

Electronic Control for Teachers



Project Sites Celaya

1. Background of Project

Since automation of industries was considered a significant issue in Mexico, the demand for re-education and training of teachers who were engaged in vocational training in the field of electronic control had been increasing. According to this background, the Mexico-Japan Technology Education Center (CETMEJA) was opened with the support of Japanese Project-type Technical Cooperation for five years (1982-1987). And thus, a system for securing the continuous development and supply of middle-level engineers was established. Since its opening, as a vocational training school in the field of electronic control, CETMEJA had sent out about 100 graduates annually mainly to the industrial circles of Central Mexico. CETMEJA also became an organization providing training and technical guidance to local industries.

Under these circumstances, the Government of Mexico requested Japan to assist the implementation of a Third-country Training Program aiming to disseminate accumulated experience and technologies to other Latin American and Caribbean countries.

2. Project Overview

(1) Period of Cooperation

FY1996-FY2000

(2) Type of Cooperation

Third-country Training Program

(3) Partner Country's Implementing Organizations

Dirección General de Educación Tecnológica Industrial (DGETI)
Mexico-Japan Technology Education Center (CETMEJA)

(4) Narrative Summary

1) Overall Goal

The capability of vocational training organizations in the field of electronic control in Latin American and Caribbean countries including Mexico is

improved.

2) Project Purpose

Trainees of the training program improve their vocational training capabilities in the field of electronic control.

3) Outputs

- Trainees acquire knowledge, skills and teaching methods of control circuits for basic electronic devices.
- Trainees acquire knowledge, skills and teaching methods of digital circuits for motor control and pneumatic system control.
- Trainees acquire knowledge of applications of support software for designing electronic control circuits.
- Trainees acquire knowledge, skills and teaching methods of applications of process control devices such as a programmable logic controllers (PLCs).
- Trainees acquire knowledge, skills and teaching methods of peripheral equipment control using personal computers.

4) Inputs

Japanese Side

Short-term experts	5
Training equipment	9 million yen
Training expenses	38 million yen

Mexican Side

Instructors and management staff	30
Training facilities and training equipment	
Training expenses	11 million yen

(5) Participant Countries

Belize, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, Dominican Republic, Venezuela

3. Members of Evaluation Team

JICA Mexico Office
(Commissioned to Y.I.T. Asociados, S.C.)

4. Period of Evaluation

15 October 1999-15 March 2000

5. Results of Evaluation

(1) Efficiency

Training equipment was supplied on time and well utilized. Particularly, the equipment brought by short-term experts, which was indispensable to construct circuits and to program, played an important role in the training. Since the training courses were conducted in Spanish with Spanish textbooks, trainees could better grasp electronic control technologies and were highly motivated to learn in their native language. Therefore, the training program was evaluated as highly efficient.

(2) Effectiveness

A total of 52 people from 11 countries participated in the training courses during a period of four years until FY1999. According to the course reports, most of the trainees mastered skills and knowledge on five subjects, such as digital control of basic electronic devices and motors. All trainees earned high average marks, over 80 percent in achievement examinations conducted by CETMEJA three times per training course. In addition, according to the results of the questionnaires, all 25 trainees who answered the questionnaires were engaged in teaching electronic engineering at home. From these, the effectiveness of this training program was evaluated to be high.

(3) Impact

Trainees from 8 out of 11 countries answered that even though they want to utilize the skills and knowledge learned in the training courses in their countries, they could not because the necessary equipment was unavailable. Still, the industry need for electronic control specialists was increasing throughout the world. There were some cases of trainees whose organizations improved their equipment by their own efforts. Also, the content of training courses were modified to better meet needs based on the suggestions and proposals of trainees.

(4) Relevance

In the industrial sector in Latin America and the Caribbean, there was a high demand for human resources with the ability to construct, operate and maintain electronic control systems. The number of applicants to this training program was always more than three times as many as the capacity, and it continued to increase. The relevance of this training program was, therefore, judged to be high.

(5) Sustainability

DGETI acknowledged the significance of this training program, and CETMEJA's implementing system was well established. However, it was difficult for them to cover the necessary expenses of the training courses. From this



Exercise in designing electronic control circuits.

uncertainty, the sustainability was not evaluated as high.

