

ECOLOGICAL ASSESSMENT OF AFTER - EFFECTS OF SEISMIC VIBRATIONS

Jamila Imamaliyeva



Azerbaijan University of Architecture and Construction
ncamila@rambler.ru

Abstract

Assessment of direct impacts of after-effects of earthquakes on the environment, economical results of ecological damages, solutions of ecological problem. Not only communal economy and communication but also environment was damaged after earthquake. Direct impacts on the environment include real and remnant danger of industry objects especially chemical depots; damage of water stocks including water economy as well as dikes, irrigation canals; destruction of city and industry cleaning systems of filthy waters; damage of water stock may cause water flood of harmed areas. Some direct influences to the environment are expected due to disturbing of sanitation and utilization rules, burial of building wreckages and destroying of ruins. It is important to create an ecological control program, as it is impossible to appreciate all impacts on environment for the first time. Disaster recovery plan contains strategies to minimize the effects of a disaster, help an organization to quickly resume key operations or continue to operate. Disaster recovery plan, which created by an organization that contains detailed instructions on how to respond to unplanned natural hazards. The vulnerability of a country, a population, or a building is measured by how susceptible to harm or loss it is in the face of a hazard. The risk is estimated by measuring the probable occurrence of a natural hazard of certain intensity against the vulnerability of the exposed elements. For example, a building is at risk during an earthquake impacts when the earthquake (hazard) is strong enough to damage or destroy the building, also when buildings were built without seismic-resistant construction techniques (vulnerability) in the design. Risk management is important factor to creating a disaster recovery plan.

Keywords: environment, losses, infrastructure, earthquake, damage

I. Introduction

Unexpected impacts on environment includes possible changes of movement of subsurface waters and water-bearing sheets; possible changes of ecosystem, varieties of different animals and taking account the complex situation in all cases it is important to control the impacts on environment. Economical results of ecological damages are:

a) financial damage; b) industrial losses; c) financial costs – that direct, straight and remote losses. Dwelling fund, social infrastructure and national economy was damaged due to calamity. For the first calculation total damage consists 5 billion dollar. But for reconstruction with higher standards is needed 6 billion. Health and education, industry, tourism, municipality infrastructure, social building, cultural monuments, water and electricity providing systems, transport, telecommunication and ecology was damaged in the result of earthquake. Earthquakes cause destructive effects to buildings, transportation networks, infrastructure systems, critical facilities and produces a range of social and economic impacts. Earthquake hazard elimination must be based on an analysis of system-level consequences to be effective. Linking physical damage to social and economic impacts is difficult for several reasons. First, and fortunately, there

are relatively few damaging earthquakes to provide actual data that can be used for understanding and modeling social and economic impacts. Second, there is not a simple deterministic relationship between physical damage and resultant impacts, and a number of contributing and confounding factors mediate this relationship. There is considerable uncertainty in the incidence of impacts across populations. There are also complex social interactions that can amplify or reduce the impacts. And finally, social and economic impacts develop and change over time. Some impacts do not manifest themselves immediately and many are not resolved in the short term. This extended temporal dimension adds complexity to linking social and economic impacts to physical damage, which occurs within a very short time period.

Under natural disasters are understood destructive natural phenomena, a result which may arise or there is a threat to life and health of people, there is a disruption or destruction of property and elements of the natural disasters. In some cases, they are caused by man, as a result of industrial or other activities without ecological balance in nature. To natural disasters typically include: earthquakes, floods, mudslides, landslides, snow drifts, volcanoes, durability to the drought. Such disasters in some cases, may be classified as fires, especially the massive forest and peat.

Natural disasters can be found in different ways. Bewilderment, as for centuries people meet various disasters, or quietly with faith in our own strength. Sure, we take the challenge of disasters can only those who are armed with knowledge on how to act in any circumstances would only correct decision: save yourself, help others, how can prevent the destructive action of natural forces. Natural disasters which are the tragedy for all state, and, especially for those regions of the country where they arise are investigated. The correct behavior of the population at natural disasters relying on knowledge of bases of civil defense is a basis of decrease in human losses and material damage.

