

Country Name	Project on Scientific and Technological Capacity Building for Work Safety in China
People's Republic of China	

I. Project Outline

Background	<p>In China, the progress of industrialization and urbanization due to economic development accompanied an increasing occurrence of accidents. In particular, the number of deaths resulting from accidents at mining and manufacturing companies was at a high level such as 16,000 in 2004. Regarding work-related illness, it was said that more than 25 million workers were working at places exposed to dust, hazardous substance, noise, etc., and the accumulated number of patients with pneumoconiosis amounted to nearly 600,000 persons by the end of 2002. The Chinese Government upheld objectives such as technological development, strengthening of corporate work safety and improvement of safe production level, and in 2001 it established the State Administration of Work Safety (SAWS). Also, the China Academy of Safety Science and Technology (CASST), which had belonged to the China International Economic and Trade Arbitration Commission, was incorporated under SAWS as a subordinate body in charge of research, and laws and regulations related to the Work Safety Law (in force since 2002) were developed. Nevertheless, occurrence of accidents continued at a high level and was not effectively controlled since (1) the system of control and supervision by the authorities was not sufficient, (2) the work safety administration itself was weak or insufficient as it was in transition and under development, and (3) companies were conscious of production but not so of engagement in work safety, and therefore personnel in charge of work safety were not secured or developed.</p>												
Objectives of the Project	<ol style="list-style-type: none"> Overall Goal: Through expansion of the results of the project, science and technology capacity on work safety is enhanced and work safety is further improved in China. Project Purpose: 1) The followings are realized through reinforcement of CASST's science and technology capacity on work safety: <ul style="list-style-type: none"> Research results are effectively utilized in development of laws and regulations in the three priority areas (hazardous materials, mechanical danger and occupational health). Measurement of working environment and mask testing are conducted. Corporate in-house training is promoted and instructors of such training is developed. 2) Improvement of work safety is promoted in Benxi City and Ningbo City, the two model cities. 												
Activities of the project	<ol style="list-style-type: none"> Project site: Beijing Municipality and the two model cities (Benxi City of Liaoning Province and Ningbo City of Zhejiang Province). Main activities: Study groups, development of reports including policy recommendations, seminars, Zero Disaster campaign at model companies, guidance on setting-up and operation of the mask testing laboratory, technical transfer on measurement of working environment, development of curriculum and instructors for corporate in-service training, etc. <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Japanese Side</td> <td style="width: 50%;">Chinese Side</td> </tr> <tr> <td>1) Experts: 33 persons</td> <td>1. Staff allocated: 74 persons</td> </tr> <tr> <td>2) Trainees received: 68 persons</td> <td>2. Land and facilities: Office for experts, mask testing laboratory. etc.</td> </tr> <tr> <td>3) Equipment: Vehicles, equipment for working environment measurement and mask testing, etc.</td> <td>3. Local cost: 9 million yuan</td> </tr> </table> 					Japanese Side	Chinese Side	1) Experts: 33 persons	1. Staff allocated: 74 persons	2) Trainees received: 68 persons	2. Land and facilities: Office for experts, mask testing laboratory. etc.	3) Equipment: Vehicles, equipment for working environment measurement and mask testing, etc.	3. Local cost: 9 million yuan
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Ex-Ante Evaluation	2006	Project Period	October 2006 to October 2010	Project Cost	529 million yen								
Implementing Agency	State Administration of Work Safety (SAWS)												
Cooperation Agency in Japan	Ministry of Welfare and Labor Establishment and Japan Industrial Safety and Health Association												

II. Result of the Evaluation¹

1 Relevance

This project has been highly consistent with China's (1) development policy "improvement of safe production level" as set in the 10th and 11th 5-year Plans for National Economic and Social Development (2001-2005 and 2006-2010, respectively) and the 11th 5-year Plan for Work Safety (2006-2010), and (2) development needs "improvement of science and technology capacity on work safety", "development of a model of work safety administration for companies", "development of human resources in charge of work safety in the administration and corporate sides", and in particular "early resolution of those issues in heavy industry bases in the northeastern region (e.g. Benxi City) and in advanced industry bases in the coastal urban region due to introduction of the market economy (e.g. Liaoning City), at the time of both ex-ante and project completion. It is also consistent with Japan's ODA policy as set in the Country Assistance Policy for China (2001) and the JICA Country Program (2002) at the time of ex-ante evaluation. Therefore, relevance of this project is high.