6. Lessons Learned and Recommendations

(1) Lessons Learned

In order to enhance the Sustainability of a Third-country Training Program, it must be examined from the planning stages whether it is possible to have a system which lets the implementing country and/or the participating countries bear expenses relevant to trainees such as air fares and accommodation, which have been borne by the Japanese side. Or, it may be possible to invite trainees within the framework of the South-south Cooperation conducted by the Mexican government.

(2) Recommendations

While there were requests from the trainees to introduce mechatronics into the training as a new theme, it was considered difficult for CETMEJA to accommodate them soon in terms of human resources and facilities. On the other hand, having heard requests from the participating countries to continue the training program, DGETI and CETMEJA desired to continue this Third-country Training Program in one way or another.

It was recommended, therefore, to extend the program to the second phase by linking it to the Third-country Training Program (FY2000-FY2004) conducted in the National Actualization Center for Teachers (Centro Nacional de Actualización Docentes: CNAD) in which the government of Japan implemented a Project-type Technical Cooperation program.

7. Follow-up Situation

Based on the above recommendation, and taking into account the high demand for the training program and CETMEJA's positive stance, the Third-country Training Program "Advanced Electronics Control" is being conducted from FY2001 to FY2003.

The Third-country Training Program "Mechatronics" is also being conducted in CNAD from FY2000 to FY2004.

Shipping and Port Management



Project Sites Veracruz

1. Background of Project

Since 1986, JICA had dispatched experts to Mexican Seamen's Education Fund (FIDENA), Merchant Marine Academy of Veracruz, and transferred technology concerning shipping and port management on a continual basis. Also from 1990 to 1995, JICA accepted nine participants from the Academy to group training courses in Japan. JICA has thus supported development of specialists who play leading roles in shipping and port management in Mexico.

Against this background, the Government of Mexico requested Japan to implement a Third-country Training Program, intending to make the Merchant Marine Academy of Veracruz the stronghold of education and research of shipping and port management in Latin America and the Caribbean.

2. Project Overview

(1) Period of Cooperation

FY1996-FY2000

(2) Type of Cooperation

Third-country Training Program

(3) Partner Country's Implementing Organizations

Mexican Seamen's Education Fund (FIDENA)
Merchant Marine Academy of Veracruz

(4) Narrative Summary

- 1) Overall Goal
The capabilities of organizations engaged in shipping and port management are improved in Latin American and the Caribbean countries, including Mexico.
- 2) Project Purpose
Shipping and port management capabilities of the training participants are improved.
- 3) Outputs
 - a) Trainees acquire knowledge of shipping

management and fleet planning.

- b) Trainees acquire knowledge of shipowner's liability and marine insurance (including for oil pollution) on the carriage of oil and other cargo.
- c) Trainees acquire knowledge of the many types of contracts regarding carriage by sea.
- d) Trainees acquire knowledge of port organizations and their management.

4) Inputs

Japanese Side

Short-term experts	4
Training equipment	1 million yen
Training expenses	43 million yen

Mexican Side

Instructors	68
Operations staff	15
Training facilities and training equipment	
Training expenses	13 million yen

(5) Participant Countries

Argentina, Bolivia, Costa Rica, Cuba, Chile, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Nicaragua, Panama, Peru, Uruguay, Venezuela

3. Members of Evaluation Team

JICA Mexico Office
(Commissioned to Y.I.T. Asociados, S.C.)

4. Period of Evaluation

15 October 1999-15 March 2000

5. Results of Evaluation

(1) Efficiency

The previous contribution of the long-term expert dispatched to the Merchant Marine Academy of Veracruz in 1989, was extremely large and vital in this training

program. At the beginning of the program, about 70 percent of lecturers were counterparts who had been trained by the expert (the number of visiting lecturers gradually increased later), and the sixteen volumes of textbooks made by the expert and his counterparts were adopted in the training and highly useful. With the exception of the personal computers provided by Japan at the beginning of the program, the Mexican side prepared the rest of the training equipment, and the timing of its preparation was adequate.