II. Methods

Social results of ecological damages.

In the social plan earthquake caused a lot of human losses and destructions. Besides of direct suffering many people lost their relatives and seriously injured. The tragedy continues its influence in the health of widows, orphans, alone and the olds. Another social damage was that losing their shares especially farmer economy, work and property people were bankrupted. Death of people, damage to dwellings, lost of dwelling s, industrial force, work places disturbed the stability of condition, financial loan system, markets and distributing channels of resources became insolvent.

Earthquake-specific phenomenon occurring in certain parts of the crust. They can occur both on land and under water. It's very important for someone to know when and where will be earthquakes. Modern science has information about where it can be a disaster of a force, but to accurately predict the day and hour is not yet. Earthquake precursors, as is already installed can appear number of indirect signs. In the period of the preceding the earthquake, for example, changes the parameters of physical and chemical composition of groundwater, which is recorded by special devices geophysical stations [1]. By the harbinger of possible earthquakes include the following symptoms that are especially need to know the population of seismically dangerous areas and it was this odor of gas in areas where before the air was clean and previously a similar phenomenon was reported, concerns the birds and animals, the outbreak in the form of scattered light of lightning, sparking closely spaced, but not touching electrical wires, a bluish glow the inner surface of the walls of houses, self-tan fluorescent tubes shortly before the tremors. All these symptoms may be the reason for alerting the public about a possible earthquake.

With advance warning about the threat of an earthquake, before leaving the apartment (house), you must turn off the heat and gas, if the stove was put out-it, you'll need to put children, elderly and dressed himself, to take the necessary things, a small supply of food, documents, and go outside. The street should be as fast as possible away from buildings and structures in the direction of areas, open spaces, strictly observing the established social order. If the earthquake began unexpectedly when get together and leave the apartment (house) was not possible should take place (up) in a door or window opening, only to die down as the first tremors of the earthquake, you should quickly get out.

III. Results

Health.

Earthquake caused a lot of death and suffering of people. People injured in serious moral, orthopedic, craniocerebral, abdominal and pectoral cavity, disabled physically and mentally.

People who rescued after earthquake lost their work ability for a long time. Health infrastructure was damaged seriously. Additional risk is that people had to use dirty water. For overcoming the situation is needed urgent medical care, and the hopeless people needed psychological support. To help to some of the regions still was very difficult. Gathering the people in one place and insanitary conditions in temporary dwellings were under the threat of cholera. Health authority already announced about skin disasters.

Education.

Primary and secondary, high education institutions was seriously damaged. Thousands of building damaged or fully destroyed. More than thousand student and schoolchildren, many professors lost their lives.

Dikes, water storehouses and irrigation systems.

As the result of earthquake, water supply and water channels infrastructure were seriously damaged. Small soil dikes and water storehouses were destroyed.

Water supply.

Water supply systems other places were damaged. Dikes for water supply, pump stations, pipelines of these regions were damaged, subsoil water sources filled with soil.

Electricity supply, transport and communication.

Although electricity lines were damaged it was possible to restore the electricity supply in natural calamity regions. The changing of dilapidated electricity equipment is not expected but the issue of modernization of electricity net in damaged regions was urgent problem. Damage to infrastructure systems produce economic losses. The studies shown that disruptions to these services produce facility repair costs, revenue loss to the service provider, direct economic loss to consumers and indirect economic loss. Moreover it is not possible to join new equipment to previous damaged parts. Road cover around villages and small towns were seriously damaged so to go to some dwellings it is possible only with helicopter. Telecommunication also was destroyed. Phone lines were damaged in the result of destruction of Automatic Phone Network. Damage to transportation systems produce significant repair costs, disrupt the movement of people and goods. Damaging of the transportation network have significant economic impacts, contribute to economic losses following an earthquake. Destructive causes of earthquake makes long-term disruption, taking years to fully restore.

