

Terminal Evaluation

Latin America and the Caribbean

1. Outline of the Project

Country:

Mexico

Project title:

Technical Cooperation for the Refinery Safety Training Center

Issue/Sector:

Mining/Environment

Cooperation scheme:

Project-type Technical Cooperation

Division in charge:

Second Technical Cooperation Division,
Mining and Industrial Development Cooperation
Department

Total cost:

916 Million Yen

**Period of
Cooperation**

1 December 1996 - 30
November 2001

Partner Country's Implementing Organization:

Petróleos Mexicanos (PEMEX)

Supporting Organization in Japan:

Petroleum Refining and Reserve Division, Agency for Natural resources
and Energy, Ministry of Economy, Trade and Industry
Petroleum Association of Japan

Related Cooperation:

"Engineering and Industrial Development Center for Small and Medium Scale Industries at Queretaro State(CIDESI)Project"

1-1 Background of the Project

The petroleum industry plays an important role in Mexico, as the income of publicly owned Petróleos Mexicanos (PEMEX) accounted for 30 percent of all public-sector income, which is 7 percent of the GNP, through the 1990's. Therefore, the petroleum industry has long been helping an important position in the national economy. However, although training on accident prevention had been conducted, the number of accidents at PEMEX refineries was much higher than that of the developed countries. Because the improvement of the safety level of the PEMEX refineries would affect all of the national economy, it was considered to have especially high importance. Based on this background, the government of Mexico requested Project-type technical Cooperation from the government of Japan for the purpose of establishing refinery safety training center and providing technical transfer on safety management including daily maintenance.

1-2 Project Overview

To improve safety measures at the Salamanca Refinery of PEMEX, the Project conducted cooperation on implementing training courses at the Safety Training Center for the employees, on-site instruction, and establishing a safety organization, system and regulations.

(1) Overall Goal

Productivity of Salamanca Refinery is improved.

(2) Project Purpose

Level of safety at the Salamanca Refinery is improved.

(3) Outputs

- 1) The organization and management system of the Project is established.
- 2) Employees acquire knowledge of safety.

- 3) Work behavior is improved.
- 4) All employees have the ability to take preventive measures by analyzing potential hazards at the workplace.
- 5) Employees observe procedures and regulations.
- 6) Recognition of the unsafe conditions is improved.
- 7) Safety information is utilized in each section.
- 8) A safety activity plan is implemented in each section.

(4)Input

Japanese side:

Long-term Experts	12	Equipment	89 Million Yen
Short-term Experts	8		
Trainees received	26		

Mexican side:

Counterparts	26		
Local Cost	191 Million US\$ (254 Million Yen)		

2. Evaluation Team

Members of Evaluation Team

Team Leader/General: Masaaki KATO, Director, Second Technical Cooperation Division, Mining and Industrial Development Cooperation Department, JICA
 Technical Cooperation Planning: Yoshinobu NAKAMURA, Deputy Director, Petroleum Refining and reserve Division, Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry
 Safety Management: Eiji KITAHARA, Chiyoda Corporation
 Evaluation Management: Motoo TAKI, Staff, Second Technical Cooperation Division, Mining and Industrial Development Cooperation Department, JICA
 Evaluation Analysis: Wataru TAKADA, CRC Overseas Cooperation Inc.

Period of Evaluation	17 June 2001 - 29 June 2001	Type of Evaluation:	Terminal Evaluation
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3. Results of Evaluation

3-1 Summary of Evaluation Results

(1) Relevance

The improvement of safety in the refinery is an important step toward improvement of productivity. Decreasing the number of plants shutdown caused by human errors will directly connect to the improvement of the productivity. Therefore, the Overall Goal and Project Purpose are in line with the economical strategy of Mexico, which regards the refining of petroleum as important. Furthermore, the project coincides with the needs of PEMEX which aims at improvement of safety improvement at the Salamanca Refinery which is one of the most important refineries in the industry.

(2) Effectiveness

The Safety Inspection Group of the Salamanca Refinery has about 250 line safety management promoters and 20 staff safety management promoters in position. Hence, the safety management system has been established. The Safety Training Center is under the vice-president in charge of production at the PEMEX headquarters, and the Training and various other support activities for an efficient safety program have been established.

On-site Japanese safety management methods such as meetings before starting work, and finger-pointing and calling are practiced everyday, and employee awareness of safety has improved. The number of accidents has decreased, and the record

of zero-accident days and no shutdowns have proved that safety at the Salamanca Refinery has improved. Moreover, evaluation by third parties such as the award presented by the American States Safety Conference, and the improved insurance rating clearly show that the Project Purpose "Improvement of the safety in the Salamanca Refinery", has been achieved.

