ILO tools and resources for labor health and safety in recovery and reconstruction following the 2011 Tohoku earthquake and tsunami

I. Causes of failure, and corrective measures, in efforts to recover from natural disasters

1. Introduction

In recovery efforts after natural disasters such as earthquakes and tsunami, in areas where roads have suffered great damage and the supplies of water, electricity, and other utilities are cut off, work is carried out amidst the scatter of fallen trees and other debris; because this kind of worksite differs in many ways from regular worksites, it is essential to pay increased attention to, and to take extra measures to protect the health and safety of, workers. Normally, it is especially necessary to keep the following points in mind.

(1) Establishing, in the period from the restoration of electricity, gas, water, and other lifelines to the reconstruction of buildings, a system of liaison and coordination to prevent industrial accidents caused by different types of work being carried out alongside each other at the same worksites.
(2) Instituting a Cash for Work policy (to both promote speedy recovery and to allow disaster victims to secure interim employment, this policy covers the temporary engagement of disaster victims and others in recovery work) and carrying out sufficient training and education in health and safety as required by the many unskilled workers, such as volunteers, who are engaged in recovery work.
(3) Preventing secondary disasters caused by landslides and building collapse caused by aftershocks and by tsunami, etc. In particular, the risk of landslide and building collapse should be thoroughly investigated before work is started.
(4) Thoroughly ensuring safety concerned with the use of heavy plant and machinery in recovery and reconstruction.
(5) Implementing measures to prevent dispersal of dust, asbestos, and chemicals during debris removal and similar work.
(6) Ensuring that measures are taken to prevent falls during overhead work, such as required for phone and communications lines, and to prevent boom lifts and similar vehicles from overturning.

The ILO has provided international labor standards (conventions and recommendations) to secure the health and safety of workers and, including practical guidelines, operational rules (usually taking into account the practical realities and characteristics of each of the industries involved) that cover various points to keep in mind to protect worker health and safety. Of these, the most relevant to work connected with recovery and reconstruction after earthquakes and other natural disasters is the *Convention Concerning Safety and Health in Construction* (No.

167) (unratified by Japan).

The general provisions of Section II of the convention (Articles 3 to 12) stipulate that representative organizations of employers and workers concerned will be consulted on the measures to be taken to give effect to the provisions of the Convention, that ratifying states undertake to, based on assessment of the safety and health hazards involved, effectively enact and implement legislation to apply the provisions, that at construction sites where two or more contractors undertake activities simultaneously (this point can be said to be the most salient characteristic of construction-related sites) there will be a structure of responsibility regarding safety and health, and that there will be a structure in which workers and employers will, each fulfilling their respective obligations, cooperate.

In Section III (Articles 13 to 34) principles, and actual protective and preventative measures, are set forth for each of the following: worksite safety; scaffolding, heavy lifting gear, transport (including earth-moving and materials handling), plant, machinery and hand tools, work in high places, excavation, below-ground work, and tunneling, cofferdams (structures comprising a wall surrounding a space in which work can be carried out in a dry environment, the enclosure being constructed in the water, out of which the water is expelled using a pump) and caissons (large concrete or metal boxes used, for example, as underwater structures such as breakwaters or when building underground structures), work in compressed air, structural frames and formwork, work over water, demolition, lighting, electricity, explosives, health hazards, fire precautions, personal protective equipment and protective clothing, first aid, welfare, information and training, and reporting of accidents and diseases. In addition, the associated *Recommendation Concerning Safety and Health in Construction* (No. 175), which was adopted at the same time as the Convention, more concretely elaborates the measures to be taken with respect to each of the items.

To ensure the effective enforcement of the Convention by nations that are party to it, Section 4 stipulates that all necessary measures be taken, including appropriate penalties and corrective measures and also requires appropriate inspection services to supervise the application of the provisions of the convention.

Full text, in Japanese, of the ILO *Convention Concerning Safety and Health in Construction* (No. 167):
http://www.ilo.org/public/japanese/region/asro/tokyo/standards/c167.htm

Full text, in Japanese, of the ILO *Recommendation Concerning Safety and Health in Construction* (No. 175):
http://www.ilo.org/public/japanese/region/asro/tokyo/standards/r175.htm

Other ILO documents dealing with occupational health and safety in the construction industry include *How to prevent accidents on small construction sites* (consisting completely of illustrations without any text whatsoever), and the *ILO Code of Practice — Safety and health in construction*, and the “Disaster, Natural and Technological” chapter in the *ILO Encyclopaedia of Occupational Health and Safety*. (Documents available in English at the URLs below.)