Industry, agriculture and cattle-breeding.

Agriculture as the main industry was fully destroyed. Such losses also affected to domestic industry, market and factory. The loss of agriculture founds and small business shares made the local populations' life more incredible. Main losses were cattle-breeding and irrigation systems.

IV. Discussion

Solutions of ecological problem.

Serious problems of population replacing and building crumbs occur during restoration process. It requires immediate and correct decision for gathering building crumbs and additional transport. It is advisable to reuse concrete and stone pieces. The situation must always be under control. The decisions must aim to less damage to ecology. It is important to be attentive in abolishment of dangerous industry substances.

It is important to work out a plan for ecological issues and it is necessary to set up temporary camps for injured people. Other urgent measures include:

- a) to control the systems of water supply and dikes (till rain season)
- b) operative controls for reducing of ecological remaining risk from destroying or deterioration of industrial infrastructure
- c) technical assistance in restoration of ecological entities

For reducing ecological risk and carrying out a useful restoration process may be advised followings:

- A) overall estimation of ecological damages of earthquake.
- B) examination and analyzing of industrial risk about transportation, keeping and processing of dangerous things
- C) to maintain the infrastructure of environmental control
- D) to apply ecological clean technology
- E) acceptance of serious ecological normative by public and social bodies for restoration of industrial entities and ecological stability.

Restoration strategy.

The restoration strategy of damaged regions must be aimed to social sphere and maximum participation of public. Total damage seems small in global scale but earthquake caused enormous loss to local population. Providing with temporary settlements - urgent measure during winter. Moreover, restoration is necessary for operating of dwellings communal economy, water and energy systems, communications, municipal and ecology structure and local managements bodies. Measures on providing the most vulnerable groups of population with vital means are also necessary. Only on – time aid can be effective.

Restoration concept under local management body – must be basis of state program. Key to success lays on creating efficient mechanism of decentralization of management. Taking into consideration of opinion of population, costs and advantages they must decide where to restore the villages, on old or another places.

Connection with society, publicity and information supply – carrying out the plan of restoration of damaged regions is basis of success. Political initiative, financing and technical knowledge can not be effective in places where does not exists exchange of information. So including ecological issues for providing more effective mutual relations with organizations and support for restoration program government must carry out urgent strategy of communication with people.

An earthquake may last from several seconds to several hours (periodically repeated tremors). By applying the frequency of shocks and the time of their occurrence may be communicated by radio and other means available. It is their actions to conform with these messages.

Firstly, such work will be done by individuals, consisting in the formation of civil defense. But the rest of the population at the call local authorities and governments DPP should participate in urgent search and rescue and recovery operation workers in the areas of destruction [2]. In carrying out such works primarily extracted from the rubble of wrecked and burning buildings of people who have a first aid; suit in the rubble of air travel; localize and eliminate the accident on

engineering networks that threaten human life or prevent the carrying out rescue operations; precipitates or strengthen the construction of buildings and structures located in a dangerous condition; Tools collection points for the victims and medical centers, and organize water. The sequence and timing of works sets the head of civil defense object caught in the earthquake zone.

Great support from the population can be provided medical facilities and medical office of civil defense in maintaining normal health and living conditions in temporary settlements (Antiseismic buildings) affected by the earthquake population. We must help to prevent outbreaks in places such infectious diseases that are typically satellite disaster. In order to prevent the emergence and spread of epidemics should be strictly adhered to epidemic measures not shy away from vaccinations and taking drugs that prevent disease. We must carefully observe the rules of personal hygiene and ensure that they comply with all family members, need to be reminded about the neighbors, coworkers.

Rules of the population in the earthquake and actions to eliminate their effects.

