Terminal Evaluation

Latin America and the Caribbean

1. Outline of the Project

Country:
Brazil

Project title:
Quality Improvement of Foundry Technology in Small and Medium Scale Industry

Issue/Sector:
Industry/General

Cooperation scheme:
Project-type Technical Cooperation

Division in charge:
First Technical Cooperation Division, Mining and Industrial Development Study Department

Total cost:
901 million Yen

Period of Cooperation
1 March 1997-28 February 2002

Partner Country's Implementing Organization:
National Service for Industrial Improvement - Minas Gerais Section(SENAI/MG)

Supporting Organization in Japan:
Minister of Economy, Trade and Industry, Manufacturing Industries Bureau, Machine Parts and Tooling Industries Office

Related Cooperation:

1-1 Background of the Project

Brazil has emphasized the improvement of the quality and productivity of its industries. In particular, the foundry industry has suffered losses from low productivity due to a shortage of skilled workers compared with other industrialized nations; hence, the introduction of new production technology has been an urgent issue. The Marcelino Corradi Foundry Technology Center (CETEF) of the National Service for Industrial Improvement - Minas Gerais Section (SENAI/MG) is the only public training institution which aims at fostering technicians in the foundry technology field, in Brazil. The Center places special focus on foundry technology for the small and medium sized enterprises, and aims at providing training and technical support services. However, the facilities are outdated to keep up with the pace of technological innovation.

Under these circumstances, the Government of Brazil requested Japan to provide Project type Technical Cooperation to improve the level of technology at CETEF.

1-2 Project Overview

The project aims at transferring technology in order to improve CETEF's services such as training and technical support programs for small and medium sized foundries in the following fields: Aluminum alloy type foundries, Detailed work foundries, Steel and Special steel foundries, Rasin bonded sands process, and Industrial automation.

(1) Overall Goal

The capacity of the technical staff in small and medium sized foundry enterprises is improved.

(2) Project Purpose

The quality of CETEF's training and support services for the small and medium sized foundries provided is upgraded to a level where can assist those industries to produce products to international standards.

(3) Outputs

1) The management system of the Project is strengthened.
2) Necessary equipment is installed and appropriately maintained.
3) The skill of Counterparts is improved.
4) CETEF's training courses are reinforced and implemented according to plan.
5) To establish a schedule system for support services to small and medium sized industries.

(4) Input

Japanese side:

Long-term Experts	6	Equipment	305 Million Yen
Short-term Experts	35	Local Cost	28 Million Yen
Trainees received	15		

Brazilian Side:

Counterparts	23
Land/Facility/Casting related facility/etc.	
Local Cost	1.478 Million Real (83 Million Yen)

2. Evaluation Team

Members of Evaluation

Leader:Kazuo TANIGAWA, Special Technical Adviser, JICA
Technology Transfer Planning:Eizo MAEDA, Technical Adviser, The Materials Process Technology Center
Evaluation Analysis:Wataru TAKADA, Senior Principal Consultant, Consultant Group CRC Overseas Cooperation Inc.
Cooperation Planning:Takeharu NAKAGAWA, Planning and Financial Cooperation Division, Mining and Industrial Development Cooperation Department, JICA

Period of Evaluation

18 November 2001-6 December 2001

Type of Evaluation:

Terminal Evaluation

3. Results of Evaluation

3-1 Summary of Evaluation Results

(1) Relevance

The Government of Brazil has directed effort toward qualitative improvement in productivity guided by the integrated development program called "Advance Brazil". Therefore, the purpose of the Project corresponds to the national policy.

With regard to the needs of the beneficiaries, the Project selected techniques to be transferred according to the needs of small and medium sized enterprises, which concern productivity improvement to strengthen the competitiveness of as many as 950 out of 1000 companies in the foundry sector, which employ an estimated 43,000 workers. As Japan's foundry technology ranks among the world's most advanced, the relevance for technical cooperation is deemed to be high.

(2) Effectiveness

It is expected that the Project Purpose as well as all of the planned outputs will be achieved by the end of the cooperation period. "Quality evaluation of the products made by the Counterparts on their own" is one of the indicators of the degree to which the Project Purpose has been achieved. According to the indicator, all of the products met the criteria set by counterparts

both in terms of material and quality in the five respective product sectors (excluding industrial automation). Since all products made by counterparts passed these criteria, it can be said that CETEF has acquired the ability to produce products to international standards. Furthermore, through project activities, the counterparts became able to offer training in line with the needs of the small and medium sized foundries. An example can be seen in the improvement of their technical level which was attained through preparation of the public lectures together with experts. Due to the above, an additional 16 short-term training courses have been developed.

(3) Efficiency

The inputs from both sides have been carried out on schedule. In terms of timing, quality, and quantity, the inputs have been efficiently managed and used. The efficiency of the Project was achieved due to the detailed activity plan, which was reviewed and adjusted every time when Expert team was dispatched from JICA. The management of project progress by the Joint Steering Committee, and the advice from the Supporting Committee in Japan also contributed to the efficiency of the Project.