ILO/SECTOR *How to prevent accidents on small construction sites* (comprising only illustrations)
http://www.ilo.org/public/english/dialogue/sector/papers/construction/wp195.pdf

ILO Code of Practice — Safety and health in construction
http://www.ilo.org/safework_bookshelf/english?d&nd=857174150

ILO Encyclopaedia on Occupational Health and Safety chapter on "Disasters, Natural and Technological"
http://www.ilo.org/safework_bookshelf/english?d&nd=170000102&nh=0

Safety, Health and Welfare on Construction Sites – A Training Manual
http://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---safework/documents/instructionalmaterial/wcms_110237.pdf

WISCON - Work Improvement in Small Construction Sites: Action checklist
http://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/documents/publication/wcms_110354.pdf

Building Safety – A free, comprehensive, international digital training package in occupational safety and health for the construction industry
http://www.ilo.org/public/english/dialogue/sector/sectors/constr/index.htm

Besides the things mentioned in the Convention, another especially important concern in recovery and reconstruction after an earthquake is how to deal with asbestos and dust. This is covered in the next sections.

2. Asbestos

Because of its excellent chemical and physical properties, asbestos has been used in various applications, such as for thermal insulation in building materials and around boiler pipes, in vehicle braking systems, and as a sealing material in chemical plants. On the downside, however, it is also known that there is a long interval between exposure to asbestos and the onset of mesothelioma, cancer, and other serious illnesses. Consequently, in its program on safety and health at work, the prevention of damage by asbestos to the health of workers is one of the major issues being dealt with by the ILO.

In the recent earthquake, the tsunami spread a huge amount of debris; much of this came from destroyed buildings and, naturally, asbestos was used in some of these; so from the viewpoint of protecting workers engaged in the removal of debris, it is also vitally important to take measures against asbestos.

To increase knowledge and awareness of the pathological effects of asbestos, and to discuss measures to reduce the risk of asbestos exposure, in 1973, the ILO held a Meeting of Experts on the Safe Use of Asbestos and published the report of the Meeting as Volume 30 in the *Occupational Safety and Health Series*. Then, in 1983, the Code of Practice on Safety in the Use of Asbestos was formulated, followed by the adoption by the ILO General Conference in 1986 of *ILO Convention on Safety in the Use of Asbestos* (No. 162) and its associated Recommendation (No. 172). In 2005, Japan also ratified Convention No. 162.

To protect workers from exposure to asbestos, the Convention stipulates measures to be taken by governments and employers. Specifically, as well as promoting the replacement of products containing asbestos with alternative products, other measures include: in principle, prohibition of the spraying of asbestos; action to prevent dispersal of asbestos into the work environment of places where asbestos is used or handled; prohibition on taking home work clothing and personal protective equipment; conducting medical examinations of workers who have been exposed to asbestos; providing information and education to workers; and instituting appropriate measures when structures containing asbestos are demolished and when asbestos is stripped from buildings.

Full text, in Japanese, of the *ILO Asbestos Convention* (No. 162):
http://www.ilo.org/public/japanese/region/asro/tokyo/standards/c162.htm

Full text, in Japanese, of the *ILO Asbestos Recommendation* (No. 172):
http://www.ilo.org/public/japanese/region/asro/tokyo/standards/st_r172.htm

Looking at the global situation, since the adoption of the 1986 *ILO Asbestos Convention*, besides ratification of the Convention (currently, as of April 2011, by 33 countries) various other efforts have been made to provide stronger protection to workers who handle asbestos; some countries have completely banned the use of asbestos. In addition, the involvement of labor unions has been strengthened.

Only in very few countries do government agencies publish quantitative data (statistics and estimates) such as annual fatalities or national damage to health due to asbestos exposure. Among these, the U.K. Health and Safety Executive (HSE), which is strengthening the control of asbestos, reckons that deaths from mesothelioma and lung cancer caused by exposure to asbestos have climbed to more than 3,500 people a year, and that the annual number of fatalities is likely to continue rising into the 2010s. During the period from 2011 to 2015, annual deaths from mesothelioma are projected to peak at between 1,950 and 2,450. This is because large amounts of asbestos, reaching a peak in the late 1960s, were used as construction materials from the 1950s to the 1980s and, decades later, the onset of mesothelioma can be expected to become apparent in people who were exposed to this asbestos.