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Rules of the population, with debris flows and landslides, and actions to mitigate their effects.

Mudslides, it flows from the mountains, a mixture of water, sand, clay, gravel, fragments of stones and even boulders. Landslides are the result of violations of the conditions of equilibrium slopes, often along rivers and reservoirs, the main cause of their occurrence is the saturation of groundwater argillaceous rocks to plastic and flowable state, resulting in and is slipping down the slope of huge masses of soil with all buildings and structures.

Of great importance to the conduct and actions of people in mudslides and landslides organization provides early detection and recording features of these natural disasters and the organization alert (warning) about the disaster.

In flood dangerous areas of possible signs of debris flows are excessive (heavy) precipitation (mud flows as a result of torrential rainfall are usually formed after a drought), rapid melting of snow, mountain lakes and reservoirs, in violation of the natural runoff of mountain rivers and streams Change channels and the formation of dykes.

In most cases, the population about the danger of debris flow can be prevented in just ten minutes or less for one to two hours or more. The approximation of such a flow can be heard by the characteristic sound of the peeling and colliding with each other boulders and fragments of stone, resembling thunder approaching at high speed train.

The most effective way to deal with a mudslide early implementation of a complex of organizational-economic, agricultural, agroforestry and waterside activities.

Population in flood dangerous areas must strictly comply with the recommendations of felling forests, farming, grazing by livestock. In mudflow in the way of its movement to settlements strengthening the dam, built embankments and temporary retaining walls, arranged mud traps, ditch, etc.

Landslides, like debris flows, often caused by heavy rains and soil erosion. Well thought-out human activity, which resulted in altered conditions for the stability of the soil (the destruction of forests even individual trees, mining and excavation Works where the geological structure of the earth, etc.).

Initial indications that landslide movements are the appearance of cracks on buildings, breaks on the roads, embankments buckling of the earth, the displacement of the base of various high-rise structures and trees at the bottom on the top.

Antilandslide events that must be involved people are challenged surface water arbor, the device supports various engineering structures, Thrush passage for drainage of soil landslide, unloading and planning landslide slope. In addition, people living in landslide areas should not allow the diversion of water from the taps, damaged water pipes and hydrants, shall promptly arrange drainage effluents in the cluster of surface water (with the formation of puddles).

With the threat of debris flow or landslide and availability of time the population was evacuated from dangerous areas to safe zones, evacuation is both on foot and with using transport. Mudslides and landslides are a serious danger in their sudden appearance. In this case, the most terrible panic. In the case of capture anyone want to stream mudflow affected by all available means. These funds may be poles or ropes, served saves. Show rescued from the stream to flow direction, with a gradual approach to its edge. When landslides may be heaping people ground, causing them to blows and injuries, falling objects, cave building structures trees. In these cases, it is necessary quickly to provide assistance to victims, if necessary, and to do artificial respiration. Consequences of landslide eliminate the formation of engineering services with the

participation of the population. After stopping the landslide formation of road and bridge building organizations begin to work to rebuild roads, bridges, power lines and communications, construction of drainage ditches, cleaning roads and streets of the drifts and debris.

Rules of the population during floods and actions to mitigate their effects.

Severe natural disasters are floods. The main causes of most floods are heavy rains, intense snowmelt and river flooding as a result of the tidal wave or the wind changes in the river mouth. Especially dangerous is flooding arising from landslides and avalanches of rock, a sudden eruption of dams or moraine lake waters, and they are usually accompanied by the transfer not only water, but almost all debris and loose material, and therefore often take disastrous. Actions carried out during floods because of the time of pre-emption floods, as well as the experience of observing the past years the manifestations of this element. The extent of flooding, for example, caused by the spring, summer or autumn floods, may be anticipated for a month or more, surges flooding - for several hours (up to days).