¹ In this ex-post evaluation, evaluation judgment was made based on analysis of information collected from written questionnaires and interviews with concerned organizations by telephone or email. Observation at the project sites was not conducted.

2 Effectiveness/Impact



Kick-off ceremony of Zero Disaster campaign at a petroleum company in Guangdong Province (2013)

This project aimed at, as Project Purpose 1, capacity enhancement of CASST as a central research institution (in research and recommendations, protective equipment testing and development of instructors of corporate in-service training), and as Project Purpose 2, development of a work safety model involved by local administrations of work safety (AWS) and companies (for prevention of occupational accidents through activities such as Zero Disaster campaign). As the overall goal, it was aimed to decrease occupational accidents across the country by continuation of activities of CASST and dissemination of the model.



A CASST staff member testing a mask using the provided mask testing equipment (2014)

It can be said that the both project purposes were achieved by the time of project completion. For Project Purpose 1, research reports developed under this project were referred to for revision or legislation of laws and regulations related to the three priority areas (hazardous materials, mechanical danger and occupational health). Also, recommendations made in the studies were adopted in such draft revisions or legislation. Testing of protective equipment focused on mask testing, which began at the laboratory set up in CASST. Measurement of working environment was also established as a duty of CASST. Further, curriculum of CASST's trainers' training for corporate in-service training on work safety was developed, and trainers were developed. As for Project Purpose 2, a Zero Disaster corporation association was established in each model city of Benxi and Ningbo with supervision and guidance of the city AWS. Member companies of the associations began work safety measures such as Zero Disaster campaign and joint patrols, which promoted prevention of accidents at workplaces.

After project completion, the above-mentioned effects have continued. Regarding Project Purpose 1, according to CASST, the research reports developed under the project are still utilized by relevant organizations as reference documents when they are engaged in revision of related laws and in addressing new challenges. Research on the three priority areas is continuing, too. Mask testing by CASST in terms of the number of times of the mask testing laboratory increased every year, and at the time of ex-post evaluation, the laboratory is used almost every day. The equipment for simple measurement of work environment is used as well in CASST's regular activities². Besides, approx. 500 instructors for corporate in-service training were developed through trainers' training conducted four times after project completion. As for Project Purpose 2, the Zero Disaster corporation associations are continuing in both Benxi and Ningbo, and the one in Ningbo has around 10,000 members. AWS of both cities are committed to pursuing Zero Disaster by conducting work environment measurement and promoting the activities of the Zero Disaster corporation associations. It is reported that the number of accidents decreased after the launch of the Zero Disaster campaign in individual companies. At model companies in Benxi in particular, serious injury or heavier accidents have never occurred and minor injury accidents significantly decreased since they started the Zero Disaster campaign.

As to Overall Goal (improvement of work safety through dissemination of the project results), the laws and regulations addressing the three priority issues are enforced. Also, according to CASST, it is making use of its skills of mask testing to cooperate with SAWS and the LA Mark Center of Personal Protective Equipment³ in supervision and regulation of production and use of masks, thereby contributing to improvement of the quality of masks and broadening of use of them in the entire country⁴. Further, CASST promoted Zero Disaster campaign in other cities of China: according to CASST, occupational accidents show a decreasing trend in those cities. In this way, it can be said that the project results were disseminated to areas other than the model cities. However, data on the number of occurrence of occupational accidents were not available except the ones in the two model cities, where a decreasing trend was observed.

Therefore, effectiveness/ impact of the project is fair.