In September 1975, Japan prohibited the use of sprayed asbestos, and in 2004 generally prohibited the shipment of products containing more than 1% of asbestos, later revising the limit, in 2006, to more than 0.1%. Even so, as in the case of Britain, Japan can expect to see future effects on health of previous exposure to asbestos; problems are occurring both with the management of ongoing healthcare and the provision of appropriate compensation to victims. Moreover, even though the use of asbestos has been banned, when dismantling or repairing buildings, facilities, ships or other things in which asbestos was used, it is necessary to take adequate measures to protect against exposure to asbestos, and this also applies to tasks such as debris removal. In the current earthquake recovery and reconstruction, when buildings or other structures are demolished or renovated, to prevent exposure to asbestos when handling debris and rubble, the Japanese government has issued a directive: *Ensuring thorough measures, including the use of dust-filtering masks, to prevent exposure to asbestos fibers*.

Because the control of asbestos is an issue that extends beyond the borders of single nations, it is also important to be aware of the problems from a global perspective. For example, at the end of their service life, large ships are often sold to ship breakers in India, Bangladesh, and other developing countries where dismantling is performed without adequate regard for occupational health and safety; here, the management of asbestos and other chemical substances has become a major issue. Consequently, to ensure environmental protection and the proper health and safety of workers, it is especially desirable to create an international system for the breaking and disposal of ships.

ILO General Conference *Resolution concerning asbestos*, *2006*:
http://www.ilo.org/safework/normative/lang--en/WCMS_108556/index.htm

The ILO position on safety in the use of asbestos:
http://www.ilo.org/safework/lang--en/WCMS_144446/index.htm

3. Dust control

While the ILO has not prescribed a set of international labor standards limited only to dust control, dust is recognized as a major hazard to the health of workers and dust control is an important issue. Asbestos fibers are one of the most dangerous types of dust, and as well as complying with the previously mentioned stipulations in the ILO *Asbestos Convention*, to prevent exposure to asbestos, including asbestos dust, and to prevent asbestos from worksites contaminating the outside environment, competent authorities and employers are required to take appropriate measures to prevent the emission of asbestos dust.

In addition to taking measures against asbestos dust, it is also extremely important to control dust in general, which causes a disease called pneumoconiosis. From the fumes and dust generated during tasks such as work using minerals, metals, abrasives, raw carbon, and arc welding, while relatively large particles can cling to nasal and bronchial passages and be expelled in the form of phlegm, fine dust penetrates deep into the lungs where it is deposited in

the alveoli. If inhalation continues over the long-term, the lung walls stiffen due to fibrosis and breathing becomes difficult. This is pneumoconiosis. As defined by the Japan *Pneumoconiosis Act*, pneumoconiosis is a "disease mainly caused by dust inhalation, which leads to fibroproliferative changes in pulmonary tissues."

Since dust control was first specified long ago in the ILO *White Lead (Painting) Convention* (No. 13), which stipulated measures to be taken to prevent danger arising from dust caused by dry rubbing down and scraping), various conventions and recommendations have mentioned measures against dust. Even the *Convention Concerning Safety and Health in Construction* (No. 167), which, as previously mentioned, is most relevant to work connected with earthquake recovery and reconstruction, stipulates maintaining, in excavations, shafts, and tunnels, “an atmosphere fit for respiration and to limit any fumes, gases, vapours, dust or other impurities to levels which are not dangerous or injurious to health and are within limits laid down by national laws or regulations (Article 19).” While these provisions specify work carried out in excavations, shafts, and tunnels, Article 13 makes general provisions, stating “All appropriate precautions shall be taken to ensure that all workplaces are safe and without risk of injury to the safety and health of workers,” and it goes without saying that the same kinds of precautions also apply to work undertaken in disaster areas, where there are likely to be large amounts of dust. The associated Recommendation (No. 175), adopted at the same time as the Convention, stipulates “Working methods are employed which protect workers against the harmful effects of chemical, physical and biological agents (Article 9e).”

