

Social and economic consequences of March 11, 2011 Tohoku disaster in Japan

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The last two years set a sad record in the number and scale of natural disasters and clearly demonstrated high vulnerability of the global economy to their impact. The most serious consequences have the so-called natural-technological disasters that have place when natural hazards trigger accidents and disasters at technological objects such as nuclear power plants, chemical plants or oil refineries and pipelines. Natural-technological disasters caused by earthquakes and devastating tsunamis have the most serious impact. One of the most large-scaled natural-technological disasters occurred on March 11, 2011 in Japan as a result of a massive 9.0-magnitude earthquake off the northeast coast of Honshu Island, that caused a more than 30-meter tsunami. A distinctive feature of such events is their synergistic nature with a disaster impact on the technosphere, resulting in simultaneous occurrences of numerous technospheric accidents. This disaster was yet another tragic confirmation of the vulnerability of modern techno-sphere and society, even such a highly developed one, as the Japanese, to the impact of natural hazards. The greatest number of fatalities and losses was caused in the Miyagi, Iwate, Fukushima, Chiba, and Ibaraki prefectures. The infrastructure in the north-east of the country is damaged to a considerable extent (more than 130 thousand houses have been completely or partially destroyed, another 265 thousand homes were seriously damaged, thousands of miles of communications, roads and railways, more than 70 bridges were destroyed). With a total damage between 400-700 billion USD in total losses and approximately 19000 deaths and almost 6000 injures, this disaster proved to be the most expensive and the most destructive on record (earthquake-report.com/2012). Of these, direct losses will reach between 294 billion USD and 374 billion USD. The earthquake and tsunami caused a number of technological accidents, including accidents at "Fukushima-1" and "Onagava" nuclear power plants, explosions and fires at refineries in Chiba, and at a petrochemical plant in Sendai, a number of other fires, railway, water, road, and other accidents. 148 lives have been lost in fires, 260 houses have been destroyed by fires.

The most serious consequence of the Tohoku event was a series of accidents at "Fukushima-1" nuclear power plant, which resulted in several leaks of radioactive substances into the atmosphere and the ocean. The accident was initially assigned to the 5-th, and later to the highest 7-th level of danger on 7-point International Nuclear Event Scale (INES). Right after the accident people (about 77 thousand) were evacuated from the 20-kilometer zone around the power plant, and the presence of people in the exclusion zone was prohibited. Later the evacuation area was extended to 60 kilometers.

About 41 percent of economic losses (including both direct and indirect losses) were caused by earthquake, about 36 percent by tsunami and about 23 percent due to the Fukushima disaster. The disaster had an impact on economic development not only in Japan but also in other countries. Many Japanese companies have suffered significant losses. The NPP Hamaoka situated in the Shizuoka Prefecture (200 km from Tokyo) with a predicted high probability of massive earthquake, was stopped. However, Japan, as well as Russia, does not intend to completely abandon nuclear power. Meanwhile some other countries declared a revision of their atomic energy programs. For example, the German government announced the decision to stop the operation of all the country's nuclear power plants by 2022.

Hopefully the lessons of the disaster will contribute to the increasing of safety of nuclear power plants and other high-risk facilities. One of the main lessons of this tragedy lies in the fact that while placing, constructing and operating such facilities, it is necessary to consider carefully the potential impacts, including natural hazards.

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