Achievement of project purpose and overall goal

Aim	Indicators	Results
(Project Purpose 1) The followings are realized through reinforcement of CASST's science and technology capacity on work safety: • Research results are	1. Number of cases where research results were used in development of laws and regulations related to the priority areas ⁵	(Project Completion) Achieved. The contents of the research outputs (14 reports) developed under this project were utilized in policy planning and proposal of regulatory standards by SAWS, and recommendations were adopted in the Regulation on the Safety Management of Hazardous Chemicals among others. (Ex-post Evaluation) Continued. After project completion, CASST continued research on the three priority issues. Also, the research outputs continue to be referred in revision of the Work Safety Law and in other cases.

² Work environment measurement is an activity of specialized agencies called occupational health service agencies. Such agencies must be qualified by SAWS or local AWS, and CASST is one of them. Besides to CASST, this project provided handy measurement instruments and carried out technical transfer on use of such instruments to Benxi AWS and Ningbo AWS that were supervisory authorities so that they could accurately and rapidly grasp the situation of the sites under their patrol. At the time of ex-post evaluation, it was confirmed that both AWS were making use of the provided instruments for grasping the work environment.

³ An agency under SAWS. It issues safety certificates (LA Mark) for production and sales of personal protective equipment such as protective masks and helmets that are used at work sites.

⁴ A case was reported that mask testing detected problems of a product, and instructions were made for improvement of the manufacturing process of that product.

⁵ Although the indicator set in the planning stage was "the number of cases", it was considered difficult to precisely count the number of cases where research results were not finally adopted in draft bills but were useful in the drafting process. Therefore, this ex-post evaluation followed the way the terminal evaluation took: this indicator could be judged as "achieved" if there are more than two cases of "use" of research results under this project.

effectively utilized in development of laws and regulations in the three priority areas (hazardous materials, mechanical danger and occupational health). • Measurement of working environment and mask testing are conducted. • Corporate in-house training is promoted and instructors of such training is developed.	2. Number of cases of work environment measurement and mask testing (more than twice)	(Project Completion) Achieved (see the table below). (Ex-post Evaluation) Continued.																				
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3. Number of instructors developed	(Project Completion) Achieved. 160 instructors for corporate in-house training were developed. (Ex-post Evaluation) Continued. Trainers' training for corporate in-house training was held four times after project completion. They were held in Hebei Province, Shanxi Province and Beijing Municipality, and a total of 523 persons attended.																					
(Project Purpose 2) Improvement of work safety is promoted in Benxi City and Ningbo City, the two model areas.	4. Decrease in risk at workplaces of member companies of the Zero Disaster corporation associations in the model areas	(Project Completion) Achieved. Benxi: Zero Disaster campaign begun at 42 member companies of the Zero Disaster corporation association and in neighboring two areas, where not only personal accidents but also facility accidents by human error were prevented after that. Ningbo: the Zero Disaster campaign that had begun at some section of a large state-owned enterprise spread within the company. Since the campaign was started, serious injury was reduced to zero, and minor injury halved. (Ex-post Evaluation) Continued. The work safety collaboration team (a corporate association aiming at work safety, to which the Zero Disaster corporation association was merged) in each model city has the following numbers of members: 35 persons from 28 companies in Benxi and approx. 10,000 persons in Ningbo. The model companies in Benxi maintained the zero accidents with serious injury or heavier damage and further reduced minor injury accidents.																				
(Overall goal) Through expansion of the results of the project, science and technology capacity on work safety is enhanced and work safety is further improved in China.	1. Number of occurrence of and deaths from serious occupational accidents	(Ex-post Evaluation) The degree of achievement could not be verified. The nationwide data and data of the areas where the activities in the model cities spread were not available. The figures from Benxi and Ningbo show slightly-decreasing trends ⁶ . Number of occurrence of / number of deaths from serious occupational accidents in the industrial, mining and commercial sectors																				
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2. Companies' voluntary actions such as campaign and corporate association activities for Zero Disaster are spread.	(Ex-post Evaluation) Achieved. Zero Disaster campaign was carried out in Pingdingshan City (Henan Province), Guangzhou City (Guangdong Province), Tianjin Municipality and Liuzhou City (Guangxi Zhuang Autonomous Region).																					

Sources: Documents provided by JICA, CASST, Benxi AWS and Ningbo AWS.