(3) Efficiency

The Inputs were mostly as planned, and the scheduled outputs have already been attained. The quality, quantity, and timing of the Inputs were adequate. All the activities of the research team, the joint coordinating committee, establishment of a Salamanca Refinery and the Safety Training Center management committee, the support of PEMEX headquarters and the supporting committee in Japan, all contributed to the efficient management of the Project.

(4) Impact

The important impacts of the Project are as follows: The shutdown of plants due to human errors has decreased at the Salamanca Refinery. The working attitude of employees has improved and an increase in productivity is expected. As a result, the success of Salamanca has come to the attention of other refineries, and the staff of the Safety Training Center visits those refineries to train employees. Activities that focused on the community are also taking place. For example, employees have introduced the safety measures taken at work to their family and local residents and have conducted training for neighboring public institutions and education facilities at their request.

(5) Sustainability

As an organization, the Safety Training Center has established its status as a training institution of all refinery systems, and already has sufficient ability to continue its training. Thus, the Salamanca Refinery is for the most part prepared to continue its safety activities.

Financially, continuing support from PEMEX for the activities of the Safety Training Center can be counted on. Therefore, it is evaluated that the sustainability in terms of organization, finance, technique is likely to be secured.

3-2 Factors that promoted realization of effects

(1) Factors concerning the planning

During the Project period, activities progressed mostly as planned. However, there were some unexpected problems. In the beginning, the on-site safety management guidance did not proceed as planned because the cooperation and understanding of middle management were insufficient, and there was some disagreement between the Salamanca Refinery and Safety Training Center concerning authority and responsibility. Each time problems occurred; the experts reviewed the PDM (Project Design Matrix) with counterparts and revised the plan.

(2) Factors concerning the Implementation Process

- 1) Training opportunities in Japan were provided for managers of the Salamanca Refinery as well as for the counterparts. By showing the safety projects implemented in Japan, safety management leadership among the managers was aroused.
- 2) Experts eagerly interacted with managers and promoted on-site activities.
- 3) Managers of PEMEX headquarters and the Salamanca Refinery recognized the importance of the Project and enthusiastically took part in and supported the Project.
- 4) Excellent Counterparts were posted and their turnover rate was low.
- 5) In addition to the 240 safety management promoters of each line, another 20 full-time staff safety management promoters were placed. Thus, Japanese style safety activities were promoted.
- 6) A management committee was established comprising the Salamanca Refinery, Safety Training Center, and the experts. This promoted the dissemination of the technical transfer on-site.
- 7) The PDM worked effectively as a Project operational tool.

3-3 Factors that impeded realization effects

(1) Factors concerning the Planning

N/A

(2) Factors concerning the Implementation Process

The necessity of on-site development as a cooperation activity for safety improvement at the Refinery was recognized. However, as it was introduced only during the second half of the cooperation period, sufficient actions could not take place.

3-4 Conclusion

The Inputs were implemented almost as planned, and the scheduled outputs were obtained. Therefore, the Project Purpose "Safety at the Salamanca Refinery will improve" has been achieved. It is also concluded that the Project effects are sustainable in terms of organization, finance, and technique.

3-5 Recommendations

To ensure the sustainability of the safety activities and Safety Training Center after the cooperation period ends, the efforts mentioned below are necessary.

- 1) The Safety Training Center needs to share the knowledge and know-how among the organizations in order to maintain the transferred techniques. At the same time, it is necessary to institutionalize the methods of allocating human resources in order to keep abreast of new technology and to renew the training courses.
- 2) The Safety Training Center and Salamanca Refinery must take measures to give compelling power to the Center's guidance on the items to be improved in each examined refinery. This is to maintain and improve the promotion functions (enlighten, practically train, plan, support, and counsel) of the safety activities established by the experts.
- 3) The Salamanca Refinery must set up concrete goals for the improvement in its safety program, and set up an implementing unit to achieve the goals.

3-6 Lessons Learned

- 1) The method of Project management using a PDM is effective. Therefore, drawing up the PDM requires carefulness and accuracy. However, when situations occur during the implementation phase that was not anticipated at the starting point, it is necessary to revise the plan promptly.
- 2) The Project was one regarding the concept of "Safety" and the behavioral changes that make safety possible. In terms of transferring the techniques in these kinds of projects, the experts themselves took the lead to show safety activities on-site that contributed greatly to improved understanding and raising awareness on-site. In addition, it was effective to approach the top officials of the organization and urge them to actively take part in and to back up the Project. Due to the above-mentioned efforts, the process of realizing what safety means on-site was brought about, and safety activities were promoted. It is concluded that this Project will become a reference project for the technical transfer of similar type projects in the future.

3-7 Follow-up Situation

- 1) To further strengthen the Salamanca Refinery's safety management system, "5s and TPM" experts were dispatched between 8 April and 6 July of 2002.
- 2) For safety activities to be instituted in Salamanca and other Refineries, Senior Oversea Volunteers were dispatched in April 2002 for two years.