"Project Formulation Survey"
under the Governmental Commission
on the Projects for ODA Overseas
Economic Cooperation in FY2013

Summary Report

Republic of Indonesia

Feasibility Study for the Project for Implementing Japanese Inspection and Maintenance Methodology for the Industrial Infrastructure in Indonesia

March 2014

Joint Venture of Chugai Technos Corporation
and Deloitte Touche Tohmatsu LLC

The content of this report is a summary of the project formulation survey, which was commissioned by the Ministry of Foreign Affairs of Japan in the FY 2013 and is carried out by the consortium of Chugai Technos Corporation and Deloitte Touche Tohmatsu, LLC. It does not represent the official view of the Ministry of Foreign Affairs.

Introduction

This is a feasibility study for the project for implementing Japanese inspection and maintenance methodology for the industrial infrastructure in Indonesia. The main purpose of this study is to present the current situation and problems from the inspection of pipes used in various manufacturing factories and to design Official Development Assistance (ODA) project by utilizing Small and Medium-sized Enterprise (SME)'s excellent products and techniques.

Chapter 1 Description of the current situation and development needs of the concerned development issues in the surveyed country

The Republic of Indonesia has invested a lot of money since the 1970s to develop the infrastructure. The Masterplan for Acceleration and Expansion of Indonesia's Economic Development (MP3EI) shows Indonesia will continue to invest in their infrastructure. At the same time, the infrastructure that was constructed in the 1990s needs retrofitting and rehabilitation. Now is a good time to emphasize the importance of maintenance.

Pipes, which are used and seen in water related services, oil and gas pipelines, various manufacturing factories, etc., make up an important part of the industrial infrastructure. In this feasibility study, the proposed company ("Company") targets oil refineries and petrochemical sector where the technology we propose, the Scale Checker, is often used. For example, PT Pertamina, a state-owned company, occupies the majority of the Indonesian refinery sector. The Cilegon area on Java Island has concentration of many petrochemical companies including Japanese investments.

According to the interview survey the Company conducted, pipes are inspected mainly by outsourcing to inspection services companies. Most of them are members of APITINDO, an association of local inspection companies. There are 137 members, which include among others the state-owned company, SUCOFINDO, and a non-destructive inspection leader, Radiant UTAMA. They are both principal members.

The Company's interview survey identified lower level of inspection technology and less recognition for preventive maintenance, which should be in place for daily plant operations even if there has been no history of problems in Indonesia.

Chapter 2 Possible applicability of the SME's products and technologies, and prospects for future business development

The target company's technology and equipment in the feasibility study are non-destructive inspection technology and the Scale Checker, which can inspect inside the pipe without disrupting the flow of operations. The Scale Checker uses low-levels of radiation that are harmless to the human body. This is a product that was developed by the Company.

The Company in question has 60 years of experience in the measurement and analysis business and is trying to develop overseas markets. Indonesia has a prospective inspection business market that will grow as the needs for infrastructure rehabilitation increases. The Company recognizes this as a chance to contribute its technology, share its experience in the development of the Indonesian economy and establish a WIN-WIN business relationship with the Indonesian business community.

The Company plans to sell the Scale Checker and non-destructive inspection services, targeting Indonesian inspection companies and oil refineries and petrochemical plants. The Scale Checker will be delivered through a local agent and non-destructive inspection services will be provided by a joint-team between the Company and a local inspection firm or by a local office that the Company may consider establishing in the future.

Challenges for developing the business in Indonesia are regulations for treatment of radiation sources, and regulations that are imposed on foreign companies looking to establish a local office.. An even larger challenge is how to improve the understanding of preventive maintenance among local plants and develop the non-destructive inspection market. The Company plans to overcome the situation by working with SUCOFINDO, the largest inspection company in Indonesia, and transferring technology.

The Company also plans to gradually grow the business by adding more service lines, targeting new clients and expanding into new areas in Indonesia. Furthermore, it is considering to establish a local office depending on the market needs in Indonesia.

Chapter 3 Verification of adaptability of the SME's products and technologies to the surveyed country (Demonstration and pilot survey)

The Company held two demonstrations and a seminar for local inspectors and relevant stakeholders in the Project Formulation Survey. The Company also participated in a trade fair in Jakarta to introduce the Scale Checker and establish relationship with local inspectors and relevant stakeholders for developing an ODA project.

BATAN (Badan Tenaga Nuklir Nasional) is an authority that regulates, researches and develops nuclear energy. As the Scale Checker uses low level radiation (Cs137), the Company performed a demonstration for BATAN officials by borrowing the radiation source BATAN had. While some officials showed their interest in introducing this new equipment, others did not understand the effectiveness of the inspection using the Scale Checker. They might not have recognized the importance of preventive maintenance. Some of their questions implied that preventive maintenance was not so generally recognised among local people..

The Company conducted the demonstration at the Indonesia's Ministry of Industry. Without the radiation source, the demonstration focused on explanation of the function and application of measured data. The officials enthusiastically discussed with the Company and showed interest in the equipment.

The Company also held a seminar with the purpose of promoting non-destructive inspection and preventive maintenance and establishing closer relationship with stakeholder in terms of ODA project development. Participants included ministries, governmental organizations, industry trade groups, inspection companies, petrochemical companies, etc. The seminar had an energetic atmosphere with participants asking practical questions regarding the applications of the Scale Checker.

Further, the Company joined the Indonesia-Japan Expo 2013, which was hosted by the Indonesia-Japan Friendship Society and the Indonesia Editor's Society, and introduced the Scale Checker and other inspection equipment and services. During the four day period, 520 visitors asked questions regarding the Scale Checker. Some visitors from the oil and gas sector suggested future orders will be made when they inspect leakage around oil tanks.

