late to be effective) and were told they would be leaving the area within a days time without the knowledge they would not be able to return to their homes for many years. The people evacuated would become the world’s first refugees due to a nuclear energy related event. There was much confusion and lack of knowledge in the immediate handling of the Chernobyl explosion which ultimately serves as a historical reference to authorities involved in future planning of nuclear emergency operations on how not to proceed.

**Disaster Recovery**
The United Nations has since developed the Chernobyl Recovery and Development Programme (CRDP), whose sole purpose is to fuel the recovery of the affected regions and eventually return them back to a state of normal living conditions. The program focuses on the mitigation of the economic, environmental and social effects of the Chernobyl disaster. By doing this, the program works with numerous other organizations to help restore the affected regions back to normal conditions. In addition to the CRDP, the Chernobyl New Safe Confinement (NSC) is currently under construction and being funded by Chernobyl Shelter Fund. Its primary purpose is to contain the partially destroyed reactor and prevent further leakage of radioactive material. The structure should also allow for future deconstruction of the reactor. The NSC is expected to be completed by 2015.

Indonesia Tsunami and Earthquake (2004)

Mitigation

When a country wants to prevent future disasters or emergencies they have gone through in the past they have to prepare themselves to avoid these problems from occurring again. The way they do this is by making a hazard-risk analysis. Once they have identified the hazards, they have to develop a strategy to avoid these hazards from becoming an emergency. These hazards are associated with the incorrect use of infrastructure and safety protocols.

What happened in Indonesia is that they were not prepared for a tsunami of that magnitude. They did not have tsunami alert systems and the population did not know a disaster like that was possible. The earthquake that triggered the tsunami was the strongest Indonesia had seen for 700 years.

These days, everything has changed in Indonesia. All of the infrastructure has been rebuilt with
the thought that a disaster like this can happened again. The buildings are constructed to withstand high impact waves and earthquakes. There are tsunami emergency towers to which people can go to save their lives. There is also the Tsunami Warning System that is handled by the Pacific Tsunami Warning Center, operated by the National Oceanic and Atmospheric Administration (NOAA). This organization uses seismic data and a system of ocean buoys to monitor tsunami activity and issue bulletins. Their job is also to watch and warn the population about impending tsunamis in the Pacific basin. Along the Indonesian coast, there are sirens that can alert the entire population within minutes that a tsunami is coming. NOAA is also taking new precautions these days, as they are providing disaster emergency shelters in several locations close to the shore.

**Preparedness**

These are efforts made in advance to prevent emergencies by creating plans to help the population get ready for such a natural disaster. The major preparation for these disasters is training. In this way, the population where a hazard exists will know how to react in a disaster like this.

What happened in Indonesia is that the population did not know how to react to a tsunami. These days everything has changed. At the shores, there are alarms. When these alarms sound, every single person has to evacuate or has to get into a safe zone. These people could go to high ground level, to the upper floors of buildings, or into the emergency towers. At hotels, the staff is prepared to evacuate every single guest. People know how to react because the cities run tsunami drills several times during the year. There are evacuations roots that lead people to concentration points. In addition, all of the military and emergency services are prepared to act in the proper way.
**Disaster Response**

After a disaster like this, it is the job of the IRD (International Relief and Development) organization to let the world know that there is a big disaster and people are in need of help. During the 2004 Indonesian Tsunami, the first thing that the IRD did was to send $4.9 million dollars of rice and 40 metric tons of ready-to-eat snacks, two containers of clothing, baby food, water, high-protein biscuits, jerry cans for water purification. They sent it to the Aceh, the country that was hit the hardest. The IRD also provides water and sanitation services such as tankers, containers and bladders immediately, then in the short time, they install shallow wells, garbage collections, and restoring water treatment facilities. Other services that were provided were people to work and restore their financial life and also trained people to help prevent sicknesses such as malaria and diarrhea. The response to natural disasters such as is tsunami that it Indonesia really hard, is to provide, food and shelter immediately after the disaster happens. The media contributes to helping the people from the disaster countries because they help donate money to provide food and shelter for the people who lost everything.

**Disaster Recovery**

One of the most affected areas by this tsunami, was Aceh. With all the money donated and help from countries all over the world, Indonesia received about $7 billion dollars for repairing homes and infrastructure. The money was managed by the World Bank and they allocated it to the services that were being used to rebuild all of the homes and infrastructure. The MDF (Multi Donor Fund for Aceh) was a service that was mandated to help rebuild Indonesia for 8 years. What the MDF found is best to approach natural disasters like these are several different ideas. The first one is that they should start by rebuilding home and communities then moving on to rebuilding the infrastructure. Then after the homes,
communities and infrastructures are rebuilt, the economic development is rebuilt. And the best way to maximize the rebuilding the community is to employ the people who used to live in the now disaster filled country to rebuild their own homes so they earn money while rebuilding their own homes. And the last approach is to build buildings that include disaster risk reduction, capacity building, and environmental protection. Indonesia will be struck again, but they are much more prepared for another natural disaster

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Works Cited


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