

Investigation of Problems Caused from Debris Management After Earthquake and Providing Appropriate Solutions

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Abstract— The occurrence of earthquakes in urban areas causes the deposition of large quantities of rubble and debris that delayed the operation of rescue operations and also reduced the process of rehabilitation activities, so debris management is very important in relation to relief programs. International experience has shown that during the purification and reconstruction process, a significant proportion of waste resulting from degradation can be reused or recycled, thus providing the necessary building materials for reconstruction operations.

International experience has shown that during the purification and reconstruction process, a significant proportion of waste resulting from degradation can be reused or recycled, thus providing the necessary building materials for reconstruction operations. And preventing the amount of debris delivered to landfills and, consequently. Therefore, it is necessary to manage relief, renovation and rehabilitation activities in the least amount of time with the proper management of rubble and debris. In this paper, the problems of the management of earthquake rubbish and rubbish are presented and appropriate strategies are presented.

Keywords- natural disasters, reuse, recycling, disposal, solid waste.

Introduction

The occurrence of natural disasters such as floods, earthquakes, and so on leads to massive production. Debris solids are said to be rubble after the occurrence of natural disasters (flood, earthquakes, ...), which includes construction materials (concrete, brick), private and public property, and green waste. A major part of most post-crisis reconstruction operations is deforestation. In most cases, rubble and debris are created by rapid winds, flood, earthquakes, landslides or fires, and immediately after the accident, disposals must be started quickly in certain areas for the sake of maintaining human health and safety, so depletion and Removing it from an accident site is one of the most important parts of the relief and rescue and reconstruction operations. Many of the remains of natural disasters are not dangerous.

Soil, building materials, green wastes constitute a large amount of debris, many of which can be recycled. Materials from storms, earthquakes,

tornadoes, floods and fires can be divided into several subsets. The debris produces a variety of types that include: 1. rubble and shells that are directly caused by natural disasters, such as rock, etc. 2. Rubble and debris that are indirectly caused by natural disasters.

Debris management

Debris management strategy has divided large-scale debris operations into two phases.

Phase I: Clearing debris and debris that prevent rescue operations from occurring in the areas of the accident, as well as a serious threat to the health and safety of the people.

Phase II: Debris removal and disposal operations are essential to ensure the reconstruction and removal of threats and potential dangers for people's health and safety.

Phase I: Emergency evacuation in order to facilitate help

Emergency evacuation, which is the first phase of debris operations Includes the following:

- Identify the main routes necessary for emergency operations.
- Identify how to prioritize actions among local organizations.
- A description of the measures taken during the first phase, including the dismantling of roads, opening the main routes by moving debris and debris to the roadside and streets.

Therefore, at this stage, no action is taken on the disposal and disposal of debris, but only involves clearing the main routes to speed up the following:

- Moving emergency vehicles.
- Restoring critical services.
- Law enforcement.
- Evaluation of damage to main equipment and facilities such as emergency rooms, hospitals and facilities under the authority of the municipality.
- Determine the type of debris created.
- Identifying priorities for access to essential facilities such as water and wastewater treatment plants, power plants, airports, and so on.

- Determine the need for services, because the need for government services is sought after Natural disaster has increased as well as the development of methods that determine the extent of destruction.

Phase II: Disposal and removal of debris from public roads

In the second phase, which includes removal and disposal of rubble from public roads, the following are considered:

- Rubble and debris are driven off the main roads along roads and streets and there is little time to separate the debris components at the same time, and the goal is only to facilitate the movement of emergency vehicles and emergency vehicles outside the accident area.
- Setting up a plan for municipalities and other responsible institutions during the crisis to coordinate debris operations.
- Determining the amount of humanitarian and humanitarian assistance.
- Coordination through local organizations to provide human resources to speed up depletion operations.
- Create an independent group using local and provincial personnel for Control and monitoring of depleting activities.
- Co-ordination with the Road and Transportation Authority and the Department of Transportation to ensure that the necessary measures are taken to facilitate traffic in order to quickly transport the debris.
- Organizing briefings to resolve disputes between organizations involved in crisis and debris.

Disposal of debris

Disposal of rubble is one of the most important challenges in managing debris during natural disasters, not just because of volume, but also because of the potential hazards that surround the environment. Therefore, clearing operations during natural disasters, which may take from one month to one year, should be taken into account with the following strategies:

- Rubble and debris are collected in temporary disposal sites.
- The amount of rubble before the transfer is reduced.
- Several disposal sites should be established.
- Volunteers and the general public will be separated from contractors at disposal sites.
- Access to controlled and controlled disposal sites.
- The provision of small vehicles, because of the difficulty of accessing small vehicles, may be needed.

Problems with debris management

- The removal of debris and other waste streams along the streets and roads, and their transfer to disposal sites, causes the mixing of rubbish and recycled materials with other materials, which reduces the potential for recycling.
- The lack of a specific organization and department that is responsible for waste production makes it difficult to control debris and, as a result, creates a confusion among organizations and ultimately leads to the illegal disposal of debris and rubbles.
- A large number of contractors make inefficient use of resources and lack of cooperation in the allocation of resources and financial resources.
- Facing with a huge amount of rubbish and debris often requires outside help.
- Hazardous substances in waste resulting from degradation are harmful to the environment and humans.
- Disposal of rubble and debris in the valleys and similar areas, due to lack of access Collecting machines in those areas makes waste management difficult.
- Resource activities and measures should be increased to avoid combining waste with other waste.
- The capacity of local disposal sites for large quantities of rubble and debris from the earthquake is not enough, so the need to select places is already sufficient.

Methods of reducing the volume of debris and rubbles

Reducing the amount of waste (reducing the amount or toxicity of waste that is repelled) is the most effective way to reduce wastes associated with wastes. There are several ways to reduce the volume of the well, including: burning, milling, crushing, burial and recycling. Each method has its own advantages and disadvantages, and it is best to use all methods to speed up depleting debris operations.

Discussion and conclusion

The occurrence of natural disasters leads to the production of huge quantities of debris caused by the destruction of various types of structures (bridges, buildings, etc.). In fact, the type of disaster will affect the quantity and characteristics of rubble and debris. Therefore, the reconstruction and restoration of damaged communities to the normal state requires clearing of areas from various debris, which is, in turn, a sensitive and multidimensional activity due to the problems in the field of rubble. Therefore, to deal with natural disasters, we must act as soon as possible to create crisis management and develop the necessary infrastructure.

Therefore, management of rubble and debris is a relatively new concern for municipalities, and very

little useful data and information is available. In this case, the evaluation of debris management after incidents can provide an important source of feedback for estimating the amount of rubble and debris, increase the management experience of debris in planning for better preparation, facilitate rebuilding and lower cost assistance during future natural disasters.

- Initial Operations before the earthquake
- Execution method after earthquake



Table no.01 Execution method after earthquake.

This method creates a framework for initial planning after an earthquake or any other type of disaster and includes a series of events that occur after the earthquake, as well as a list of all the issues that should be addressed and all issues related to solid waste management and debris is included. Executed procedure to the magnitude and time of an earthquake it does not depend on the modalities to be implemented before and during the earthquake.

The important point is that the use of this procedure is applicable to any crisis that generates significant amounts of debris and thus leads to a disruption to the solid waste management system.

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