3 Efficiency

While the project period was as planned, the project cost was higher than the plan (ratio against the plan: 136%) as the number of long-term and short-term experts were increased to cover necessary specialized areas. Therefore, efficiency of the project is fair.

4 Sustainability

In the policy aspect, this project is still given importance in the development policy as the bill to revise the Work Safety Law of the People's Republic of China (draft) being discussed at the National People's Congress at the time of ex-post evaluation stipulates that business operators must provide workers with work safety education and training. Also, the Guiding Principles on Strengthening Work Safety Training for Supervisors of Enterprises (Notice of the State Council, 2010) and the Notice of the State Council, No.40 (2011) call for implementation of work safety training for all supervisors and workers for the aim of enhancing safety consciousness and skills and promoting sustainable improvement of work safety conditions across the country. In the institutional aspect, the organizational framework of the implementing agency is established: since project completion, there have been no major changes in the framework for work safety, i.e., (i) SAWS assumes administrative control over work safety and occupational health as a central government agency directly subordinate to the State Council, (ii) CASST supports SAWS in research aspect, and (iii) each local AWS is responsible for supervision administration under the guidance of SAWS. Also, allocation of personnel to each organization is sufficient. At CASST, instructors for Zero Disaster campaign are secured, and trainers' training for instructors for corporate in-house training is being conducted with no major problem. In the technical aspect, counterpart personnel of SAWS, CASST and Benxi AWS at the time of project period are continuously in charge of work safety at the time of ex-post evaluation. Although counterpart personnel of Ningbo City at the time of project period were transferred, work-safety related tasks were handed over to the successors. According to CASST, it conducts research and in-house technical training. Operation manuals were developed for mask testing equipment and other laboratory

⁶ The population is around 1,700,000 in Benxi City and around 7,600,000 in Ningbo City.

equipment. New employees are trained, too.

As for the financial aspect, while some budget data was not available since the amount was classified as internal information, CASST and Benxi AWS answered that sufficient budget for maintaining and disseminating the project results, which could be confirmed by the following points (no financial information was available from Ningbo AWS): first, SAWS conducted a national preliminary study for development of the above-mentioned Notice of the State Council (2010) and developed the guidelines using its own budget. Second, CASST conducts calibration and maintenance of the laboratory facilities and equipment as well as trainers' training for corporate in-house training (upon request from companies). Third, the budget of Benxi AWS for supervision administration on work safety increased from 3,480,000 yuan in 2011 to 7,990,000 yuan in 2013. Also, around 2-3 million yuan is expensed every year for testing and measurement and for joint patrols.

From these findings, it is considered that the project has no problem in the policy background as well as the institutional, technical and financial aspects of the implementing agency; therefore, sustainability of the project effects is high.

5 Summary of the Evaluation

For the project purposes of (1) capacity development of CASST and (2) development of a model of work safety involved by local AWS and companies, this project achieved (1) development of research reports and use of them for development of related laws and regulations, establishment of testing protective equipment (i.e. masks) and development of instructors for corporate in-house training, and (2) prevention of occupational accidents in the model cities of Benxi and Ningbo through actions by city AWS and companies such as Zero Disaster campaign. For the overall goal, it was confirmed that CASST continued such activities and the achievements in the model cities were spread to other cities. However, in terms of contribution to reduction of occupational accidents across the country, i.e., performance of the designated indicator, CASST suggested a decreasing trend in the above-mentioned cities, but that was not confirmed from statistical information. As for sustainability, no problem was observed in the policy background of this project as well as the institutional set-up and technical aspect for continuation of CASST's activities and dissemination of the project results. In the financial aspect as well, necessary budget is expensed according to the implementing agency.

In the light of above, this project is evaluated to be satisfactory.

III. Recommendations & Lessons Learned

Recommendations for Implementing agency:

While the relationship between SAWS and local AWS is established as mentioned above, it is desirable that SAWS continuously grasp situations of the model areas by means such as taking an opportunity of guidance to those areas, so that it could reflect the effects confirmed there in providing guidance to other areas.