(2) Effectiveness

During the cooperation period of five years from 1996, 97 people participated in the training courses. Judging from the achievement of the trainees in the examinations, the information was transferred effectively as average marks were always above 80 percent. In addition, 46 of the 48 trainees who responded to the questionnaires or interviews in this evaluation survey answered that their present job was related to the training program, and the knowledge they learned in the courses was of good use. Considering these factors, the effectiveness of the program was evaluated to be high.

(3) Impact

The majority of trainees (38/48) who answered the questionnaires or interviews made efforts to disseminate the knowledge gained by presenting it in seminars, lectures, or in publications, or by making textbooks modifying the contents to suit the situation of their country. Furthermore, based on the Japanese expert's activities which extended over a long period of time and the outcomes of this training program, a master course in management of shipping and port enterprises was opened in the Merchant Marine Academy of Veracruz in 1999. Further, in the Panama Institute of Technology, to which one of the trainees belonged, the port and shipping operations course was promoted from the junior college level to the college level on the advice of the above mentioned Japanese expert. Multi-modal policy¹⁾ had been brought into practice by trainees from Bolivia. Overall, several educational and administrative impacts can be observed as stated above.

(4) Relevance

Carried forward by the waves of globalization, Latin American and Caribbean countries were aiming towards export-oriented economic development. As a key sector in this movement, the shipping and port sector was in the process of modernization. Since both carrier nations and non-carrier nations were pushing ahead with the privatization of port operations, human resources development for the post-privatization system was an urgent necessity. Under these circumstances, the high need for this training program was indicated by the number of applicants, which had been double the capacity



Training course

every year. The relevance of this program at the time of the evaluation was therefore assessed to be high.

(5) Sustainability

The training implementation capabilities of the Merchant Marine Academy of Veracruz, were judged to be sufficient as demonstrated by the opening of the new master course on shipping and port management. However, there was uncertainty regarding financial sustainability, since it was considered difficult for FIDENA to continue implementing this training program using its own funds.

6. Lessons Learned and Recommendations

(1) Lessons Learned

The prospect of the Sustainability of a Third-country Training Program must be assessed at the planning stage. Generally in Mexico, it is difficult for the government to allocate funds to cover the travel and accommodation expenses of trainees; therefore, the expectation in this regard must be low. As a countermeasure to this constraint, it was suggested to implement a Third-country Training Program within the framework of the South-south Cooperation conducted by the Mexican government, or to combine the program with fee-charging training programs.

(2) Recommendations

The governmental port services were in the process of privatization under the export-oriented economic development policy. With the technology transferred by the 10-year guidance of the Japanese Individual Expert, it was then possible for the Mexican side alone to implement training programs as far as technical aspects are concerned. These factors must be considered when the second phase of this training program is requested.

¹⁾ A method to achieve a convenient and smooth total urban transportation system by the systematic combination of several means of transportation such as air traffic, marine, water carriage and railways.

The National Center for Environmental Research and Training (Phase II)



Project Sites Mexico City

1. Background of Project

In the United Mexican States, environmental pollution is becoming a serious national issue. Hazardous waste and air pollution due to the population density in urban areas, particularly Mexico City, has reached a dangerous level. The lack of human resources in the field of environmental protection is a related issue. Considering these circumstances, the Mexican Government sought to establish the National Center for Environmental Research and Training (CENICA) to conduct research and training relevant to environmental protection, and requested Project-type Technical Cooperation from the Japanese Government. Responding to the request, the Japanese Government carried out Phase I of the project for two years during which the organization system of CENICA was established and the basic technologies to deal with air pollution, hazardous waste and industrial pollution were transferred. Phase II of the cooperation started in July 1997 and continued for three years. It aimed at strengthening the structure and activities of CENICA, which were established in the first phase.