When the time of pre-emption flood efforts are being made for the erection of the waterworks on the rivers and in other places alleged flooding. To prepare and conduct the evacuation in advance of population and agricultural animals, the removal of property from areas of possible flooding. On the evacuation in case of floods, as a rule, was declared special order of the commission to combat flooding. The population of the evacuation order early and be notified by local radio broadcasting networks and local television, working in addition be notified through the administration of enterprises, institutions and educational institutions. Evacuation in the nearest towns, outside of flood zones. The resettlement of the population is carried out in public buildings or residential area inhabitants. At local enterprises and institutions under the threat of flooding changes the mode of operation and settings it where the work stops. Protecting some of the wealth is sometimes provided on the site, which are sealed sumps, entrances and window openings basements and ground floors buildings.

In the area of possible flooding temporarily quit school and preschool, children are transferred to schools and institutions that are in safe places. In the case of flash floods warning the population is made all the available technical means of notification, including through loud speaking mobile installations.

Sudden onset of flooding is the need for special behavior and actions of people. If people are living on the ground floor or other lower floors and on the street there is the rise of the water must leave the apartment, ascend to the upper floors, if the single-storey house- take the attic. Search for people in the flooded area is organized and implemented immediately, for it brought the crews of floating funds of civil defense units and all other available forces and means.

Rules of the population, with snow drifts and actions to mitigate their effects.

Winter manifestation of the elemental forces of nature are often expressed in snowdrifts as a result of snowfalls and blizzards. Snowfalls, the duration of which may be from 16 to 24 hours greatly affect the economic activity of the population, especially in rural areas [12]. The negative impact of this phenomenon is aggravated by storms (blizzards, snowstorm) in which the rapidly deteriorating visibility, suspended transport links, as well as long-distance.

With the announcement of curtain warning-warning of possible snow drifts - to restrict movement, especially in rural areas, to create a home needed supply of food, water and fuel. In some areas with the onset of winter on the streets, between houses, you must pull the ropes to help in severe snowstorm oriented to pedestrians and to overcome the strong wind.

Especially dangerous snow drifts are for people caught in the path, away from human habitation. When proceeding by road should not attempt to overcome the snow drifts, you must stop completely close the blinds machine shield the engine from the radiator. If it is possible to install a car engine in the windward side. From time to leave the car, shovel snow, to avoid being buried under it. In addition, not snowbound car - a good benchmark for the search team. Motor vehicle and must be warming up to avoid it "freezing".

When heating the car is important to prevent wicking into the cab (body, interior) of exhaust gases, to this end it is important to make sure that the exhaust pipe is not piled snow.

If the path together will be a few people (several cars) it is best to gather all together and use one car as cover, the engines other cars must be emptied. Do not leave the cover-car: in the heavy snow (blizzard) guidelines at first glance seems to be reliable, a few tens of meters may be lost.

In rural areas receiving storm warnings to procure the required quantity of fodder and water for animals kept on farms. Scot contained on remote pastures in a matter of urgency is distilled in the nearest shelter, pre-equipped in the terrain or fixed camps.

With the formation of icy magnitude of the disaster increases [8]. Hoar-frost education on the roads made it difficult, and the rugged terrain and completely stop the operation of road transport. Pedestrians find it difficult, and the collapse of various structures and objects under load become a real danger. In these circumstances it is necessary to avoid being in dilapidated buildings, under power lines and communications and near their poles, under the trees.

In mountain areas after heavy snowfall increases the risk of avalanches. About this risk population is advised various warning signals installed in the field of possible avalanches and possible avalanches. We should not disregard these warnings; we must strictly implement their recommendations.

To fight with snowdrifts and ice formation and involved civil defense services, as well as all able-bodied population of the area and, if necessary, and neighboring areas.

Snow work in the cities primarily conducted on the main roads, restored the work of life-sustaining water supply facilities. Snow is removed from the roadway to leeward. Widely used engineering technique that is at equipping units, as well as snow plow equipment installations. For the work involved all the available transport, handling equipment and people.

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