Full text, in Japanese, of the ILO *Convention Concerning Safety and Health in Construction* (No. 167):
http://www.ilo.org/public/japanese/region/asro/tokyo/standards/c167.htm

Full text, in Japanese, of the ILO *Recommendation Concerning Safety and Health in Construction* (No. 175):
http://www.ilo.org/public/japanese/region/asro/tokyo/standards/r175.htm

ILO Convention 148, *Working Environment (Air Pollution, Noise and Vibration)* (unratified by Japan), states that “air pollution covers all air contaminated by substances, whatever their physical state, which are harmful to health or otherwise dangerous”—thus dust that is harmful to health is included—and the Convention stipulates actions to be taken by governments, employers, and workers. Part III deals with preventative and protective measures (Articles 8 to 14), stating that, within limits established pursuant to Article 8, “the working environment shall be kept free from any hazard due to air pollution, noise or vibration” and if this is not possible, “the employer shall provide and maintain suitable personal protective equipment.” Especially in the current earthquake disaster area, for the workers engaged in tasks such as removing debris, remaining residents, and other people in the area, it is hard to suppress dust to the levels found in ordinary work sites, consequently the Japanese government has taken such measures as a free-of-charge, two-stage distribution of a total of 90,000 dust masks.

Code of Practice: Ambient factors in the workplace:
http://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---safework/documents/norma

tiveinstrument/wcms_107729.pdf

II. Radiation protection of workers

The ILO is an organization concerned with worker protection, and some of its activities involve promoting the health and safety of workers. Based on ILO Radiation Protection Convention (No. 115), adopted in 1960, and its associated Recommendation (No. 114), the ILO has been cooperating closely with international bodies such as the IAEA (International Atomic Energy Agency) and WHO (World Health Organization) to deal with radiation issues. This section contains information on ILO activities concerned with radiation protection of workers compiled by Mr. Shengli Niu, Senior Specialist on Occupational Health at the International Labour Office. (Translation supervised by Occupational Health Specialist Ms. Yuka Ujita of the same division.)

Since the incident at the Fukushima Daiichi Nuclear Plant, the SAFEWORK section of the ILO website has carried a special page to provide information: as well as ILO instruments Convention 115 and Recommendation 114, and operational regulations, related documents including *Arrangements for preparedness for a nuclear or radiological emergency: Safety guide*, *Criteria for use in preparedness and response for a nuclear or radiological emergency: General safety guide*, and *Preparedness and response for a nuclear or radiological emergency: Safety requirements* are available, along with links to the websites of other relevant organizations. In addition, the *Encyclopaedia of Occupational Health and Safety* published by the ILO, which provides comprehensive explanation of all the diverse topics connected with worker safety and health, can now be searched as a single database at the SAFEWORK website, including a detailed section on ionizing radiation with articles such as “Radiation Biology and Biological Effects,” “Radiation Safety,” and “Planning for and management of Radiation Disasters.” There is also a section on accidents and safety management in which nuclear power plant disasters are discussed. A Japanese translation of the book, *ILO Sangyou Anzen Hoken Ensaikuropedia* (4th Ed.), published by Roudou Chousakai, is available.

ILO Convention 174 (unratified by Japan) deals with the prevention of major industrial disasters. This has provisions for preventing and minimizing the effects of large accidents involving hazardous substances and, excluding (1) nuclear installations and plants processing radioactive substances, (2) military installations, and (3) transport outside the site of an installation other than by pipeline, applies to major hazard installations (facilities that produce, process, handle, use, dispose of or store hazardous substances in quantities exceeding the threshold quantity). Countries that are party to the convention are obliged to formulate, implement, and periodically review a coherent national policy concerning the protection of workers, the public and the environment against the risk of major accidents, and to establish a system to identify major hazard installations. In addition, at each major hazard installation, employers are required to notify the competent authority of any major hazard installation that they have identified and establish and maintain a documented system of major hazard control, prepare safety reports, and report accidents; other provisions include the rights and duties of workers and their representatives, the responsibility of exporting states, off-site emergency

preparedness, siting of major hazard installations, and inspection. An associated ILO recommendation (No. 181) supplements the Convention.

Full text, in Japanese, of ILO *Prevention of Major Industrial Disasters Convention* (No. 174):
http://www.ilo.org/public/japanese/region/asro/tokyo/standards/st_c174.htm

Full text, in Japanese, of ILO *Prevention of Major Industrial Disasters Recommendation* (No. 181):
http://www.ilo.org/public/japanese/region/asro/tokyo/standards/st_r181.htm

Please see the following URL of Safe Work Information Note Series No.1 “Radiation Protection of Workers”, which shows the same text of this part.

http://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---safework/documents/publication/wcms_154238.pdf