Chapter 4 Expected development impact and effect on business development of the proposing SME in the surveyed country through proposed ODA projects

The introduction of the Scale Checker to the Republic of Indonesia will improve the quality of inspection, foster preventive maintenance and result in improving productivity and preventing accidents at the plants.

For a long time, the Company has accumulated experience in the measurement and analysis business and has been trying to develop overseas markets. However, the challenge is that there is less recognition for the Scale Checker and preventive maintenance. Promoting preventive maintenance by the Company alone requires a

huge amount of hard work over a long period of time that a single private company typically cannot do without receiving support or providing economic incentives.

ODA project development will mean the following support and advantages:

- ✓ Prepare for certain business conditions in advance in order to sustain the local business for years to come by not only providing the equipment but also transferring technology and know-how.
- ✓ Increase credibility and recognition of the Scale Checker and other tools and services;
- ✓ Develop the market by standardizing the equipment and technology in Indonesia;
- ✓ Reinforce relationship and network with important clients and stakeholders;
- ✓ Become familiar with local legal requirements to establish a local office and business customs and access to necessary information to launch the local business;

Chapter 5 Proposals for formulating ODA projects

Through the Project Formulation Survey, the Company confirmed the needs for: the advanced inspection equipment and Japan's sophisticated inspection technology. In response to its current needs, the Company proposes an ODA project under the Pilot survey for disseminating SME's technologies scheme.

There is a tentatively proposed ODA project named the "Project for improving inspection technology in industrial infrastructure". The project will support the quality improvement efforts of the non-destructive inspection that will be provided to the oil refinery and petrochemical sectors in the Republic of Indonesia to help prevent accidents and malpractices and promote preventive maintenance in plants.

It will be a three year project, including a few pilot plants to monitor progress and the effects of improving the quality of inspections and preventive maintenance. The targeted group will be non-destructive inspection companies and the counterpart will be PT. SUCOFINDO, the largest general inspection company in Indonesia.

Planned activities are as follows:

- ✓ The Japanese government donates the Scale Checker to SUCOFINDO;
- ✓ The Company teaches how to use the Scale Checker to the counterpart;
- ✓ The Company teaches sophisticated non-destructive inspection techniques with the Scale Checker to the counterpart;
- ✓ The counterpart is sent to Japan as technical trainees and learn Japan's sophisticated inspection techniques, including non-destructive inspections

using the Scale Checker.
The Company, consultants and counterpart conduct a survey on the quality of non-destructive inspection services and client satisfaction in pilot plants.

- ✓ The counterpart prepares a manual or case book on how to use the Scale Checker for local inspectors (excepting the counterpart's) and the Company holds technical workshops with support of the counterpart.
- ✓ The Company and consultants hold demonstrations and seminars on non-destructive inspections using the Scale Checker for plant owners and operators;

Outputs to be expected are as follows:

- ✓ Local inspectors who can provide non-destructive inspections with the Scale Checker are fostered;
- ✓ High-quality non-destructive inspections using the Scale Checker are provided to pilot plants;
- ✓ Based on suggestions and resolutions provided by inspectors, the pilot plants conduct renewal or maintenance of installations and equipment;
- ✓ Pilot plants improve their recognition on preventive maintenance;
- ✓ Non-destructive inspections using the Scale Checker are recognized and widely adopted among the pilot plants;
- ✓ Local inspectors participating in workshops improve inspection technique;
- ✓ Participants from plants in demonstrations and seminars recognize importance of preventive maintenance.

Necessary inputs are as follows:

Japanese side

- 2 Scale Checkers
- 6-8 technical experts (e.g. 2-4 Scale Checker and non-destructive inspector, 1 maintenance for installation, 1 preventive maintenance and 2 customer satisfaction and quality management)
- 1 interpreter (Indonesian - Japanese)

Indonesian side

- 5 inspectors (counterparts)
- A few pilot plants

Type（Project Formulation Survey）
【Republic of Indonesia】Feasibility Study for the Project for Implementing Japanese Inspection and Maintenance Methodology for the Industrial Infrastructure in Indonesia

SMEs and Counterpart Organization

- Name of SME: Chugai Technos Corporation
- Location of SME: Hiroshima, Japan
- Survey Site・Counterpart Organization: Jakarta, Republic of Indonesia / Sucofindo

Concerned Development Issues

➢Unawareness and immaturity of maintenance to the piping infrastructure of refineries and petrochemical plants

- ✓ Since maintenance practice is not so disseminated, when broken down, facilities will be replaced by new ones.
- ✓ Taking the loss caused by discontinued operations into consideration, the cost of replacing the facility would exceed the cost of maintenance.
- ✓ In the near future, aging of facilities will be a serious issue.

Products and Technologies of SMEs

➢ **Scale Checker**

- ✓ Scale checker is an inspection tool which allows inspectors to examine the inside of pipes from outside by transmitting very low level radiation.
- ✓ Measure the scale inside pipes from the outside without stopping plant operations.
- ✓ Offer high quality images to assess the safety of the pipes without transmitting high doses of radiation

Proposed ODA Projects and Expected Impact

- ➢ In the Pilot survey for disseminating SME's technologies programs , Scale Checkers are provided to a state-owned inspection company and its employees will learn not only how to use them, but also planning effective inspection programs and effective reporting skills through training in pilot plants under technical experts.
- ➢ As a result, learning of non-destructive inspection techniques and permeation of preventive maintenance can be expected.

Future Business Development of SMEs

- ➢ Enhance the sales channel of Scale Checkers in Indonesia, especially to the upstream market
- ➢ Development of non-destructive testing business