2. Project Overview

(1) Period of Cooperation

1 July 1997-30 June 2000

(2) Type of Cooperation

Project-type Technical Cooperation

(3) Partner Country's Implementing Organization

National Institute of Ecology (INE)

(4) Narrative Summary

- 1) Overall Goal
Environmental protection in the United Mexican States is improved.
- 2) Project Purpose
The structure and activities, in particular those addressing air pollution and hazardous waste, of the National Center for Environmental Research and Training (CENICA) are strengthened.
- 3) Outputs

- a) Management of CENICA is improved
- b) Facilities and equipment necessary for environmental research and training are effectively used by counterpart personnel.
- c) Technical information related to the establishment of environmental protection standards is provided to relevant Mexican authorities.
- d) Knowledge and techniques of federal government officials, local authorities and industry personnel on environmental protection are improved.
- e) The role of CENICA in data collection and publications related to environmental matters (particularly in the field of air pollution and hazardous waste) is improved.

4) Inputs

Japanese Side

Long-term experts	7
Short-term experts	11
Trainees received	12
Equipment	464 million yen

Mexican Side

Counterparts	31
Land and facilities	
Local cost	approx. 360 million yen

3. Members of Evaluation Team

Team Leader:

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Air Pollution:

Shinji WAKAMATSU, Investigator, Urban Air Quality Research Team, PM2.5&DEP Research Project, National Institute for Environmental Studies

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Evaluation Analysis:
Koichi HYOGO, PADECO Co., Ltd.

4. Period of Evaluation

11 January 2000-21 January 2000

5. Results of Evaluation

(1) Efficiency

In general, inputs from both the Mexican and Japanese sides were carried out efficiently for achieving target outcomes. The counterpart training and provision of necessary facilities matched the Mexican needs and contributed to strengthening the personnel and physical resources of CENICA. However, technology transfer was disrupted by the delayed establishment of facilities, particularly the power distribution system, on the Mexican side and late dispatch of the long-term experts in hazardous waste due to the absence of appropriate personnel.

(2) Effectiveness

The basic structure, management capability, and technologies of CENICA were established during the first phase. Building on this foundation, in Phase II, technologies to establish and operate the monitoring station and the experimental facilities in the field of air pollution were transferred. CENICA has been involved in formulating and revising more than eight national environmental standards, including the official standard for automobile exhaust fumes. Therefore, the project purpose of strengthening the basic structure and activities of CENICA was deemed to be achieved. However, some problems remain such as the delay in the Dispatch of Experts in practical analysis techniques and hazardous waste and the slow development of measures for waste disposal.

(3) Impact

Improvements were found in the area of environmental public administration. Some outputs of the project were reflected in the administrative level discussions at the Exploratory Committee on the formulation of official standards. However, it is often difficult to carry out specific environmental protection activities in the short-term for the government, local governments and public enterprises. More time is needed for CENICA to establish concrete environmental measures, which would demonstrate the impact of the support.

(4) Relevance

This project was implemented in accordance with the Six-Year National Environment Plan. The significance of the project has not been modified, thus the relevance of the project is deemed to be high.



An expert lectures counterparts in a laboratory

(5) Sustainability

Institutional sustainability is considered to be high since it is expected that CENICA will be promoted to the level of department in the Ministry for the Environment, Natural Resources and Fisheries. Furthermore, allocation of the budget will also be more secure subsequent to the promotion, and thus CENICA is expected to become financially sustainable. While the basic technical capability of CENICA was established, the level of technology is still not high enough for CENICA to become a leading institution at the time of the evaluation.

6. Lessons Learned and Recommendations

(1) Lessons Learned

It is effective to carry out a project in phases when the pre-conditions for the implementation of the cooperation are not met yet but early project start is needed. When the Phase II cooperation is formulated it is necessary to establish clear targets and indicators in order to define goals precisely and monitor the progress of achieving goals.

In projects aiming at capacity building and strengthening of research institutions, it is important that new knowledge and skills are applied through research to problem-solving in the real world. For this purpose, it is necessary to strengthen the partnership among the various sectors, such as research, experiment, training, and information dissemination, and to ensure that practical skills and techniques are gained through the project.

(2) Recommendations

An extension of the project was recommended for further enhancement of the organizational structure, clarification of the operation plan, and improvement of the research capacity of CENICA.

7. Follow-up Situation

Following the above-mentioned recommendation, a two-year Follow-up cooperation ending 30 June 2001 was implemented.