However, if there were not the following problems, more efficient project management would have been possible: 1) recruiting the experts was difficult, 2) the counterparts needed to perform their normal duties aside from newly-added Project responsibilities, 3) more time than expected was needed to repair some machinery, and 4) there was a delay in the purchase of equipment parts during the second half of the project because of procedural trouble.

(4) Impact

Of all the graduates of the CETEF training courses, 58 of the graduates were locally employed, and 422 returned to companies in 12 states which had dispatched them. According to the questionnaire/interview survey, many companies answered that as a result of the technical service of CETEF, the number of inferior products decreased, and quality and productivity increased. The Project is contributing to the steady improvement of the small and medium sized foundries' technology standard.

An analysis made by CETEF indicates that, although no specific change has occurred in the amount of exports, exports of the products of the small and medium sized foundries doubled between 1997 and 2000. Moreover, on average, productivity during the same period rose about 10 percent. The related institutions such as the Brazilian foundry association regard the contributions of the Project is one of the reasons for this achievement.

As a result of a special seminar to invite foreign foundry supporting institutions, a network which connects the foundry supporting institutions of surrounding countries was founded. This can be counted as a positive impact other than achievement of the Overall Goal.

(5) Sustainability

Based on the three points described below, the project effects will be sustained organizationally, financially, and technologically.
1) The turnover rate of the work force in CETEF is low, and the relationship between CETEF and superior institutions/industries /universities is sound. There are no problems concerning their management ability.
2) The budget of the CETEF is provided by SENAI/MG. Its income is stable because continuing support from the superior institutions is promised; CETEF's major source of revenue is contributions by enterprises. Another independent source of revenue for CETEF is the training program developed by the Project and technical support services, accounting for 60 percent of total management costs. For these reasons, although superior institutions need to consider how to fund the burden carried by the Japanese side including the extension activity and machinery maintenance costs, there are only a few points to be concerned about in terms of the sustainability.
3) The training and technical support services developed through the Project have been operated as the general work of CETEF, even after the end of the Project.

3-2 Factors that Promoted the Realization of Effects

(1) Factors concerning the planning

A good balance of theory and practice was achieved in technical transfer, by selecting two or three targets and carrying out transfer through the production of those target products for each sub-sector. This made the practical guidance by CETEF to the companies possible. Also, setting a clear goal was found to be useful for smooth transfer of technology.

(2) Factors concerning the Implementation Process

1) CETEF was already established organization, and it already had a low workforce turnover rate. For this reason, a considerable output was obtained in the limited amount of time.
2) Counterparts understood the state of affairs of Japan, and JICA's structure of technical cooperation because they had participated in the JICA Group Training Program, which contributed to increased Project efficiency.

3-3 Factors that Impeded the Realization of Effects

(1) Factors concerning the planning

Since the sub-sectors that received technology transfer varied, each sub-sector was assigned an expert and counterparts in accordance with their specialties. This made close liaison among the different sub-sectors difficult. This method would have been appropriate to foster experts in each sub-sector. However, for those items which should be common knowledge to all counterparts, such basics as metallurgy, instruction by a method other than by each sector would have been more appropriate.

(2) Factors concerning the implementation process

Recruitment of experts in specific fields was difficult, and this affected the progress of technology transfer. Because the Counterparts needed to perform their original duties assigned before the Project, there were difficult cases in terms of securing enough time for technology transfer. Moreover, the purchase of equipment parts and consumable materials was delayed occasionally owing to the troubles in the business procedures. There were no major difficulties concerning efficiency as a whole. However, if not for these factors, the implementation process would have been all the more efficient.

3-4 Conclusion

The Project, which is aimed at the improvement of the foundry technology in small and medium scale industries of Brazil, was driven by the strong needs of the Brazilian Foundry Industries and the national policy. The Project was carried out effectively and efficiently as a result of adequate inputs from both Japan and Brazil. The Project contributed not only to the improvement in CETEF's technology, but also to an improvement in the product quality of many foundries.

3-5 Recommendations

(1) CETEF should promote the dissemination of transferred technologies among currently employed technical personnel in order to prevent the possible loss of these technologies through the retirement or resignation of personnel. CETEF should also foster activities to develop human resources within the organization.

(2) It is desirable that CETEF maintains and further strengthens the relationship that it has so far developed with other institutions in and outside Brazil through technology interchanges and special seminars. This should be done in a way that each institution will contribute in some way.

(3) In order to effectively use the equipment introduced to CETEF for the training and technical support services, it is necessary to minimize as much as possible the length of the periods during which the equipment is out of operation. Therefore, it is important for CETEF to execute thorough control of consumable materials and daily/periodical preventive maintenance.

(4) CETEF is reinforcing the capacity of laboratories to deal with the increasing tests and analyses by increasing its staff. It is suggested that as a technical service institution, accumulated data should preferably be rearranged by company and examined for better utilization.

3-6 Lessons Learned

The Project covered many technical fields, and the experts and their counterparts were posted for each field in accordance with their specialties. Therefore, it was difficult to form horizontal linkages among the different technical fields. There should be other ways of pursuing technology transfer for common themes required in all fields.

3-7 Follow-up Situation

N/A